
Business Statistics in Practice

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This review is of the second edition of "Business Statistics in Practice", which was published in 2001 and is one of a series of titles under the publisher's Operations and Decision Sciences series. The first edition was published under the title "Applied Statistics: Improving Business Processes". The aims and objectives of the book as stated by the authors are, "This is a modern and practical approach to the first course in business statistics". The book is targeted primarily at undergraduate business students with no specific background in statistics: "The only prerequisite for this book is high school algebra", that is, the book starts from first principles in statistics and probability and develops the material from there. Having said that, the scope and range of the material, especially the supplementary material on the CD-ROM, would allow it to be used for more than just an introductory course, and indeed for MBA students. However, the main theme of the book is its focus on statistics within the context of business. In particular, it is generously illustrated with business case studies and exercises. "The ultimate goal of statistical analysis in business is business improvement. This theme is the foundation for the case studies and examples in this text, many of which are based on actual, real world situations."

Overview of Structure and Contents

The review will begin with an overview of the structure and contents of the book and its accompanying CD-ROM. The book consists of 856 pages, organised into 18 chapters with a number of appendices at the end of the book. It begins with a general introduction and chapters on descriptive statistics and probability. There are then chapters on most standard material such as discrete and continuous variables, inference, forecasting, process control, non-parametric methods & Chi-square tests, and it concludes with a chapter on decision theory.

Each chapter starts with a brief overview and introduction, and then goes on to describe the relevant theory and technique. Business cases are introduced almost immediately to illustrate the material, with plenty of further cases, worked examples and exercises. Each chapter concludes with a summary, a glossary, a list of important formulas, and a selection of supplementary exercises. Finally, there are pointers to relevant Internet sites, and instructions for performing the techniques on both Minitab and Excel. The Internet pointers also include exercises for students to perform with the data they find. The appendices at the end of the book include 18 standard stats tables (Normal, t, F etc), notes on counting rules and combinations, and a brief description of the Hypergeometric distribution. There are also brief solutions to the odd-numbered exercises, a list of references and an index.

The CD-ROM, which runs under Windows 95, 98 or NT 4.0, includes a variety of supporting material. For each chapter in the book there is an accompanying PowerPoint presentation; there are Excel worksheets; there are Excel and Minitab data sets; there are short, interactive tests (quizzes) which provide instant scores; there are also short Lotus Screen Cam videos, demonstrating the Excel and Minitab techniques.

The CD-ROM also includes material not directly linked to the contents of the book. There are nine additional chapters of what would typically be considered more advanced material. This includes topics such as factor and cluster analysis, Box-Jenkins and Holt-Winters' methods. There is also a copy of MegaStat, an Excel Add-in which provides an extra menu of statistical functions to the standard Excel spreadsheet.

Book details:

Title: Business Statistics in Practice, 2nd Edition

Authors:

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0-07-232058-3(student ed)
0-07-241535-5 (instructor's ed)
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Finally, the CD-ROM includes a copy of Visual Statistics 2.0. This package was reviewed in the May 2002 edition of MSOR Connections, so the only thing to be said here, is from the review itself. *“Visual Statistics 2.0 is educational software that aims to help students’ understanding and confidence with a range of statistical data analysis methodology, through visualisation with interactive capabilities. The authors state that it is to be used with a textbook or other course materials, and is intended to be useful to instructors as well as to students.”* [1]

Teaching Material

As would be expected of a text from a major academic publisher, the overall layout, style and presentation is of a very high standard. The structure and organisation makes it straightforward to locate material, and thus for lecturers to select, which parts of the book they do, and do not want to use. Given the quantity of material in the book and on the disk, I anticipate that few courses would include it all. Generally, the explanation of the theory is comprehensive. For example, when describing hypothesis testing, both the use of rejection points and p-values are described. At the same time, the approach is reasonably pragmatic, with students encouraged to start applying the theory to business problems straightaway.

My main criticism would be that some of the material that I find particularly interesting and consider relevant to business statistics is only included as short supplements. For example, the chapter on descriptive statistics concludes with a brief section titled *‘Misleading Graphs and Charts’*. This touches on the ground covered by Darrell Huff’s book, *‘How to Lie with Statistics’*. [2] Whilst I would wholeheartedly agree with the authors’ sentiments that, *“The statistical analyst’s goal should be to present the most accurate and truthful portrayal of a data set that is possible”*, I am not sure that a statistical analyst’s job is ever that straightforward, especially in the world of business. In my first job I worked for a manager who was only interested in statistics that presented his point of view. Learning to maintain professional integrity whilst avoiding the dole queue is often as tricky as any of the techniques described in this book.

The chapter on confidence intervals concludes with a brief introduction to survey sampling, and one of the case studies concerns the ethics of collecting anonymous data. In general, though there is little in the book about the practical issue of collecting data. Whilst such a topic could easily form the basis of a quite separate course in its own right, I do think it deserves a little more

prominence here. Many companies would quite happily employ the techniques and practices described elsewhere in the book - if they only had the time, money and skill to collect the appropriate data. Preparing students for a life in business statistics on the assumption that neat samples of data will usually be waiting for them seems a little optimistic.

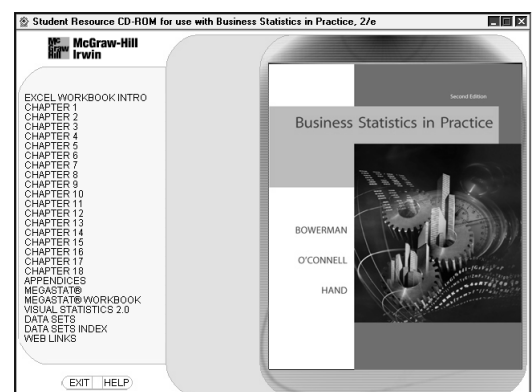
Finally, I particularly like the extended introduction to the chapter on process control, which puts the topic in its historical context. Elsewhere, unfortunately, there is less effort to put the material in a general business context. The chapter on time series forecasting for example launches straight into the technique, and barely alludes to the limitations of the technique - using historical data to predict stock market crashes, for example. Whilst a text of over 850 pages is clearly not short of material, perhaps a little more material about the ‘practical’ aspects of business statistics would have been welcome, even at the expense of more traditional material.

Case Studies and Examples

The book places great emphasis on its use of case studies, many of which are authentic problems encountered by the authors, their colleagues or former students. The cases cover a wide range of business types, including car production, food processing, fisheries, utilities, fast food, hotels, and management consultancies. The type of problems, likewise are diverse, ranging from marketing and forecasting, through to recruitment, the design of business information systems and process control.

The cases are generally well-illustrated with diagrams to explain the more technical aspects, such as the structure of a camshaft or an air conditioner compressor shell. There are also plenty of other photographs to engage the reader. A number of the case scenarios reoccur throughout the book, although each time in the context of the technique being described.

Screen
shot from
CD-ROM



As is to be expected of an American text, the case studies are mainly American. However, UK students are unlikely to be puzzled by the references. Many of the companies referred to are familiar global names (Toyota, Intel, Coca-Cola etc), and for those that are not, it is usually easy to relate to the nature of their business. Also, one or two examples have a specific UK reference: one of the cases referred to several times concerns household expenditure on insurance in the UK; another compares the use of humour in UK advertisements with advertisements elsewhere. (Yes, UK ads are generally funnier.)

My main criticism with the use of these cases, is similar to the one voiced previously. That is, the cases cut straight to the quick of doing a specific piece of analysis. Issues such as collecting the data, framing the question, presenting the results for a non-technical audience are not mentioned.

Statistical Software and Use of Internet

The text also places great emphasis on both the use of statistical software and the use of the Internet. Firstly, the authors recognise that there are a range of software tools available: most students these days will have access to Excel, which is suitable for basic statistics. However, for more advanced techniques, and for specialist statisticians, packages such as Minitab, SAS or SPSS are preferable. The text therefore uses both Excel and Minitab extensively but also includes examples of SAS output in the book, and SPSS output on the CD-ROM. That is, the book allows flexibility for lecturers, depending on their preferences and the software available.

Each chapter in the book concludes with an appendix on how to use Minitab and Excel. These include step-by-step instructions, and are accompanied by several screen shots of what to expect. (The instructions are based on version 13 of Minitab and the Office 97 version of Excel). Chapter 1 starts with instructions for getting started, and subsequent chapters describe how to perform the technique described previously. As well as these instructions, the CD-ROM also includes short videos (Lotus Screen Cam) demonstrating these transactions. I particularly enjoyed the laid back commentary which accompanies these demonstrations. Students are then provided with a comprehensive set of data sets to practice these procedures themselves.

As far as the material on searching the Internet is concerned, this is similar to the case studies in that the sites are predominantly American. However, once again, this should not be a problem. My only concern

here would be that some of these sites have a statistician's perspective of the business world, sites such as Gallup, the Journal of Statistics Education, and US Census data. Whilst these are all very useful and interesting sites, once again I suspect that they give the impression that good data is easy to find. However, the exercises that accompany these sections do encourage students to explore the data and answer questions about it.

As mentioned earlier, MegaStat, an Excel add-in and Visual Statistics are also included on the CD-ROM. Together, these provide a number of options to the way the course is taught.

Overview & Conclusions

Overall, this book provides a very thorough and comprehensive source of teaching material. For lecturers looking for a text that provides a good, approachable introduction to standard business statistics techniques, the book is to be highly recommended. In particular, many people will like the authors' efforts to link the book's material to both software packages, and also to a wide variety of business case studies.

My personal criticism would be over the practical aspects of business analysis and the book's emphasis on technique. Clearly the content of a course depends on its aims and goals, and in particular, its target audience. For the student who aims to become a specialist statistician in a major management consultancy, the material of this text would seem to be a necessary requirement, and it would be hard to find fault with the book. However, for the student who sees statistics as just one of his/her skills in a general business management role, perhaps a little less emphasis on technique, and more on practice would be appropriate. Finding the right balance to suit everyone, is of course the tricky bit.

Finally, the book also provides an excellent example of the turbulent nature of business statistics. Two tables from the year 2000 are presented in the first chapter, rating America's most admired companies in terms of product quality, innovativeness and investment value and companies considered best to work for. The fact that the now discredited Enron company appears in both lists should hopefully encourage students to keep an open mind about any data they are presented with, both before and after statistical analysis.

References

- [1] MacGillivray, H. Review of Visual Statistics 2.0, *MSOR Connections* 2, 2 May 2002
- [2] Huff, D. *How to Lie with Statistics*, Penguin Books, 1991