Third Edition

至9467\$4650

Market Research and Analysis



Lehmann

Market Research and Analysis

Donald R. Lehmann Columbia University





1989 Third Edition

IRWIN

Homewood, IL 60430 Boston, MA 02116

© RICHARD D. IRWIN, 1979, 1985, and 1989

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

Sponsoring editor: Elizabeth J. Schilling Production manager: Irene H. Sotiroff Cover design: Jeanne Regan Compositor: Science Typographers, Inc.

Compositor: Science Typographers, Inc.

Type face: 10/12 Times Roman

Printer: R. R. Donnelley & Sons Company

Library of Congress Cataloging-in-Publication Data

Lehmann, Donald R.

Market research and analysis/Donald R. Lehmann.—3rd ed.

p. cm

Includes bibliographies and index.

ISBN 0-256-07038-5

1. Marketing research. 2. Marketing research—Problems,

exercises, etc. I. Title

HF5415.2.L388 1989

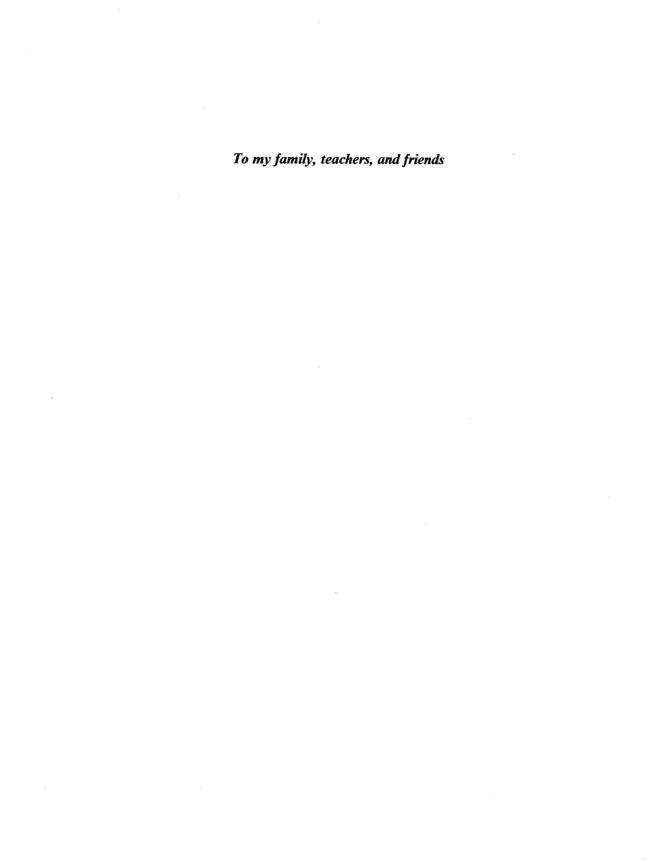
658.8'3-dc19

88-15734

CIP

Printed in the United States of America

1 2 3 4 5 6 7 8 9 0 DO 5 4 3 2 1 0 9 8



Preface

The third edition of this book represents a refinement of the approach taken in the first two editions. The book is based on the premises that (a) research is useful, (b) research skills can be learned, and (c) not everyone reading this book does so voluntarily. Consequently the book attempts to convey some of the fun as well as the agony involved in doing and using marketing research, while still providing a fairly complete coverage of technical issues. Some basic features of the book are:

- 1. While there are descriptive sections, the basic writing style is instructive rather than encyclopedic. The reason for this is the assumption that most people need to follow a learning process in understanding marketing research which is more than just memorization of facts.
- 2. The author feels that the best way to learn the nuances of research is by doing some. He has found that a simple project (define a problem, make up a questionnaire, go get 150 respondents, analyze the data, and write a report) is the best learning experience in the course. Next to that, analysis of results seems to be the best way to increase understanding. For that reason, the analysis chapters contain studies already analyzed so the reader can see how inferences can be drawn from actual results.
- 3. A common data base involving 940 female heads of households' responses to a 1975 survey about usage of and attitudes toward foods is used throughout much of the book as an ongoing case example. This provides readers with the opportunity to view a large survey as it is analyzed by several methods and to compare the methods in a concrete situation.
- 4. The "fancy" analytical techniques are discussed mainly in words in the chapters. Mathematics are generally banished to appendixes. (How's that for market segmentation?)
- 5. Sample computer output from the SPSS and SAS programs is reproduced in the appendixes to the analysis chapters. This allows practice in interpreting essential results from actual output.



- 6. The target reader is a user rather than a producer of marketing research. Still, in order to be a good user, one must know enough about the subject to ask good questions. Therefore, the book will try to explain how or at least why many of the basic procedures are used.
- 7. The writing style will be, at times, light. This is based on the assumptions that (a) some readers may not be passionately interested in the subject and need to be kept awake, (b) it is dangerous for an author to take himself too seriously, and (c) this book should help introduce the subject but cannot possibly say everything relevant about it.

The major changes from the second edition include:

- 1. A study concerned with durable ownership and life styles is added to illustrate the techniques. Sample outputs (from both SPSSX and SAS) are included in the instructor's manual which can be copied to provide additional hands-on experience in interpreting output.
- 2. Chapter 8, which deals with supplier services, has been completely redone.
- 3. The discussion of factor analysis in Chapter 14 has been restructured (and hopefully made simpler).
- 4. Somewhat greater attention has been paid to qualitative procedures.
- 5. Via appendixes, a few useful technical issues such as testing for the equality of regression coefficients have been added.

In addition, the entire volume has been tightened, and painful though it was, some sections were actually removed.

The author would like to thank many people for their assistance and encouragement on the revision including Gary Gaeth of the University of Iowa and David Schmittlein of the University of Pennsylvania, as well as the faculty members at Columbia and his family. Unfortunately, the blame for any shortcomings is not as easily conveyed.

Special thanks are due my wife, Kris, without whose efforts at editing, typing, drawing figures, etc., this book would not have been completed.

Donald R. Lehmann

Contents

1	The Role of Marketing Research	3
	Who Does Marketing Research?	5
	What Is Marketing Research?	6
	The Role of Marketing Research	in a Business
	The Role of the Marketing Resea	rcher Vis-á-Vis
	the Manager 9	

PART ONE Basic Concepts

1

How Companies Get Research Done
What Research Does Not Do 14
The International Perspective 15
The Approach of This Book 16
Bibliography 17

2 The Value of Information 19

Decision Analysis and Information Value: Concept 22 Decision Analysis 24 Value of Information: Quantitative Assessment 34 Information Need and Value Influences 39 **Summary** 40 **Problems** 40 Bibliography 43 Appendix 2-A: An Example of Expected Information Value Calculations 45

6

10

3	The Research Process 58
	Problem Definition 59
	Information Needs 62
	Research Objectives 63
	Type of Study 63
	Stating Hypotheses 64
	Selection of Type of Research 65
	Design of Data Collection Method 67
	Analysis Plan 69
	Data Collection 70
	Analysis and Interpretation 70
	Drawing Conclusions 72
	The Research Report 72
	A Typical Approach 74
	An Example 75
	Summary 76
	Problems 76
	Bibliography 77
4	Sources of Information 78
	Secondary Sources: Internal 78
	Secondary Sources: External 80
	Primary Sources: Informal 88
	Qualitative Methods 89
	Observations 94
	Surveys 98
	Panels 98
	Experiments 101
	Models/Simulations 102
	Summary 103
	Problems 103
	Bibliography 103
PART TWO	l December for Application 107
Collecting Information and	d Preparing for Analysis 107
5	Causality and Experiments 109
	Basic Concepts 109
	Establishing Causality 111

Experiments 112 Design: Managerial Issues 115 117 Design: Basic Notions Formal Experimental Designs 119 Laboratory Experiments 125 Field Experiments 127 Natural Experiments 128 Summary 130 **Problems** 130 Bibliography 132 6 Survey Design 133 Content 134 Writing Questions 141 Question Sequence 153 Type of Survey 156 Fielding the Survey 166 Examples 167 Summary 170 **Problems** 170 Bibliography 171 Appendix 6-A: Commercial Personal Interview Survey 176 Appendix 6-B: Nutritional Questionnaire Appendix 6-C: Ownership and Values Survey 194 7 Measurement and Scaling 200 Scales and Scale Types 200 The Effect of Scales on Analysis 203 Examples 204 **Practical Considerations** 217 Basic Concepts of Measurement 222 Other Issues 226 An Error Typology 229 Summary 238 **Problems** 239 Bibliography 240 Appendix 7-A: Law of Comparative Judgment 243 Appendix 7-B: The Delphi Procedure 247

PART TH	REE
Analytical	Methods

387

392 11 Basic Analysis

393 Scale Type and Analyses

395 Describing a Single Variable

Comparing Responses to Two or More Questions 403

406 Basic Analysis Examples

Relations between Variables: Cross Tabs 409

Correlation Coefficients 420

425 Data Adjustment Procedures

Summary 429

Problems 430

Bibliography 436

Appendix 11-A: Basic Analysis of Nutritional Habits Survey 437

455 Appendix 11-B: Sample Cross-Tab Output

12 Comparing Differences in Key Variables 459

The Notion of Statistical Inference

Tests Concerning One Sample, One Variable 461

Tests Concerning One Sample, One Percentage 464

466 Test Concerning Two Means

Matched Sample Tests 468

Test Concerning Two Percentages

Test Concerning Several Means: ANOVA 471

One-Way ANOVA 475

Two-Way ANOVA 480

More General ANOVA 490

490 Analysis of Covariance

491 Multiple Dependent Variables

A Nutrition Example 491

Summary 495

495 **Problems**

Bibliography 500

Appendix 12-A: Sample ANOVA Output 501

13 Regression Analysis 509

Simple (Two-Variable) Linear Regression Analysis 510

520 Multiple Regression

v	11	

525 Nutrition Survey Example Issues in Using Regression Analysis 529 Some Uses of Regression Analysis 545 Causation versus Correlation 552 Making Regression Useful 556 Summary 557 559 **Problems Bibliography** 562 Appendix 13-A: Hand Calculation 564 Appendix 13-B: Formula Derivation 567 Appendix 13-C: Sample Regression Output 570 Appendix 13-D: Simultaneous Equation Regression 582 Appendix 13-E: The Effect of Collinearity on the Standard Error of a Regression Coefficient 588 Appendix 13-F: ANOVA and Regression 591 Appendix 13-G: Increasing the Precision of Estimated

Regression Coefficients 596

597 Appendix 13-H: Testing for Significant Improvement

14 Grouping Procedures 602

Factor Analysis 602 Cluster Analysis 619 643 Summary **Problems** 644

Bibliography Appendix 14-A: Foundations of Factor Analysis 650 Appendix 14-B: Sample Factor Analysis Output 654 Appendix 14-C: Sample Cluster Analysis Output 663

Appendix 14-D: SAS Clustering Results, 50 States Data 669

15 Multiattribute Modeling 672

Basic Concept 672

Multidimensional Scaling (MDS) 674

Attribute-Rating Based Maps 687

647

Brand Choice and Switching-Based Maps 701

Uses for Maps 702

704 Summary

MDS and Cluster Analysis 705

Conjoint Analysis 705

Summary 715 **Problems** 716 **Bibliography** 719 Appendix 15-A: SAS ALSCAL on 50 States Data 724 Appendix 15-B: Derivation of Attribute Utilities in Conjoint Analysis 727 16 Additional Predictive Procedures 731 Two-Group Linear Discriminant Analysis 731 Multiple Group Discriminant Analysis 746 Logit Models 750 Summary 752 **Problems** 753 **Bibliography** 754 Appendix 16-A: Sample Discriminant Analysis Output 757 Appendix 16-B: Technical Aspects of Discriminant Analysis 765 Appendix 16-C: Classification Functions and Discriminant Analysis 769 Appendix 16-D: Automatic Interaction Detector (AID) 771 Appendix 16-E: Canonical Correlation 776 Appendix 16-F: Structure Equation Modeling 777 Appendix 16-G: Log-Linear Models 779 781 Market Potentials and Sales Forecasting 17 783 Purposes 784 Quality/Accuracy Needed in the Forecast 785 Market Potentials 785 Forecasting Methods 790 Choice of Forecasting Method 802 Example: The Year 2000 805 Summary 808 **Problems** 808 Bibliography 810 18 Product Research 812

Existing Products

New Products

812

822

PART FOUR Applications

Summary 834
Problems 835
Bibliography 837
Appendix 18-A: Sample Concept Test Formats 841

19 Industrial Marketing Research 845

Types of Industrial Marketing 845 Key Features 847

Data Sources 850 Summary 851 Bibliography 851

20 Final Comments 853

The Expanding World of Market Research 853
The Future 856
Conclusion 856

Appendixes 859

Bibliography

Appendix A: Random Numbers 861

858

Appendix B: Standard Normal Distribution Areas 863

Appendix C: The t Distribution 864 Appendix D: The x^2 Distribution 866

Appendix E: Critical Values of the F Distribution 869

Index 873

Basic Concepts

1

The Role of Marketing Research

The term *marketing research* means different things to different people. For this book, the following definition is used:

Marketing research is the collection, processing, and analysis of information on topics relevant to marketing. It begins with problem definition and ends with a report and action recommendations.

This is purposely a broad definition and is intended to include the large variety of things done under the name of marketing research. One thing this definition excludes are marketing/sales gimmicks which masquerade as marketing research (e.g., the old opening gambits of many encyclopedia or real estate salespersons, see McDaniel, Verille, and Madden, 1985).

An expanded version of this definition was adopted by the American Marketing Association in 1987:

Marketing Research is the function which links the consumer, customer, and public to the marketer through information—information used to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process.

Marketing Research specifies the information required to address these issues; designs the method for collection information; manages and implements the data collection process; analyzes the results; and communicates the findings and their implications.

In order to understand what marketing research is about, it is useful to understand where it comes from. Set in a business environment, marketing

research is practically oriented. Aligned as it is with marketing, producing results which "sell" (are accepted) is very important. Yet, in juxtaposition with this pragmatic framework is the connotation of research + scientific, scholarly, logical pursuit of truth. As will be seen, this juxtaposition leads to perpetual conflict between the demands of expediency and truth seeking.

As an applied field, marketing research has been a large importer of methodologies and concepts from other fields. These "benefactors" have

included the following:

Psychology and sociology, from which most of the theories about how consumers think and process information have been drawn. Particularly relevant is the field of social psychology.

Microeconomics, from which utility theory and related concepts have been appropriated.

Statistics, from which most of the analytical procedures have been borrowed.

Experimental design, from which the fundamental concepts of testing and research design have largely been drawn.

As would be expected in such a hybrid field, the terminology also is drawn from separate areas, and learning the jargon can be a nontrivial barrier to understanding the subject (as the reader may already be aware).

The term research encompasses widely disparate approaches to gaining and analyzing information. Some of the major contrasts are as follows:

Orientation. This can range from tightly focused research (e.g., what would be the effect on sales of a 10 percent price cut) to very general, scholarly styled investigations (e.g., finding out what our customers think about when they use our product).

Formality. While most people associate research with studies which are structured with budgets, time schedules, and computerized analysis, both introspection and informal contacts with customers or salespersons are excellent ways to gain information.

Amount of data collection. Again, a common stereotype of marketing research is that it involves extensive data collection, usually in the form of either an experiment or a survey. Not only are there many other kinds of data collection, but much of marketing research involves analysis of data which is already available.

Complexity of analysis. Research can include nothing more complicated than counts of the responses to a single question (i.e., how many people bought blue shirts) or "fancy" multivariate statistical procedures which simultaneously examine several variables in a variety of ways.

Marketing research and analysis is thus something of a hodgepodge of different approaches and heritages.