

教育部高校工商管理类教学指导委员会 双语教学推荐教材

PEARSON



BUSINESS
ADMINISTRATION
CLASSICS

工商管理经典教材·核心课系列

Administration Classics

数据、模

型与决策

(英文版·第4版)

STATISTICS,
DATA ANALYSIS,

AND DECISION
MODELING

(Fourth Edition)

詹姆斯·R·埃文斯 (James R. Evans) 著

中国人民大学出版社

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总 序

随着我国加入 WTO,越来越多的国内企业参与到国际竞争中来,用国际上通用的语言思考、工作、交流的能力也越来越受到重视。这样一种能力也成为我国各类人才参与竞争的一种有效工具。国家教育机构、各类院校以及一些主要的教材出版单位一直在思考,如何顺应这一发展潮流,推动各层次人员通过学习来获取这种能力。双语教学就是这种背景下的一种尝试。

双语教学在我国主要指汉语和国际通用的英语教学。事实上,双语教学在我国教育界已经不是一个陌生的词汇了,以双语教学为主的科研课题也已列入国家“十五”规划的重点课题。但从另一方面来看,双语教学从其诞生的那天起就被包围在人们的赞成与反对声中。如今,依然是有人赞成有人反对,但不论是赞成居多还是反对占上,双语教学的规模和影响都在原有的基础上不断扩大,且呈大发展之势。一些率先进行双语教学的院校在实践中积累了经验,不断加以改进;一些待进入者也在模仿中学习,并静待时机成熟时加入这一行列。由于我国长期缺乏讲第二语言(包括英语)的环境,开展双语教学面临特殊的困难,因此,选用合适的教材就成为双语教学成功与否的一个重要问题。我们认为,双语教学从一开始就应该使用原版的各类学科的教材,而不是由本土教师自编的教材,从而可以避免中国式英语问题,保证语言的原汁原味。各院校除应执行国家颁布的教学大纲和课程标准外,还应根据双语教学的特点和需要,适当调整教学课时的设置,合理选择优秀的、合适的双语教材。

顺应这样一种大的教育发展趋势,中国人民大学出版社同众多国际知名的大出版公司,如麦格劳-希尔出版公司、培生教育出版公司等合作,面向大学本科生层次,遴选了一批国外最优秀的管理类原版教材,涉及专业基础课,人力资源管理、市场营销及国际化管理等专业方向课,并广泛听取有着丰富的双语一线教学经验的教师的建议和意见,对原版教材进行了适当的改编,删减了一些不适合我国国情和不适合教学的内容;另一方面,根据教育部对双语教学教材篇幅合理、定价低的要求,我们更是努力区别于目前市场上形形色色的各类英文版、英文影印版的大部头,将目标受众锁定在大学本科生层次。本套教材尤其突出了以下一些特点:

- 保持英文原版教材的特色。本套双语教材根据国内教学实际需要,对原书进行了一定的改编,主要是删减了一些不适合教学以及不符合我国国情的内容,但在体系结构和内容特色方面都保持了原版教材的风貌。专家们的认真改编和审定,使本套教材既保持了学术上的完整性,又贴近中国实际;既方便教师教学,又方便学生理解和掌握。

- 突出管理类专业教材的实用性。本套教材既强调学术的基础性,又兼顾应用的广泛性;既侧重让学生掌握基本的理论知识、专业术语和专业表达方式,又考虑到教材和管理实践的紧密结合,有助于学生形成专业的思维能力,培养实际的管理技能。

● 体系经过精心组织。本套教材在体系架构上充分考虑到当前我国在本科教育阶段推广双语教学的进度安排,首先针对那些课程内容国际化程度较高的学科进行双语教材开发,在其专业模块内精心选择各专业教材。这种安排既有利于我国教师摸索双语教学的经验,使得双语教学贴近现实教学的需要;也有利于我们收集关于双语教学教材的建议,更好地推出后续的双语教材及教辅材料。

● 篇幅合理,价格相对较低。为适应国内双语教学内容和课时上的实际需要,本套教材进行了一定的删减和改编,使总体篇幅更为合理;而采取低定价,则充分考虑到学生实际的购买能力,从而使本套教材得以真正走近广大读者。

● 提供强大的教学支持。依托国际大出版公司的力量,本套教材为教师提供了配套的教辅材料,如教师手册、PowerPoint 讲义、试题库等,并配有内容极为丰富的网络资源,从而使教学更为便利。

本套教材是在双语教学教材出版方面的一种尝试。我们在选书、改编及出版的过程中得到了国内许多高校的专家、教师的支持和指导,在此深表谢意。同时,为我们后续推出的教材更适于教学,我们也真诚地期待广大读者提出宝贵的意见和建议。需要说明的是,尽管我们在改编的过程中已加以注意,但由于各教材的作者所处的政治、经济和文化背景不同,书中内容仍可能有不妥之处,望读者在阅读时注意比较和甄别。

徐二明

中国人民大学商学院

PREFACE*

INTENDED AUDIENCE

Statistics, Data Analysis, and Decision Modeling was written to meet the need for an introductory text that provides a basic introduction to business statistics and decision models/optimization, focusing on practical applications of data analysis and decision modeling, all presented in a simple and straightforward fashion.

The text consists of 14 chapters in two distinct parts. The first eight chapters deal with statistical and data analysis topics, while the remaining chapters deal with decision models and applications. Thus, the text may be used for:

- MBA or undergraduate business programs that combine topics in business statistics and management science into a single, brief, quantitative methods course.
- Business programs that teach statistics and management science in short, modular courses.
- Executive MBA programs.
- Graduate refresher courses for business statistics and management science.

SUBSTANCE

The danger in using quantitative methods does not generally lie in the inability to perform the requisite calculations, but rather in the lack of a fundamental understanding of why to use a procedure, how to use it correctly, and how to properly interpret results. The principal focus of this text is conceptual understanding using simple and practical examples rather than a plug-and-chug or point-and-click mentality, as are often done in other texts, supplemented by appropriate theory. On the other hand, the text does not attempt to be an encyclopedia of detailed quantitative procedures, but focuses in on useful concepts and tools for today's managers.

To support the presentation of topics in business statistics and decision modeling, this text integrates fundamental theory and practical applications in a spreadsheet environment using *Microsoft Excel 2007* and various spreadsheet add-ins, specifically:

- *PHStat*, a collection of statistical tools that enhance the capabilities of Excel; published by Pearson Education.
- A time limited professional version of *Crystal Ball* (including *CBPredictor* for forecasting and *OptQuest* for optimization), the most popular commercial package for risk analysis.
- *TreePlan*, a decision analysis add-in.
- *SimQuick*, an Excel-based application for process simulation, published by Pearson Education.
- *Premium Solver*, a more powerful version of Excel's Solver.

These tools have been integrated throughout the text to simplify the presentations and implement tools and calculations so that more focus can be placed on interpretation and understanding the managerial implications of results. However, as not to disrupt the flow of the text discussion and distract from conceptual understanding, we have placed boxed "Notes" for Excel, *PHStat*, and other add-ins that provide procedural details of using specific functions, tools, or techniques where appropriate.

* 适应国内双语教学的需要, 影印版删除了原著的第8章“统计质量控制”, 为保留原书概貌, 未对前言作任何删减。有需要了解相关内容的读者可参阅中国人民大学出版社出版的翻译版。

NEW TO THIS EDITION

The fourth edition of this text has been substantially re-written to improve clarity and pedagogical features. Many significant changes have been made in this edition. These changes include the following.

1. Spreadsheet-based tools and applications are now compatible with *Microsoft Excel 2007*, which is used throughout this edition.
2. Every chapter has been carefully revised to improve clarity of the material. Many explanations of critical concepts have been enhanced using new business examples and data sets.
3. Key decision modeling chapters in Part 2 of this book have been significantly revised and reorganized. These are Chapter 9—*Building and Using Decision Models*, Chapter 13—*Linear Optimization*, and Chapter 14—*Integer and Nonlinear Optimization*.
4. Theory and extensive computational formulas have been relegated to end of chapter Appendixes to provide better flexibility for instructors, and not impede learning essential concepts and skills.
5. End-of-chapter material has been enhanced and reorganized to include *Basic Concepts Review Questions* that focus on the understanding of fundamental terms concepts; *Skill-Building Exercises* that facilitate experiential learning and Excel-based skills, and *Problems and Applications*, which provide a wide variety of numerical exercises and practical applications to real and/or realistic data sets or problem scenarios. New cases are introduced in most chapters.

TO THE STUDENTS

The CD-ROM accompanying this text contains all the data and model files used throughout the text in examples, problems, and exercises.* These are also available on the text's Web site, www.pearsonhighered.com/evans. Versions of a variety of software packages, including *PHStat*, *SimQuick*, *Crystal Ball*, and *Premium Solver*, are also available in connection with this text. For complete information on these, please also visit www.pearsonhighered.com/evans.

TO THE INSTRUCTORS

To access instructor solutions files please visit pearsonhighered.com/evans and choose the instructor resources option. A variety of instructor resources are available for instructors who register for our secure environment. The files for each chapter, including PowerPoint presentations, are available for download.

As a registered faculty member, you can login directly to download resource files, and receive immediate access and instructions for installing Course Management content to your campus server.

Need help? Our dedicated Technical Support team is ready to assist instructors with questions about the media supplements that accompany this text. Visit: <http://247.pearsoned.com/> for answers to frequently asked questions and toll-free user support phone numbers.

* 原著配有一张光盘，影印版将光盘内容放在中国人民大学出版社工商管理分社网站（www.rdjg.com.cn）上。

中国人民大学出版社工商管理类英文版教材

序号	中文书名	英文书名	版次	作者	定价(元)	出版年份	ISBN
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(一) 工商管理经典教材·核心课系列(教育部高校工商管理类教学指导委员会双语教学推荐教材)

1	经济学原理	Principles of Economics	9	Karl E. Case	59	2010	978-7-300-12321-9
2	宏观经济学原理	Foundations of Macroeconomics	4	Robin Bade, Michael Parkin	45	2010	978-7-300-12346-2
3	微观经济学原理	Foundations of Microeconomics	4	Robin Bade, Michael Parkin	45	2010	978-7-300-12345-5
4	管理学原理	Foundations of Management	6	Stephen Robbins	45	2010	978-7-300-12320-2
5	组织行为学精要	Essentials of Organizational Behavior	10	Stephen Robbins	39	2011	978-7-300-13498-7
6	组织行为学: 关键概念、技能与最佳实践(注释版)	Organizational Behavior: Key Concepts, Skills & Best Practices	4	Angelo Kinicki Robert Kreitner	49	2011	978-7-300-13349-2
7	组织行为学精要(注释本)	Essentials of Organizational Behavior	7	Stephen Robbins	35	2009	978-7-300-10903-9
8	战略管理	Strategic Management: Concepts and Cases	8	Michael A. Hitt	48	2009	978-7-300-10515-4
9	战略管理	Strategic Management	1	G. Page West III Charles E. Bamford	39	2011	978-7-300-13339-3
10	战略管理精要(注释版)	Essentials of Strategic Management	5	J. David Hunger Thomas L. Wheelen	39	2012	978-7-300-15198-4
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12	人力资源管理	Human Resource Management: Gaining a Competitive Advantage	7	Raymond A. Noe	55	2011	978-7-300-13059-0
13	管理沟通	Management Communication	4	James S. O'Rourke, IV	48	2010	978-7-300-12028-7
14	商务沟通	Lesikar's Business Communication	12	Kathryn Rentz	55	2012	978-7-300-15054-3
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16	管理信息系统	Essentials of Management Information Systems	7	Kenneth C. Laudon	49	2009	978-7-300-10317-4
17	商学精要	Business Essentials	8	Ronald J. Ebert Ricky W. Griffin	39	2010	978-7-300-12176-5
18	公司财务管理	Corporate Financial Management	2	Douglas R. Emery	38	2007	978-7-300-08366-7
19	商业研究方法	Business Research Methods	9	Donald R. Cooper	39	2007	978-7-300-08421-3
20	企业物流与供应链管理	Business Logistics/Supply Chain Management	5	Ronald H. Ballou	45	2008	978-7-300-08490-9
21	运作管理原理	Foundations of Operations Management	1	Larry P. Ritzman	30	2004	7-300-05679-2
22	运作管理	Operations Management	8	Jay Heizer, Barry Render	49	2009	978-7-300-10218-4
23	电子商务导论	Introduction to Electronic Commerce	2	Efraim Turban	49	2010	978-7-300-12166-6
24	基础统计学	Elementary Statistics: Picturing the World	4	Ron Larson, Betsy Farber	49	2010	978-7-300-12525-1

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3	国际金融	International Finance	3	Keith Pilbeam	45	2009	978-7-300-10579-6
4	国际管理	International Management: Text & and Cases	5	Paul W. Beamish	35	2005	7-300-06398-5
5	国际营销	International Marketing	14	Philip R. Cateora	42	2009	978-7-300-10656-4
6	国际商务	International Business	7	Charles W. L. Hill	45	2009	978-7-300-10339-6
7	全球商务	Global Business	1	Mike W. Peng	39.8	2009	978-7-300-11221-3

(三) 工商管理经典教材·市场营销系列(教育部高校工商管理类教学指导委员会双语教学推荐教材)

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2	市场营销学	Marketing: An Introduction	9	Gary Armstrong	49	2010	978-7-300-12306-6
3	市场营销学基础	Basic Marketing: A Marketing Strategy Planning Approach	18	William D. Perreault, Jr. Joseph P. Cannon E. Jerome McCarthy	69	2012	978-7-300-15285-1
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6	网络营销	E-Marketing	5	Judy Strauss	49	2010	978-7-300-12153-6
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9	销售管理	Sales Management	1	John J. Tanner, Jr.	48	2010	978-7-300-12426-1
10	服务营销	Services Marketing	6	Christopher Lovelock	65	2010	978-7-300-12820-7
11	服务营销	Essentials of Services Marketing	1	Christopher Lovelock	55	2011	978-7-300-13399-7
12	营销调研	Marketing Research	6	Alvin C. Burns	55	2011	978-7-300-13337-9
13	现代品牌管理	Managing Brands: A Contemporary Perspective	1	Sylvie Laforet	49	2011	978-7-300-14775-8

(四) 工商管理经典教材·会计与财务系列(教育部高校工商管理类教学指导委员会双语教学推荐教材)

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2	会计学：财务会计分册	Accounting	23	James M. Reeve et al.	52	2010	978-7-300-11799-7
3	会计学：管理会计分册	Accounting	23	James M. Reeve et al.			
4	中级会计学	Intermediate Accounting	12	Donald E. Kieso Jerry J. Weygandt	49	2007	978-7-300-07949-3
5	管理会计	Managerial Accounting	1	Charles T. Horngren et al.	52	2011	978-7-300-14275-3
6	成本与管理会计	Cost Accounting: A Managerial Emphasis	13	Charles T. Horngren	79	2011	978-7-300-13398-0
7	高级会计学	Advanced Accounting	10	Floyd A. Beams			
8	公司理财	Corporate Finance: Core Principles and Applications	1	Stephen A. Ross	36	2007	978-7-300-07902-8
9	公司理财	Corporate Finance	1	Jonathan Berk	52	2009	978-7-300-11041-7
10	财务管理基础	Fundamental of Corporate Finance	6	Richard A. Brealey et al.	65	2011	978-7-300-14408-5
11	财务报表分析	Financial Statement Analysis	10	John J. Wild	48	2010	978-7-300-11402-6
12	财务报表分析与运用	The Analysis and Use of Financial Statements	3	Gerald I. White	38	2007	978-7-300-07948-6
13	审计学：一种整合方法	Auditing and Assurance Services: An Integrated Approach	12	Alvin A. Arens	52	2009	978-7-300-10386-0
14	政府与非营利组织会计	Accounting for Governmental and Nonprofit Entities	15	Earl R. Wilson	52	2011	978-7-300-14785-7
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2	国际人力资源管理	International Human Resource Management	5	Peter J. Dowling	39.8	2010	978-7-300-11222-0
3	心理学与人力资源管理	Applied Psychology in Human Resource Management	7	Wayne F. Cascio	59	2011	978-7-300-14824-3

(六) 工商管理经典教材·运营管理系列(教育部高校工商管理类教学指导委员会双语教学推荐教材)

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2	供应链设计与管理：概念、战略与案例研究	Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies	3	David Simchi-Levi Philip Kaminsky Edith Simichi-Levi	45	2009	978-7-300-11099-8
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4	项目管理	Project Management	5	David I. Cleland	55	2011	978-7-300-13338-6
5	运营管理——供需匹配的视角	Matching Supply with Demand: An Introduction to Operations Management	2	Gerard Cachon	49	2011	978-7-300-14923-3

(七) 管理科学与工程经典教材

1	数据、模型与决策	Introduction to Management Science	10	Bernard W. Taylor III	69	2011	978-7-300-13751-3
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Part

I

Statistics and Data Analysis

INTRODUCTION

A phrase one often hears in many companies today is, "In fact, we trust all of our use data." Indeed, organizations that make decisions based on data are more likely to succeed than those that do not. However, many organizations ignore the most important data they need to make good decisions. They do so for several reasons:

- They may not fully understand what to measure or how to measure it.
- They may be reluctant to award the required time and effort.
- They may feel they can make decisions by instinct and do not need data.
- They may fear discovering options or goals that challenge their current strategy.

Even if organizations do gather data, they may not interpret their product information correctly from analysis of data. Analysis refers to extracting larger meaning from data to support evaluation and decision making. One of the most important tools for analyzing data in business is statistical analysis, which is the science of collecting, organizing, analyzing, interpreting, and presenting data. Modern spreadsheet technology, such as Microsoft Excel, has made it quite easy to organize, analyze, and present data.

Data also provides key inputs to decision models. A decision model is a logical or mathematical representation of a problem or business situation. Decision models establish relationships between various factors that decision makers might take and results that they might expect, thereby allowing decision makers to predict what might happen based on the model's assumptions. For instance, the manager of a grocery store might want to know how best to use promotional coupons, discounts, and advertising to increase sales. In the past, grocery stores have studied the relationship between sales volume to programs such as those by conducting controlled experiments to identify the relationship between sales and sales volume. That is, they implemented different combinations of price promotions, coupon programs, and advertising (the decision variables) and observed

Chapter

1

Data and Business Decisions

INTRODUCTION

A phrase one often hears in many companies today is, "In God we trust; all others use data." Modern organizations truly manage by fact—they depend on complete and accurate data for performance evaluation, improvement, and decision making. However, many organizations ignore the most important data they need to make good decisions. This may occur for several reasons:

- They may not fully understand what to measure or how to measure.
- They may be reluctant to spend the required time and effort.
- They may feel they can make decisions by instinct and do not need data.
- They may fear discovering problems or poor performance that data may uncover.

Even if organizations do gather data, they may not interpret them properly.

Information derives from analysis of data. *Analysis* refers to extracting larger meaning from data to support evaluation and decision making. One of the most important tools for analyzing data in business is **statistics**, which is the science of *collecting, organizing, analyzing, interpreting, and presenting* data. Modern spreadsheet technology, such as Microsoft Excel, has made it quite easy to organize, analyze, and present data.

Data also provide key inputs to decision models. A **decision model** is a logical or mathematical representation of a problem or business situation. Decision models establish relationships between actions that decision makers might take and results that they might expect, thereby allowing the decision makers to predict what might happen based on the model assumptions. For instance, the manager of a grocery store might want to know how best to use price promotions, coupon programs, and advertising to increase sales. In the past, grocers have studied the relationship of sales volume to programs such as these by conducting controlled experiments to identify the relationship between actions and sales volumes.¹ That is, they implement different combinations of price promotions, coupon programs, and advertising (the decision variables) then observe