contains a few good case studies directly related to quality engineering, many of the examples have nothing to do with industry (e.g., measurements on the shapes and sizes of painted turtle carapaces, weight of middle-aged men in fitness clubs, diagnosis of liver disease). These examples are used to illustrate the methodologies as they are being developed and make up the bulk of the results given in the book. On the bright side, the case studies are engaging. The data analysis objectives of the case studies are clearly described, and the presentations of results show how multivariate analysis can address the objectives.

One could argue that the goal of a book describing application of multivariate methods to specific types of problems should aim to provide reads with a "feel" for how these methods work for *their* problems. For example, I have spent years encouraging microbiologists to use "industrial statistics," such as response surface methods or control charts. I have found that once they see in-depth case studies within their area of science that address the nuances of their data, they are almost completely on board. In this sense, the authors moderately succeed using their case studies. However, I would suggest that they make the data available to the public, because many people learn by reproducing examples that they study.

To enable quality organizations to better use multivariate methods, this text should be supplemented with others. For example, the chapter on discrimination hits the major points for classical multivariate methods; however, a vast array of tools for discrimination currently exist, and the classical methods may not fit the problem well and may be far from optimal. For instance, many on-line measurement systems produce large amounts of data on each sample, such as optical coordinate measurement machines, so there may be more variables than observations. Classical methods cannot handle this situation well (e.g., LDA with more variables than observations). I suggest the text by Hastie, Tibshirani, and Friedman (2001) to supplement this book if more expertise is required for discrimination, clustering, and principal components analysis, and the text by Mason and Young (2001) for a more in-depth resource for multivariate control charting.

All in all, the authors meet their intended goals somewhat. This text provides the motivation to use multivariate analysis, but could do a better job providing the means.

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Hastie, T., Tibshirani, R., and Friedman, J. (2001), *The Elements of Statistical Learning*, New York: Springer-Verlag.

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Multivariate Bayesian Statistics: Models for Source Separation and Signal Unmixing, by Daniel B. ROWE, Boca Raton, FL: Chapman & Hall/CRC, 2003, ISBN 1-58488-318-9, x + 329 pp., $89.95.

This book is a thorough exposition of Bayesian modeling techniques. The motivating example used throughout is the source separation model. The author effectively uses the example of a cocktail party with a variety of conversations around the room captured by a set of microphones. The model is designed to separate the different sources (the party guest's conversations) as they are heard, mixed, from the various microphones. This example allows the author to step through a variety of basic Bayesian approaches to modeling, from linear regression to multivariate regression to factor analysis and, finally, to the source separation model.

After setting up the basic problem of the source separation problem in Chapter 1, the author starts with the basics. Chapter 2 is a basic description of a number of standard univariate and multivariate distributions. This chapter reads as if it was computer generated—the exact same format is used to describe each distribution. Nonetheless, it is thorough and provides a handy reference for determining the key characteristics of many common distributions.

Chapter 3 gives a short but very understandable tutorial on the basics of Bayesian statistical thought. The author effectively explains Bayes theorem on the basis of two events and then expands the explanation to scalar, vector, and matrix variables. Chapter 4 covers various types of prior distributions, including noninformative, conjugate, and generalized conjugate for each of the types of distributions covered in Chapter 2. Each of these prior distributions is dependent on some hyperparameters, and assessment of the hyperparameters is discussed in Chapter 5. Here the description of how to think about the hyperparameters in terms of prior expert knowledge is most helpful.

Chapter 6 goes into great detail on the use of Gibbs sampling and iterated conditional modes for estimating marginal posterior means and joint maximum posterior modal estimates. This chapter is very helpful in its step-by-step explanation of how these algorithms can be applied to estimate the quantities of interest in a Bayesian analysis.

The next three chapters build the foundation for the Bayesian source separation model that is the book's foundation. Chapter 7 gives a refresher on the classical multivariate regression model, focusing on the distributional assumptions that are present. Chapter 8 extends the model to a full Bayesian approach and gives detailed instructions on how to calculate results. Chapter 9 covers the Bayesian approach to factor analysis, again with detailed instructions on how to set up the Gibbs sampling algorithm and develop results.

Chapter 10 pulls all of the previous work together into a detailed description of procedures to fit a Bayesian source separation model. One of the really nice feature of both Chapters 9 and 10 is the presence of a full dataset and example results, allowing the reader to check his or her understanding of the procedures and algorithms presented. Chapter 11 extends the source separation model to include both observable and unobservable sources.

The last few chapters of the book deal with a case study of data from functional magnetic resonance imaging (FMRI). This allows the author to give a specific application of the techniques that have been developed so far in the book. Further extensions are explored to allow for dynamic coefficient models and dealing with correlated observations.

Overall, the book is well written and gives a detailed step-by-step approach to some widely applicable model types. Previously, when I needed to build a specific model, I could (if the model was very simple) determine a good approach using the books by Gelman et al. (1995) and Congdon (2001). This book helps me understand how to build some complex models using a Bayesian approach with a much better understanding of what effect my decisions will have on the final model results.

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Congdon, P. (2001), *Bayesian Statistical Modeling*, West Sussex, U.K.: Wiley.

Gelman, A., Carlin, J. B., Stern, H. S., and Rubin, D. B. (1995), *Bayesian Data Analysis*, London: Chapman & Hall.

Measurement and Multivariate Analysis, edited by S. NISHISATO, Y. BABA, H. BOZDOGAN, and K. KANEFUJI, Tokyo: Springer-Verlag, 2002, ISBN 4-431-70338-1, xvi + 332 pp., $109.00.

This book contains a collection of papers from an International Conference on Measurement and Multivariate Analysis held May 12–14, 2000, in Banff, Alberta, Canada. Topics cover a wide range of theoretical work in statistics, related disciplines, and applications. All of the papers were reviewed before their inclusion in the proceedings. The papers are organized into seven sections. The title of each section and the number of papers included in each are as follows:

Keynote Papers (2)
Introduction (1)
Scaling (8)
Structure Analysis (8)
Statistical Inference (7)
Algorithms (5)
Data Analysis (4).

The first keynote paper, "Categories and Quantites" by J. C. Gower, deals with the rank of a matrix of categorical variables. Gower states in this summary that this rank may be used as a basis of multivariate methods for approximating categorical data similar to how the rank of a quantitative data matrix is used for standard multivariate methods. Gower outlines several problems that depend on the notation of categorical rank. The second keynote paper in is "Questionnaire Construction, Data Collection and Data Analysis: An Approach by the