清华物流学系列英文版教材



运营与供应链管理

Introduction to Operations and

导论

Supply Chain Management

(美) Cecil C. Bozarth 著Robert B. Handfield





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由于原作者所处国家的政治、经济和文化背景等与我国不同,对书中所持观点,敬请广大读者在阅读过程中注意加以分析和鉴别。

我们期望这套影印书的出版对我国经济科学的发展能有所帮助,对我国经济管理 专业的教学能有所促进。

欢迎广大读者给我们提出宝贵的意见和建议;同时也欢迎有关的专业人士向我们推荐您所接触到的国外优秀图书。

清华大学出版社 2007.12 世纪之交,中国与世界的发展呈现最显著的两大趋势——以网络为代表的信息技术的 突飞猛进,以及经济全球化的激烈挑战。无论是无远弗界的因特网,还是日益密切的政治、经济、文化等方面的国际合作,都标示着 21 世纪的中国是一个更加开放的中国,也面临着一个更加开放的世界。

教育,特别是管理教育总是扮演着学习与合作的先行者的角色。改革开放以来,尤其是 20 世纪 90 年代之后,为了探寻中国国情与国际上一切优秀的管理教育思想、方法和手段的完美结合,为了更好地培养高层次的"面向国际市场竞争、具备国际经营头脑"的管理者,我国的教育机构与美国、欧洲、澳洲以及亚洲一些国家和地区的大量的著名管理学院和顶尖跨国企业建立了长期密切的合作关系。以清华大学经济管理学院为例,2000 年,学院顾问委员会成立,并于 10 月举行了第一次会议,2001 年 4 月又举行了第二次会议。这个顾问委员会包括了世界上最大的一些跨国公司和中国几家顶尖企业的最高领导人,其阵容之大、层次之高,超过了世界上任何一所商学院。在这样高层次、多样化、重实效的管理教育国际合作中,教师和学生与国外的交流机会大幅度增加,越来越深刻地融入到全球性的教育、文化和思想观念的时代变革中,我们的管理教育工作者和经济管理学习者,更加真切地体验到这个世界正发生着深刻的变化,也更主动地探寻和把握着世界经济发展和跨国企业运作的脉搏。

我国管理教育的发展,闭关锁国、闭门造车是绝对不行的,必须同国际接轨,按照国际一流的水准来要求自己。正如朱镕基同志在清华大学经济管理学院成立十周年时所发的贺信中指出的那样:"建设有中国特色的社会主义,需要一大批掌握市场经济的一般规律,熟悉其运行规则,而又了解中国企业实情的经济管理人才。清华大学经济管理学院就要敢于借鉴、引进世界上一切优秀的经济管理学院的教学内容、方法和手段,结合中国的国情,办成世界第一流的经管学院。"作为达到世界一流的一个重要基础,朱镕基同志多次建议清华的MBA教育要加强英语教学。我体会,这不仅因为英语是当今世界交往中重要的语言工具,是连接中国与世界的

重要桥梁和媒介,而且更是中国经济管理人才参与国际竞争,加强国际合作,实现中国企业的国际战略的基石。推动和实行英文教学并不是目的,真正的目的在于培养学生——这些未来的企业家——能够具备同国际竞争对手、合作伙伴沟通和对抗的能力。按照这一要求,清华大学经济管理学院正在不断推动英语教学的步伐,使得英语不仅是一门需要学习的核心课程,而且渗透到各门专业课程的学习当中。

课堂讲授之外,课前课后的大量英文原版著作、案例的阅读对于提高学生的英文水平也是非常关键的。这不仅是积累相当的专业词汇的重要手段,而且是对学习者思维方式的有效训练。

我们知道,就阅读而言,学习和借鉴国外先进的管理经验和掌握经济理论动态,或是阅读翻译作品,或是阅读原著。前者属于间接阅读,后者属于直接阅读。直接阅读取决于读者的外文阅读能力,有较高外语水平的读者当然喜欢直接阅读原著,这样不仅可以避免因译者的疏忽或水平所限而造成的纰漏,同时也可以尽享原作者思想的真实表达。而对于那些有一定外语基础,但又不能完全独立阅读国外原著的读者来说,外文的阅读能力是需要加强培养和训练的,尤其是专业外语的阅读能力更是如此。如果一个人永远不接触专业外版图书,他在获得国外学术信息方面就永远会比别人差半年甚至一年的时间,他就会在无形中减弱自己的竞争能力。因此,我们认为,有一定外语基础的读者,都应该尝试一下阅读外文原版,只要努力并坚持,就一定能过了这道关,到那时就能体验到直接阅读的妙处了。

在掌握大量术语的同时,我们更看重读者在阅读英文原版著作时对于西方管理者或研究者的思维方式的学习和体会。我认为,原汁原味的世界级大师富有特色的表达方式背后,反映了思维习惯,反映了思想精髓,反映了文化特征,也反映了战略偏好。知己知彼,对于跨文化的管理思想、方法的学习,一定要熟悉这些思想、方法所孕育、成长的文化土壤,这样,有朝一日才能真正"具备国际战略头脑"。

以往,普通读者购买和阅读英文原版还有一个书价的障碍。一本外版书少则几十美元,多则上百美元,一般读者只能望书兴叹。随着全球经济合作步伐的加快,目前在出版行业有了一种新的合作出版的方式,即外文影印版,其价格几乎与国内同类图书持平。这样一来,读者可以不必再为书价发愁。清华大学出版社这些年在这方面一直以独特的优势领先于同行。早在1997年,清华大学出版社敢为人先,在国内最早推出一批优秀商学英文版教材,规模宏大,在企业界和管理教育界引起不小的轰动,更使国内莘莘学子受益良多。

为了配合清华大学经济管理学院推动英文授课的急需,也为了向全国更多的 MBA 试点院

校和更多的经济管理学院的教师和学生提供学习上的支持,清华大学出版社再次隆重推出与世界著名出版集团合作的英文原版影印商学教科书,也使广大工商界人士、经济管理类学生享用到最新最好质优价廉的国际教材。

祝愿我国的管理教育事业在社会各界的大力支持和关心下不断发展、日进日新;祝愿我国的经济建设在不断涌现的大批高层次的面向国际市场竞争、具备国际经营头脑的管理者的勉力经营下早日中兴。

社 化 时 教授 清华大学经济管理学院

ABOUT THE AUTHORS



Professor Cecil Bozarth is an Associate Professor at the College of Management at N.C. State University where he has received awards for teaching excellence at both the undergraduate and graduate levels. He is a former chair of the Operations Management Division of the Academy of Management, and in 1999 was recognized by APICS as a subject matter expert (SME) in the area of supply chain management. His particular areas of interest are operations and supply chain strategy and supply chain information systems. Cecil's consulting experience cuts across a wide range of industries, including such companies as ABB, Bayer Biological Products, Daimler-Benz, John Deere, Duke Energy, Ford Motor Company, GKN, IBM, GlaxoSmithKline, Longistics, Milliken, Progress Energy, Sonoco, and others. Cecil is an Associate Editor for the Journal of Operations Management and has also served as a guest editor for the Academy of Management Journal, as well as the Journal of Operations Management.



Professor Robert Handfield is the Bank of America Professor and a Distinguished University Professor at N.C. State University. Rob has extensive consulting experience with companies such as American Airlines, Duke Energy, Bank of America, Federal Express, General Motors, BMW, Steelcase, Herman Miller, Honda of America, Johnson Controls, Bechtel, GlaxoSmithKline, John Deere, ChevronTexaco, Shell, British Petroleum, Union Pacific, Milliken, and others, and is a world-renowned expert in the area of Purchasing and Logistics. Rob is the Editor-in-Chief of the Journal of Operations Management and has written several books on SCM topics, including Introduction to Supply Chain Management (Prentice Hall, with Ernest L. Nichols; translated into Japanese, Korean, Chinese, and Indonesian), Supply Chain Redesign (Prentice Hall Financial Times), and Purchasing and Supply Chain Management, 3rd edition (South-Western College Publishing, with Robert M. Monczka and Robert J. Trent).

PREFACE

The rules of business have changed. In today's environment, new products are launched and businesses are born every day. Customers are increasingly difficult to keep and costly to replace. Companies face intense competition from traditional powerhouses and new players and must continue to find new revenue opportunities and increase efficiencies.

In addition, "virtual corporations" now outsource a wide range of functions such as design, manufacturing, and distribution so they can focus on their core competencies. Much of this outsourcing is being diverted to low cost countries, such as China, India, and countries in Eastern Europe.

Is this the end of U.S. operations management? No—we believe it is only the beginning of a new era—the era of operations and supply chain management.

OUR VISION

This is the first text written for the introductory course in operations management that provides an integrated and comprehensive treatment of both operations and supply chain management. It is unique because it provides substantial coverage of the major operations management (OM) topics and tools, and it extends the coverage to include core supply chain management (SCM) issues. Our goal is for students to understand that in order to succeed, companies must integrate SCM issues into every facet of their business. We include two chapters not included in other introductory OM texts to emphasize the important role played by the purchasing process and the factors affecting sourcing decisions and logistics in the total operations and supply chain management picture (Chapter 10, "Sourcing Decisions and Purchasing," and Chapter 11, "Logistics").

In addition, SCM themes such as outsourcing, global channel management, new product development, and business process improvement are woven into the fabric of every chapter that covers "traditional" OM topics. We explore how things have changed—and introduce students to concepts that they need to consider in the future that may impact what they do in the workplace. Most important, we emphasize the fact that operations and supply chain management is an exciting career opportunity!

When we set out to write this text, many of our colleagues told us that they:

- Were under pressure to cover OM and SCM in a single overview course.
- Wanted to provide potential majors with a clearer idea of what advanced SCM courses would cover.
- Believed current textbooks were outdated and spent too much time covering tools and techniques not relevant to operations and supply chain managers.

We wrote this book to address these needs. Our years of experience in teaching, industry, and consulting tell us that:

- The integration of operations and supply chain management is critical to business success. While a strong internal operations function is vital to a firm's survival, it is not sufficient. Firms must also understand how to link with their supply chain partners.
- Employers are demanding more qualified candidates. With the increased focus on outsourcing, there is a shortage of people to manage suppliers and distributors, and businesses are seeking students with knowledge in logistics, purchasing, and relationship management.

Adopting a supply chain perspective allows us to extend our understanding of services' role in the economy. Like other books in the area, we have included numerous service examples throughout. But we take it a step further. Because the supply chain perspective is integrated throughout, we can cover real-world service issues that fall outside of the scope of traditional books.

Coverage of Analytical Tools and Techniques

Even with the extended focus on SCM, the book does not overlook the important role of analytical tools and techniques. We polled professors who teach operations in many different environments across the country to ensure we covered the most popular tools and techniques they use in their introductory OM course. In fact, these subjects are covered in a way that is both comprehensive and integrated throughout the text. The key tools developed in the text are the ones most frequently mentioned by professors and represent a fundamental "toolkit" that can be applied in any manufacturing or service environment. Highlights of the coverage are as follows:

- The book contains **comprehensive coverage** of the tools and techniques in the traditional OM areas (quality, capacity, queuing, forecasting, inventory, planning and control, and project management), as well as the purchasing and logistics areas.
- Tools and techniques are always introduced within the context of the OM and SCM issues at hand—not in separate chapters or supplements. For example, a capacity analysis toolkit is woven into a discussion of sales and operations planning across the supply chain and not treated separately.
- Throughout the book, students are shown how tools and techniques can be applied using **Microsoft Excel spreadsheets**. Learning is reinforced through homework problems that provide the students with a template and hints for checking their answers.
- Optimization modeling is discussed and illustrated at two points in the book. Specifically, students are shown in a step-by-step fashion how to develop and solve the assignment problem (Chapter 11) and the sales and operations problem (Chapter 12) using Excel's Solver function. Learning is reinforced through homework problems that provide the students with a template and hints for checking their logic.
- Instructors can generate additional, **customized homework problems** using the Excel templates available on the book's Web site. This is ideal for professors teaching large sections of an Introductory Operations/Supply Chain course, where customized cases can be problematic. With these homework problems, professors have an extra measure to guard against plagiarism in homework assignments.
- Because the book uses Microsoft Excel, students will not need to purchase or be trained in specialized software. Student costs are limited to the textbook, with additional materials, cases, and homework assignments available for electronic distribution at the professor's discretion.

Tools and Techniques Integrated Throughout

TOOLS AND TECHNIQUES	SOLVED EXAMPLES	HOMEWORK PROBLEMS	EXCEL EXAMPLES/ PROBLEMS
Chapter 2: Operations and Supply Chain Strategies			
Value index	X	X	X
Chapter 3: Business Processes			
Relationship mapping	X		
Process mapping	X	, X	Andrew Property
Performance measures (productivity, efficiency, cycle time, percent value-added time)	X	X	
Chapter 4: Managing Quality			
Continuous improvement tools (root cause analysis, scatter plots, check sheets, Pareto charts)	X	X	
Cause and effect diagrams	X		
Process capability ratio	X	X	
Process capability index	X	x	
Six sigma quality	X	X	
\overline{X} and R charts	X	x	X
p charts .	X	X	X
Acceptance sampling	X		
Chapter 5: Managing Projects			
Gantt charts	X	X	
Activity on node (AON) diagrams and critical path method (CPM)	X	X	Microsoft project example
Project crashing	X	X	
Chapter 6: Developing Products and Services			
Quality function deployment (QFD)	X		
Chapter 7: Process Choice and Layout Decisions in Manufac	turing and Ser	vices	
Line balancing	X	X	
Assigning department locations	X	X	
Chapter 8: Managing Capacity			
Expected value analysis	X	X	X
Decision trees	X	X	
Break-even analysis	X	·x	X
Indifference point	X	x	X
Theory of constraints	x		

TOOLS AND TECHNIQUES	SOLVED EXAMPLES	HOMEWORK PROBLEMS	EXCEL EXAMPLES, PROBLEMS
Waiting lines (queuing analysis)	X	X	
Learning curves	X	X	
Chapter 9: Forecasting			
Moving average model	X	X	X
Exponential smoothing model	X	X	X
Adjusted exponential smoothing model	X	X	X
Linear regression	X	X	X
Seasonal adjustments	X	X	X
Multiple regression	X	X	X
MAD, MFE, and tracking signal	X	X	X
Chapter 10: Sourcing Decisions and the Purchasing Pro	cess		
Profit leverage	X	X	
Total cost analysis	X	X	
Analytic hierarchy process	X	X	X
Weighted-point evaluation system	X	X	X
Chapter 11: Logistics			
Shipment consolidation	X	X	X
Perfect order calculation	X	X	
Landed costs	X	X	
Weighted center of gravity model	X	X	X
Optimization modeling (assignment problem using Excel Solver function)	x	X	x
Chapter 12: Sales and Operations Planning (Aggregate I	Planning)		
Top-down sales and operations planning	X	X	X
Bottom-up sales and operations planning	X	X	
Cash flow analysis	X	X	
Load profiles	X	X	
Optimization modeling (top-down sales and operations planning using Excel Solver function)	x	x	X
Chapter 13: Managing Inventory throughout the Supply	Chain		
Periodic review systems	X	X	
Economic order quantity	X	X	X
Reorder points and safety stock	x	X	X
Quantity discounts	X	х	

TOOLS AND TECHNIQUES	SOLVED EXAMPLES	HOMEWORK PROBLEMS	EXCEL EXAMPLES/ PROBLEMS
Single period inventory systems (newsboy problem)	X	X	
Pooling safety stock	X	X·	X
Chapter 14: Managing Production across the Supply Ch	ain		
Master scheduling	X	X	
Material requirements planning (MRP)	x	X	
Job sequencing rules	X	X	
Distribution requirements planning (DRP)	X	X	
Chapter 15: JIT/Lean Production			
Kanban sizing	X	X	
Linking MRP and kanban	X	X	

Taking the Coverage of Services in New Directions

Nowadays, an OM text must provide balanced coverage of manufacturing and service businesses, and this text is no exception. It includes numerous services examples throughout, including those in the chapters covering strategy, process choice, quality management, and inventory.

But we take this a step further. Because the supply chain perspective is integrated throughout, we can cover real-world service issues that fall outside the scope of traditional books. For example:

- Developing logistics as a source of core competency at the Lowe's (Chapters 2 and 10)
- Implementing a business-to-business (B2B) e-marketplace to manage purchasing in scientific and research firms (Chapter 16)
- Analyzing the insourcing/outsourcing decision for the help desk function at an Internet service provider (Chapter 9)
- Mapping and analyzing information flows at a distribution center (Chapters 3 and 16)
- Putting in place consolidated warehousing and hub-and-spoke systems at logistics services providers
- Analyzing shipping capacity options at a seafood wholesaler (Chapter 8)

SUPPLEMENTS

Test Item File was written by Geoff Willis, University of Central Oklahoma. It contains approximately fifteen true/false, fifteen multiple-choice, ten fill-in-the-blank, and five essay questions per chapter.

TestGen (on IRC on CD) TestGen is a test generator program that lets you view and edit testbank questions, transfer them to tests, and print tests in a variety of formats. The program also offers many options for organizing and displaying testbanks and tests. A built-in random number and text generator makes it ideal for creating multiple versions of tests that involve math calculations and provides more possible test items than testbank questions. Powerful search and sort functions let you easily locate questions and arrange them in the order you prefer. Refer to the read me file TestGen\Readme.txt for further information about initial installation of TestGen. You may also find information about TestGen and updates to the software on the Internet at http://www.prenhall.com/testgen.

Instructor's Solutions Manual Created by Don Knox of Wayland Baptist University, it contains worked-out solutions for all exercises and problems in the text.

IRC on CD contains Instructor's Solutions Manual in both Word and PDF formats, Test Item Files in Word, TestGen, TIF conversion files for BlackBoard and WebCT, and PowerPoint presentation files.

Companion Web site See www.prenhall.com/bozarth.

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