Advanced Methods of
MARKETING
RESEARCH

Edited by
RICHARD P.
BAGOZZI

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Acknowledgments

Introduction

Richard P. Bagozzi

The past few years have witnessed unparalleled developments in research methods. Much of this has occurred in the fields of psychometrics and statistics, but many important contributions have been made by marketing researchers as well.

The present volume presents recent innovations in research methods found in all three fields mentioned above but with particular relevance to marketing. Virtually all the major advanced techniques are covered including structural equation modeling, partial least squares, the multivariate analysis of categorical data, chi-square automatic interaction detection (applied to market segmentation), multidimensional scaling, conjoint analysis, multiple correspondence analysis, latent structure analysis, and latent class regression.

This book is the first one to consider all these major advances. It is intended for three audiences: PhD students, faculty, and practicing researchers who desire in-depth, state-of-the-art coverage of the newest methods. It is conceivable that some instructors will find the book suitable as an assigned text in the MBA research and modeling courses. Useful background can be obtained by reading the companion volume, *Principles of Marketing Research* (Bagozzi, 1994) also published by Blackwell.

Chapter 1 by Bagozzi and Yi covers three advanced topics in structural equation models (SEMs). First, the analysis of experimental data by SEMs are considered for MANOVA designs. Second, SEM panel models are explored. Finally, canonical correlation analysis is examined from the point of view of SEMs. Each topic is illustrated with relevant examples.

In Chapter 2, Fornell and Cha give a thorough introduction to partial least squares (PLS). They begin by pointing out that PLS is based upon a stochastic concept of causality, which is the primary way that PLS differs from such traditional statistical treatments as econometric and LISREL models. They then address, in turn, the topics of predictor specification, model structure, and estimation. Finally, they discuss criteria for the evaluation of PLS models.

The multivariate statistical analysis of categorical data is presented by Magidson in Chapter 3. Focus is placed upon the analysis of categorical dependent variables as functions of categorical independent variables. The author begins with an introduction to the use of log-linear models for describing relationships in two-way tables and for analyzing standardized frequency counts (i.e. rates). Following this, the logit model is introduced and examples provided showing the use of the model for an experiment designed to increase the return rate of mail surveys and the use of the model for adjusting TV diary ratings. Next, polytomous models are considered including the case of a trichotomous dependent variable and the multinomial logit model. The chapter closes with the Y-Assocation or ordinal regression model. Many examples are given throughout.

One of the newest and most exciting techniques for market segmentation is the chi-squared automatic interaction detection technique (CHAID) which is now available with the SPSS-PC and SAS statistical packages. In Chapter 4, Magidson introduces CHAID and contrasts it with the earlier regression, AID, and clustering approaches. He also treats CHAID analyses of polytomous dependent variables (i.e. those with more than two categories). Two novel extensions of CHAID are developed as well: ordinal criteria and single-factor calibration (Y*-Association). Many examples are given for these procedures.

Arabie and Hubert provide a state of the art review of cluster analysis in Chapter 5. After reviewing substantive uses of cluster analysis in marketing, they point-out misunderstandings and misuses of clustering and related procedures. A useful taxonomy of clustering methods is then introduced. Finally, the chapter closes with a discussion of practical problems and software.

Advances in multidimensional scaling have pushed the technique in many new directions. DeSarbo, Manrai, and Manrai (Chapter 6) consider recent developments in one of these directions, latent class multidimensional scaling (LCMDS), which is especially relevant to the problem of market segmentation. The authors begin their chapter with a framework for the estimation of LCMDS models. They then discuss the use of LCMDS models for proximity, dominance, and choice data. Although the focus of the chapter is on technical aspects of this new technique, they briefly mention recent and potential applications.

In Chapter 7, Louviere examines new and emerging areas of conjoint analysis technology. After reviewing the behavioral foundations of conjoint analysis, he gives a metatheoretical overview of the technique. The heart of the chapter then analyzes recent developments. The reader will be exposed to many novel ideas that are sure to stimulate new directions and provoke debates in the years ahead.

Hoffman, de Leeuw, and Arjunji provide an overview of multiple correspondence analysis (MCA) in Chapter 8. They consider the philosophy of the approach, discuss its history, and reveal its relationships with multidimensional scaling and more generally classical multivariate analysis.

Special attention is given to the underlying theory of MCA. An interesting empirical example is given and discussion made of the use of MCA in representing brands and variables in a single map.

Latent structure and other mixture models are surveyed by Dillon and Kumar in Chapter 9. The authors begin with a detailed presentation of finite mixture models. They then consider unconstrained latent class analysis and provide an illustration. Next, constrained latent class analysis is covered. Finally, a sample of various applications from the literature are reviewed.

Wedel and DeSarbo (Chapter 10) review recent developments in latent class regression models. Special consideration is given to the foundation of the models as applied to various categories of data. An application of latent class regression is also provided to conjoint analysis in the field of service quality measurement.

The technology of marketing research has reached a stage of unusual complexity and diversification. It was a humbling experience putting together the chapters for this volume. It is hoped that marketing scholars, new and old, will be excited by the many developments and use and build upon them in their work. Answers to end of chapter questions can be obtained by writing to Richard P. Bagozzi, School of Business Administration, University of Michigan, Ann Arbor, Michigan, 48109–1234, USA.

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Advanced Topics in Structural Equation Models

Richard P. Bagozzi
Youjae Yi

Introduction

In this chapter we consider how structural equation models can be extended to handle various research designs. Among others, we focus on three useful designs: experimental designs, panel designs, and canonical correlation analysis. For each, basic considerations in the application of structural equation analyses are presented, similarities and differences between structural equation analyses and traditional analyses are discussed, and illustrations are provided. Most of the models are estimated using LISREL (Jöreskog and Sörbom, 1989) because of its availability and ease of use, although one might employ other programs such as EQS (Bentler, 1989), EzPath (Steiger, 1989), LINEQS (a subroutine in SAS Proc CALIS), or PLS (Lohmöller, 1984). Although these topics are interrelated and overlap, we examine each category in sequence to facilitate the presentation.

Experimental Designs

Structural equation models can be used to analyze the data from experimental designs (Bagozzi and Yi, 1989; Bagozzi, Yi, and Singh, 1991; Kühnel, 1988). In this section, we will examine structural equation models for various experimental designs. We begin with a structural equation specification of a one-way MANOVA as an alternative to traditional analysis. Then we examine structural equation models extended to accommodate more complex designs such as latent variable MANOVAs, MANCOVAs, step-down analysis, and two-way MANOVAs.

Manifest variable MANOVA

The analysis of MANOVA designs can be accomplished with structural equation models by respecifying the parameters. To demonstrate the use of