时代教育 · 国外高校优秀教材精选

（英文版）

运筹管理分析

—— 使用Excel

Operations Analysis Using Microsoft Excel

南希 C.维达 (Nancy C. Weida)
(美) 龙尼 里查德森 (Ronny Richardson) 著
安德鲁 瓦森依 (Andrew Vazsonyi)

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Nancy C. Weida, Ronny Richardson, Andrew Vazsonyi
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随着我国加入 WTO，国际间的竞争越来越激烈，而国际间的竞争实际上也就是人才的竞争、教育的竞争。为了加快培养具有国际竞争力的高水平技术人才，加快我国教育改革的步伐，国家教育部近来出台了一系列倡导高校开展双语教学、引进原版教材的政策。以此为契机，机械工业出版社陆续推出了一系列国外影印版教材，其内容涉及高等学校公共基础课，以及机、电、信息领域的专业基础课和专业课。

引进国外优秀原版教材，在有条件的学校推动开展英语授课或双语教学，自然也引进了先进的教学思想和教学方法，这对提高我国自编教材的水平，加强学生的英语实际应用能力，使我国的高等教育尽快与国际接轨，必将起到积极的推动作用。

为了做好教材的引进工作，机械工业出版社特别成立了由著名专家组成的国外高校优秀教材审定委员会。这些专家对实施双语教学做了深入细致的调查研究，对引进原版教材提出了许多建设性意见，并慎重地对每一本将要引进的原版教材一审再审，精选再精选，确认教材本身的质量水平，以及权威性和先进性，以期所引进的原版教材能适应我国学生的外语水平和学习特点。在引进工作中，审定委员会还结合我国高校教学课程体系的设置和要求，对原版教材的教学思想和方法的先进性、科学性严格把关。同时尽量考虑原版教材的系统性和经济性。

这套教材出版后，我们将根据各高校的双语教学计划，举办原版教材的教师培训，及时地将其推荐给各高校选用。希望高校师生在使用教材后及时反馈意见和建议，使我们更好地为教学改革服务。

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序

运筹管理研究的是商品生产和服务中的变化过程。本书讲授的是如何用 Excel 分析管理中的问题，使决策者能更好更容易地作出决定。

当今的竞争和风云变幻的全球市场使掌握相关的定量的建模方法成为当务之急，所以管理者应当掌握更新更强大的管理工具。用 Excel 建构模型，可以解决学习运筹管理时最令人头痛的计算繁琐问题。然而本书又强调了决策的做出需要仔细地思考和构思，避免了只能用 Excel 作简单计算的错觉。

市场上有很多优秀的运筹管理教材，也有很多 Excel 的使用手册，但没有一本书能将其二者有机地结合。

Excel 能更好地帮助分析如何解决问题，且本书中的很多方法在传统的运筹管理教材中还未包括。本书不仅讲授了简化分析业务管理的问题，还更深层次地探究了它的细节。

本书主要集中于构造和解决运筹管理问题，但是这些方法也可以应用到其他决策中去。本书尽量像实际生活中一样多角度地考虑问题，而不是如一般运筹管理教材一样简单地从一个角度出发。

三位作者各有特长，优势互补，或者荣获过很多教学奖项，或者写过多本畅销教材。他们的研究领域也各有侧重，有的有从事运筹和经济管理的多年教学经验，有的擅长写计算机导向的贸易教材，有的有较深的数学和统计学功底。

本书适合作为经济管理专业的本科生、研究生的教材或参考书，也可作为 MBA 及短期 MBA 课程教材。

章栋恩
北京工商大学

About the Authors

Nancy C. Weida, PhD, has won numerous teaching awards from both Bucknell University and the University of Delaware on university-wide, departmental, and student organization levels. The most recent was the "Students' Choice" award presented to her by Bucknell University's BSBA Class of 1999 for her devotion to their undergraduate education.

She is currently Chair of the Management Department and an Associate Professor of Decision Sciences at Bucknell University, having earned degrees in operations research/business administration (operations management), operations research/mathematics, mathematics, and history from the University of Delaware and Colgate University. She is extremely active in professional organizations such as the Decision Sciences Institute and the International Business Schools Computing Association, and she is a founding vice president for operations management of the newly formed Academy of Business Education.

A Red Sox fan and pianist, she enjoys sports, music, the ocean, and mystery novels. Her musical tastes range from J. S. Bach to Hall and Oates.

Ronny Richardson, PhD, has a vast amount of experience in writing books. He has written over 20 computer-oriented trade books that have sold more than 350,000 copies, and he has also served as a statistics textbook consultant. His experiences in teaching and writing have helped him learn how to explain complex topics to new users in an understandable fashion.

He is currently an Associate Professor of Management at Southern Polytechnic State University, having earned degrees in business administration, operations management, statistics, and mathematics from Georgia State University and the University of Southern Mississippi.

When not working, he is an avid kayaker and racquetball player.

Andrew Vazsonyi, PhD, is an internationally recognized author, researcher, and educator. He is the author of over 70 technical articles and 7 textbooks in English, German, Spanish, French, Russian, Japanese, and Hungarian. Although his initial research was in pure mathematics, he later made contributions in the fields of aerodynamics and control systems. Since 1955, he has been concentrating in applying mathematics to problems of management.

He received a PhD in mathematics from the University of Budapest, a postdoctoral fellowship from the University of Paris, and an S.M. in mechanical engineering from Harvard University. He served for 25 years in industrial positions and has 20 years of teaching experience. He has the unique distinction of being the only person ever elected Past President of the Institute of Management Sciences without serving as President.

Although currently retired, he studies and writes about the application of mathematical techniques to general management, operations management, management science, operations research, the use of computers, and epistemology. He is concentrating on making his work accessible to millions and on writing his memoirs. He has been married since 1952, and he is an avid golf player who shoots in the low sixties (9 holes).

Preface

Today's competitive and complex global markets make the need for relevant quantitative modeling techniques more pressing. Thus, practitioners of operations management (OM) must adapt new, more powerful approaches to managing operations. Fortunately, computers and information technology enable managers to improve operational effectiveness by allowing new ways to model and analyze a variety of problems.

We wrote this book to provide a practical resource for students and practitioners to model and analyze complex problems using the power of Microsoft® Excel. We feel that although there are many excellent operations management textbooks available, they lack comprehensive coverage of how to use Excel to make effective decisions. Conversely, there are many general purpose Excel manuals, but they lack coverage of operations-specific models. This book serves the student and the professional by providing context-specific descriptions of how to model and analyze OM situations.

Operations Analysis Using Microsoft® Excel concentrates on the quantitative aspects of operations management, while covering only those features of Excel that are of interest to operations management and for which Excel is an excellent modeling tool. *Operations Analysis Using Microsoft® Excel* thus empowers the student and the practitioner to improve their managerial decision making.

Is *Operations Analysis Using Microsoft® Excel* for You?

We wrote this book with two primary audiences in mind: the student and the practitioner. This book may be used by the undergraduate or MBA student as a supplement to a traditional text, or it may be used as a core text in a short MBA course. It can also be used as a stand-alone self-study text for practitioners who need to keep informed about the latest developments.

Because this book may be used as a supplement with another text, it is important to mention that the concepts and techniques presented here can be used to solve problems in the corresponding chapters of any textbook. So instructors do not need to depend on our end-of-chapter exercises if they prefer those in their main text.

Many students are turned off by the math requirements of traditional quantitative texts. Modeling with Excel offers an easy way around this dilemma, while retaining rigor and realism. However, we avoid the delusion of trying to replace judgment with "point-and-click," which can happen when Excel is used without careful thought.

This book requires only a basic familiarity with Excel. Readers who either have experience with Excel or have completed a short introductory course in Excel should have no difficulty with this book.

Decision Making

Modeling and analysis of operations situations require much more than merely quantitative solutions. Throughout the book, we emphasize the importance of solving problems in context, while considering the interdependence of such business functions as operations, finance, and marketing, and the ever-changing assumptions and realities of particular decision-making situations.

Excel is not merely a powerful computational device; used creatively, it leads to better decision making and problem solving. The scenario management feature of Excel is central to our approach, because it better mirrors how practitioners solve problems. Instead of starting from scratch in solving problems (as many quantitative approaches assume), we begin more realistically with the actual current state of an organization's situation and work to improve the operations. This is accomplished through simulation of "what-if" scenarios. Scenarios permit the analysis of OM problems in the context of larger issues of the organization and allow OM to be integrated with other business functions such as marketing, finance, and human resources.

Pedagogical Approach

We recognize that in addition to clarity of technical description, students need to be motivated by personal, down-to-earth, interesting material. We include an abundance of pertinent stories in direct, simple, easy-to-read language, making *Operations Analysis Using Microsoft® Excel* fun to read. Fundamental concepts are preceded by a brief narrative statement and pertinent examples. Our approach is to include a case study or example in an easy, anecdotal, qualitative style. We stress the qualitative as a prelude to justify the need for quantitative techniques. We find that students appreciate this practical approach and build better intuition into the models.

The visual appeal of tables, curves, and graphs makes spreadsheets ideal for enhancing readers' understanding of model building, analysis, and implementation. Examples of the misuse of quantitative techniques are included to warn the readers of traps and to build their self-confidence.

The Excel worksheets referred to in the book can be downloaded at no cost from the Data Library at www.duxbury.com. By downloading these Excel worksheet templates and following along as they study our book, readers take an active role in learning the techniques. The worksheet templates can then be adapted to analyze other OM situations. The worksheets are compatible with Excel 97 and Excel 2000. The concepts and modeling are compatible with any recent version of Excel as well as any other modern spreadsheet.

We also have included several exercises at the end of each chapter. Many of them are direct applications of the text, reinforcing learning and requiring

students to perform what-if sensitivity analysis, manage scenarios, and select the "best" alternative and solution. But we also include "mind-expanding" problems that require creativity, extending the principles described in the text. Thus we build the bridge from what students already know to the essence of what they need to know to deal with real-life, practical situations.

Support

Excel Worksheet Templates The Excel worksheets we use to model the situations discussed in this book can be downloaded free of charge from the Data Library at www.duxbury.com. This allows readers to work along with us as they read the book. Readers can modify these files and immediately see the impact of the modifications, further enhancing learning.

We strongly encourage students and practitioners to take these files and modify them to fit other situations. Such modification may be in response to solving the end-of-chapter exercises in this book or in another OM textbook or using these worksheets as the basis of solving real problems.

Appendices This book uses a few techniques with which many Excel users are not familiar: Scenarios, Goal Seeker, and Solver. These techniques form the heart of the book. Since they are so important, and because even advanced readers are unlikely to be familiar with them, they are explained in Appendix A. Appendix A also explains a few other Excel concepts that could confuse some readers.

Appendix B is a reference that gives a very brief rundown of the function of each of the models used in the book, all of which can be downloaded from the Data Library at www.duxbury.com. A description of each worksheet template is also given in detail in the text of the book.

Solutions Instructors are supported with solution worksheets to the exercises on the instructor's CD-ROM available through the instructor's local Thomson Learning representative.

We have made every effort to correct typos and errors. We will post any detected errors on the Online Book Companion site at www.duxbury.com.

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I give particular thanks to Andy Vazsonyi, who continues to teach and inspire me.

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I would also like to thank Dr. Robert Yancy, the School of Management, and Southern Polytechnic State University for the support they have given me while I worked on this book.

Andrew Vazsonyi: I am greatly indebted to Herbert A. Simon, who through his work substantially influenced my outlook on management.

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To the Reader

Operations management (OM) is the study of the transformation processes involved in the production of goods and services. The objective of this book is to teach you how to analyze operations management problems with Microsoft® Excel in order to improve and facilitate managerial decision making.

Although our main focus is on using Excel to frame and solve operations management problems, the growing interdependence of such business functions as operations, marketing, and finance means that our techniques can be used in many types of organizational decision-making contexts. Our approach makes the situations multidimensional and lifelike, in contrast to the typical OM text approach of simple, single-concept problems. This is why Excel is used so extensively as our modeling tool. Real problems are too complex to be modeled by hand.

Excel is not merely a powerful computational tool; it is also a creativity tool that can help make organizations more competitive and efficient. In particular, Excel offers new and better approaches for dealing with many types of practical operations management situations and problems. Many of these approaches have not yet been explored in traditional operations management books. This book enables you to use Excel both to simplify analyses of OM problems and to pursue an analysis in greater detail.

By its very nature, operations management is multidisciplinary in its methodology and application. We will thus use both qualitative *and* quantitative analytical tools, so be prepared to engage both sides of your brain as you study and learn the techniques and ideas in this book.

This book does not replace existing books in operations management; it augments them by showing how the requisite modeling can be created and how calculations can be carried out using Excel. The emphasis is not on using advanced Excel features to generate complex worksheets, but on practical approaches to managerial decision making using Excel as the analysis tool. We examine operations management problems in the context of the corporation and establish interaction with other functional areas of management. Thus, you are stimulated to consider problems from many perspectives and to realize that the operations function is an integral component of the corporate structure.

We urge you to download the worksheets used in the book, available free of charge from the Data Library at www.duxbury.com. You can thus take an active role in learning the techniques by loading the appropriate worksheets and following along as you study this book. These worksheet templates can also be adapted to meet your problem-solving needs. The worksheet files are compatible with

Excel 97 and Excel 2000. The concepts and modeling are compatible with any recent version of Excel as well as any other modern spreadsheet.

We also have included several exercises at the end of each chapter for you to practice what you have learned. The exercises reinforce the concepts discussed in the chapters and are complex enough to help you appreciate how complicated real business problems are.

In using this book, we hope you gain new insights into the interdisciplinary nature of managerial decision making and how Excel can help model these complex scenarios.

Nancy C. Weida
Ronny Richardson
Andrew Vazsonyi

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