
Part I Strategic Issues

1	Introduction	3
1.1	What Is Database Marketing?	3
1.1.1	Defining Database Marketing	4
1.1.2	Database Marketing, Direct Marketing, and Customer Relationship Management	5
1.2	Why Is Database Marketing Becoming More Important?	6
1.3	The Database Marketing Process	8
1.4	Organization of the Book	12
2	Why Database Marketing?	13
2.1	Enhancing Marketing Productivity	13
2.1.1	The Basic Argument	13
2.1.2	The Marketing Productivity Argument in Depth	15
2.1.3	Evidence for the Marketing Productivity Argument	19
2.1.4	Assessment	22
2.2	Creating and Enhancing Customer Relationships	23
2.2.1	The Basic Argument	23
2.2.2	Customer Relationships and the Role of Database Marketing	23
2.2.3	Evidence for the Argument that Database Marketing Enhances Customer Relationships	28
2.2.4	Assessment	31
2.3	Creating Sustainable Competitive Advantage	32
2.3.1	The Basic Argument	32
2.3.2	Evolution of the Sustainable Competitive Advantage Argument	32

2.3.3	Assessment	44
2.4	Summary	45
3	Organizing for Database Marketing	47
3.1	The Customer-Centric Organization	47
3.2	Database Marketing Strategy	48
3.2.1	Strategies for Implementing DBM	49
3.2.2	Generating a Competitive Advantage	51
3.2.3	Summary	51
3.3	Customer Management: The Structural Foundation of the Customer-Centric Organization	52
3.3.1	What Is Customer Management?	52
3.3.2	The Motivation for Customer Management	53
3.3.3	Forming Customer Portfolios	54
3.3.4	Is Customer Management the Wave of the Future?	55
3.3.5	Acquisition and Retention Departmentalization	56
3.4	Processes for Managing Information: Knowledge Management	57
3.4.1	The Concept	57
3.4.2	Does Effective Knowledge Management Enhance Performance?	58
3.4.3	Creating Knowledge	59
3.4.4	Codifying Knowledge	60
3.4.5	Transferring Knowledge	61
3.4.6	Using Knowledge	62
3.4.7	Designing a Knowledge Management System	63
3.4.8	Issues and Challenges	65
3.5	Compensation and Incentives	65
3.5.1	Theory	66
3.5.2	Empirical Findings	67
3.5.3	Summary	69
3.6	People	69
3.6.1	Providing Appropriate Support	69
3.6.2	Intra-Firm Coordination	70
4	Customer Privacy and Database Marketing	75
4.1	Background	75
4.1.1	Customer Privacy Concerns and Their Consequences for Database Marketers	75
4.1.2	Historical Perspective	78
4.2	Customer Attitudes Toward Privacy	79
4.2.1	Segmentation Schemes	79
4.2.2	Impact of Attitudes on Database Marketing Behaviors	81
4.2.3	International Differences in Privacy Concerns	82
4.3	Current Practices Regarding Privacy	85
4.3.1	Privacy Policies	85

4.3.2	Collecting Data	87
4.3.3	The Legal Environment	88
4.4	Potential Solutions to Privacy Concerns	91
4.4.1	Software Solutions	91
4.4.2	Regulation	91
4.4.3	Permission Marketing	94
4.4.4	Customer Data Ownership	96
4.4.5	Focus on Trust	97
4.4.6	Top Management Support	98
4.4.7	Privacy as Profit Maximization	99
4.5	Summary and Avenues for Research	100

Part II Customer Lifetime Value (LTV)

5	Customer Lifetime Value: Fundamentals	105
5.1	Introduction	105
5.1.1	Definition of Lifetime Value of a Customer	106
5.1.2	A Simple Example of Calculating Customer Lifetime Value	106
5.2	Mathematical Formulation of LTV	108
5.3	The Two Primary LTV Models: Simple Retention and Migration	109
5.3.1	Simple Retention Models	109
5.3.2	Migration Models	114
5.4	LTV Models that Include Unobserved Customer Attrition	121
5.5	Estimating Revenues	130
5.5.1	Constant Revenue per Period Model	130
5.5.2	Trend Models	130
5.5.3	Causal Models	130
5.5.4	Stochastic Models of Purchase Rates and Volume	131
6	Issues in Computing Customer Lifetime Value	133
6.1	Introduction	133
6.2	Discount Rate and Time Horizon	134
6.2.1	Opportunity Cost of Capital Approach	134
6.2.2	Discount Rate Based on the Source-of-Risk Approach	140
6.3	Customer Portfolio Management	142
6.4	Cost Accounting Issues	145
6.4.1	Activity-Based Costing (ABC)	145
6.4.2	Variable Costs and Allocating Fixed Overhead	148
6.5	Incorporating Marketing Response	154
6.6	Incorporating Externalities	158

7	Customer Lifetime Value Applications	161
7.1	Using LTV to Target Customer Acquisition	161
7.2	Using LTV to Guide Customer Reactivation Strategies	163
7.3	Using SMC's Model to Value Customers	164
7.4	A Case Example of Applying LTV Modeling	168
7.5	Segmentation Methods Using Variants of LTV	172
7.5.1	Customer Pyramids	172
7.5.2	Creating Customer Portfolios Using LTV Measures	174
7.6	Drivers of the Components of LTV	175
7.7	Forecasting Potential LTV	176
7.8	Valuing a Firm's Customer Base	178

Part III Database Marketing Tools: The Basics

8	Sources of Data	183
8.1	Introduction	183
8.2	Types of Data for Describing Customers	184
8.2.1	Customer Identification Data	184
8.2.2	Demographic Data	186
8.2.3	Psychographic or Lifestyle Data	186
8.2.4	Transaction Data	188
8.2.5	Marketing Action Data	190
8.2.6	Other Types of Data	191
8.3	Sources of Customer Information	191
8.3.1	Internal (Secondary) Data	192
8.3.2	External (Secondary) Data	193
8.3.3	Primary Data	211
8.4	The Destination Marketing Company	213
9	Test Design and Analysis	215
9.1	The Importance of Testing	215
9.2	To Test or Not to Test	216
9.2.1	Value of Information	216
9.2.2	Assessing Mistargeting Costs	221
9.3	Sampling Techniques	223
9.3.1	Probability Versus Nonprobability Sampling	224
9.3.2	Simple Random Sampling	224
9.3.3	Systematic Random Sampling	225
9.3.4	Other Sampling Techniques	226
9.4	Determining the Sample Size	227
9.4.1	Statistical Approach	227
9.4.2	Decision Theoretic Approach	229
9.5	Test Designs	235
9.5.1	Single Factor Experiments	235

9.5.2	Multifactor Experiments: Full Factorials	238
9.5.3	Multifactor Experiments: Orthogonal Designs	241
9.5.4	Quasi-Experiments	243
10	The Predictive Modeling Process	245
10.1	Predictive Modelling and the Quest for Marketing Productivity	245
10.2	The Predictive Modeling Process: Overview	248
10.3	The Process in Detail	248
10.3.1	Define the Problem	248
10.3.2	Prepare the Data	250
10.3.3	Estimate the Model	256
10.3.4	Evaluate the Model	259
10.3.5	Select Customers to Target	267
10.4	A Predictive Modeling Example	275
10.5	Long-Term Considerations	280
10.5.1	Preaching to the Choir	280
10.5.2	Model Shelf Life and Selectivity Bias	280
10.5.3	Learning from the Interpretation of Predictive Models	284
10.5.4	Predictive Modeling Is a Process to Be Managed	285
10.6	Future Research	286

Part IV Database Marketing Tools: Statistical Techniques

11	Statistical Issues in Predictive Modeling	291
11.1	Economic Justification for Building a Statistical Model	292
11.2	Selection of Variables and Models	293
11.2.1	Variable Selection	293
11.2.2	Variable Transformations	299
11.3	Treatment of Missing Variables	301
11.3.1	Casewise Deletion	302
11.3.2	Pairwise Deletion	302
11.3.3	Single Imputation	302
11.3.4	Multiple Imputation	303
11.3.5	Data Fusion	305
11.3.6	Missing Variable Dummies	307
11.4	Evaluation of Statistical Models	308
11.4.1	Dividing the Sample into the Calibration and Validation Sample	309
11.4.2	Evaluation Criteria	312
11.5	Concluding Note: Evolutionary Model-Building	321

12 RFM Analysis	323
12.1 Introduction	323
12.2 The Basics of the RFM Model	324
12.2.1 Definition of Recency, Frequency, and Monetary Value	324
12.2.2 RFM for Segment-Level Prediction	326
12.3 Breakeven Analysis: Determining the Cutoff Point	327
12.3.1 Profit Maximizing Cutoff Response Probability	328
12.3.2 Heterogeneous Order Amounts	329
12.4 Extending the RFM Model	331
12.4.1 Treating the RFM Model as ANOVA	331
12.4.2 Alternative Response Models Without Discretization ..	334
12.4.3 A Stochastic RFM Model by Colombo and Jiang (1999)	336
13 Market Basket Analysis	339
13.1 Introduction	339
13.2 Benefits for Marketers	340
13.3 Deriving Market Basket Association Rules	341
13.3.1 Setup of a Market Basket Problem	341
13.3.2 Deriving “Interesting” Association Rules	342
13.3.3 Zhang (2000) Measures of Association and Dissociation	345
13.4 Issues in Market Basket Analysis	346
13.4.1 Using Taxonomies to Overcome the Dimensionality Problem	346
13.4.2 Association Rules for More than Two Items	347
13.4.3 Adding Virtual Items to Enrich the Quality of the Market Basket Analysis	348
13.4.4 Adding Temporal Component to the Market Basket Analysis	349
13.5 Conclusion	350
14 Collaborative Filtering	353
14.1 Introduction	353
14.2 Memory-Based Methods	354
14.2.1 Computing Similarity Between Users	356
14.2.2 Evaluation Metrics	360
14.3 Model-Based Methods	363
14.3.1 The Cluster Model	364
14.3.2 Item-Based Collaborative Filtering	364
14.3.3 A Bayesian Mixture Model by Chien and George (1999)	366
14.3.4 A Hierarchical Bayesian Approach by Ansari et al. (2000)	366

14.4	Current Issues in Collaborative Filtering	368
14.4.1	Combining Content-Based Information Filtering with Collaborative Filtering	368
14.4.2	Implicit Ratings.....	372
14.4.3	Selection Bias	374
14.4.4	Recommendations Across Categories	375
15	Discrete Dependent Variables and Duration Models	377
15.1	Binary Response Model	378
15.1.1	Linear Probability Model	378
15.1.2	Binary Logit (or Logistic Regression) and Probit Models	379
15.1.3	Logistic Regression with Rare Events Data	382
15.1.4	Discriminant Analysis.....	385
15.2	Multinomial Response Model	386
15.3	Models for Count Data.....	388
15.3.1	Poisson Regression	388
15.3.2	Negative Binomial Regression	389
15.4	Censored Regression (Tobit) Models and Extensions	390
15.5	Time Duration (Hazard) Models.....	392
15.5.1	Characteristics of Duration Data	393
15.5.2	Analysis of Duration Data Using a Classical Linear Regression.....	394
15.5.3	Hazard Models.....	395
15.5.4	Incorporating Covariates into the Hazard Function ...	398
16	Cluster Analysis	401
16.1	Introduction	401
16.2	The Clustering Process.....	402
16.2.1	Selecting Clustering Variables	403
16.2.2	Similarity Measures.....	404
16.2.3	Clustering Methods.....	408
16.2.4	The Number of Clusters.....	418
16.3	Applying Cluster Analysis	419
16.3.1	Interpreting the Results	419
16.3.2	Targeting the Desired Cluster	420
17	Decision Trees	423
17.1	Introduction	423
17.2	Fundamentals of Decision Trees	424
17.3	Finding the Best Splitting Rule	427
17.3.1	Gini Index of Diversity	427
17.3.2	Entropy and Information Theoretic Measures	429
17.3.3	Chi-Square Test	430
17.3.4	Other Splitting Rules	432

17.4	Finding the Right Sized Tree.....	432
17.4.1	Pruning	432
17.4.2	Other Methods for Finding the Right Sized Tree	434
17.5	Other Issues in Decision Trees.....	435
17.5.1	Multivariate Splits.....	436
17.5.2	Cost Considerations	436
17.5.3	Finding an Optimal Tree	436
17.6	Application to a Direct Mail Offer	437
17.7	Strengths and Weaknesses of Decision Trees	438
18	Artificial Neural Networks.....	443
18.1	Introduction	443
18.1.1	Historical Remarks	443
18.1.2	ANN Applications in Database Marketing	444
18.1.3	Strengths and Weaknesses	445
18.2	Models of Neurons	447
18.3	Multilayer Perceptrons	450
18.3.1	Network Architecture	451
18.3.2	Back-Propagation Algorithm.....	454
18.3.3	Application to Credit Scoring	455
18.3.4	Optimal Number of Units in the Hidden Layer, Learning-Rate, and Momentum Parameters	457
18.3.5	Stopping Criteria.....	457
18.3.6	Feature (Input Variable) Selection	458
18.3.7	Assessing the Importance of the Input Variables.....	459
18.4	Radial-Basis Function Networks	460
18.4.1	Background	460
18.4.2	A Curve-Fitting (Approximation) Problem	461
18.4.3	Application Example	463
19	Machine Learning	465
19.1	Introduction	465
19.2	1-Rule	466
19.3	Rule Induction by Covering Algorithms	468
19.3.1	Covering Algorithms and Decision Trees.....	469
19.3.2	PRISM	470
19.3.3	A Probability Measure for Rule Evaluation and the INDUCT Algorithm	474
19.4	Instance-Based Learning	477
19.4.1	Strengths and Limitations	478
19.4.2	A Brief Description of an Instance-Based Learning Algorithm	478
19.4.3	Selection of Exemplars	479
19.4.4	Attribute Weights	481
19.5	Genetic Algorithms	481

19.6 Bayesian Networks	484
19.7 Support Vector Machines	486
19.8 Combining Multiple Models: Committee Machines	489
19.8.1 Bagging	490
19.8.2 Boosting	491
19.8.3 Other Committee Machines	492

Part V Customer Management

20 Acquiring Customers	495
20.1 Introduction	495
20.2 The Fundamental Equation of Customer Equity	496
20.3 Acquisition Costs	497
20.4 Strategies for Increasing Number of Customers Acquired	499
20.4.1 Increasing Market Size	499
20.4.2 Increasing Marketing Acquisition Expenditures.....	500
20.4.3 Changing the Shape of the Acquisition Curve	501
20.4.4 Using Lead Products	503
20.4.5 Acquisition Pricing and Promotions	504
20.5 Developing a Customer Acquisition Program	505
20.5.1 Framework	505
20.5.2 Segmentation, Targeting and Positioning (STP)	506
20.5.3 Product/Service Offering	507
20.5.4 Acquisition Targeting	508
20.5.5 Targeting Methods for Customer Acquisition.....	510
20.6 Research Issues in Acquisition Marketing	514
21 Cross-Selling and Up-Selling	515
21.1 The Strategy	515
21.2 Cross-Selling Models	516
21.2.1 Next-Product-to-Buy Models	517
21.2.2 Next-Product-to-Buy Models with Explicit Consideration of Purchase Timing	529
21.2.3 Next-Product-to-Buy with Timing and Response	534
21.3 Up-Selling	537
21.3.1 A Data Envelope Analysis Model	538
21.3.2 A Stochastic Frontier Model	540
21.4 Developing an Ongoing Cross-Selling Effort	541
21.4.1 Process Overview.....	541
21.4.2 Strategy.....	541
21.4.3 Data Collection	544
21.4.4 Analytics	544
21.4.5 Implementation	546

21.4.6 Evaluation	546
21.5 Research Needs	547
22 Frequency Reward Programs	549
22.1 Definition and Motivation	549
22.2 How Frequency Reward Programs Influence Customer Behavior	550
22.2.1 Mechanisms for Increasing Sales	550
22.2.2 What We Know About How Customers Respond to Reward Programs	552
22.3 Do Frequency Reward Programs Increase Profits in a Competitive Environment?	562
22.4 Frequency Reward Program Design	565
22.4.1 Design Decisions	565
22.4.2 Infrastructure	565
22.4.3 Enrollment Procedures	566
22.4.4 Reward Schedule	566
22.4.5 The Reward	569
22.4.6 Personalized Marketing	571
22.4.7 Partnering	572
22.4.8 Monitor and Evaluate	573
22.5 Frequency Reward Program Examples	573
22.5.1 Harrah's Entertainment ¹	573
22.5.2 The UK Supermarket Industry: Nectar Versus Clubcard	574
22.5.3 Cingular Rollover Minutes	576
22.5.4 Hilton Hotels	576
22.6 Research Needs	578
23 Customer Tier Programs	579
23.1 Definition and Motivation	579
23.2 Designing Customer Tier Programs	581
23.2.1 Overview	581
23.2.2 Review Objectives	582
23.2.3 Create the Customer Database	582
23.2.4 Define Tiers	582
23.2.5 Determine Acquisition Potential for Each Tier	584
23.2.6 Determine Development Potential for Each Tier	585
23.2.7 Allocate Funds to Tiers	588
23.2.8 Design Tier-Specific Programs	595
23.2.9 Implement and Evaluate	596
23.3 Examples of Customer Tier Programs	597
23.3.1 Bank One (Hartfeil 1996)	597
23.3.2 Royal Bank of Canada (Rasmusson 1999)	598
23.3.3 Thomas Cook Travel (Rasmusson 1999)	598

23.3.4	Canadian Grocery Store Chain (Grant and Schlesinger 1995)	598
23.3.5	Major US Bank (Rust et al. 2000)	599
23.3.6	Viking Office Products (Miller 2001)	600
23.3.7	Swedbank (Storbacka and Luukinen 1994, see also Storbacka 1993)	600
23.4	Risks in Implementing Customer Tier Programs	601
23.5	Future Research Requirements	604
24	Churn Management	607
24.1	The Problem.....	607
24.2	Factors that Cause Churn	611
24.3	Predicting Customer Churn.....	615
24.3.1	Single Future Period Models	616
24.3.2	Time Series Models	622
24.4	Managerial Approaches to Reducing Churn	625
24.4.1	Overview	625
24.4.2	A Framework for Proactive Churn Management	627
24.4.3	Implementing a Proactive Churn Management Program	631
24.5	Future Research	633
25	Multichannel Customer Management	635
25.1	The Emergence of Multichannel Customer Management	636
25.1.1	The Push Toward Multichannel	636
25.1.2	The Pull of Multichannel	636
25.2	The Multichannel Customer	637
25.2.1	A Framework for Studying the Customer's Channel Choice Decision	637
25.2.2	Characteristics of Multichannel Customers.....	638
25.2.3	Determinants of Channel Choice	641
25.2.4	Models of Customer Channel Migration	647
25.2.5	Research Shopping	652
25.2.6	Channel Usage and Customer Loyalty	655
25.2.7	The Impact of Acquisition Channel on Customer Behavior	655
25.2.8	The Impact of Channel Introduction on Firm Performance	657
25.3	Developing Multichannel Strategies	659
25.3.1	Framework for the Multichannel Design Process	659
25.3.2	Analyze Customers	659
25.3.3	Design Channels	661
25.3.4	Implementation	667
25.3.5	Evaluation	668

25.4	Industry Examples	672
25.4.1	Retail “Best Practice” (Crawford 2002)	672
25.4.2	Waters Corporation (CRM ROI Review 2003).....	672
25.4.3	The Pharmaceutical Industry (Boehm 2002)	673
25.4.4	Circuit City (Smith 2006; Wolf 2006)	674
25.4.5	Summary.....	674
26	Acquisition and Retention Management	675
26.1	Introduction	675
26.2	Modeling Acquisition and Retention	676
26.2.1	The Blattberg and Deighton (1996) Model.....	676
26.2.2	Cohort Models	682
26.2.3	Type II Tobit Models	682
26.2.4	Competitive Models	687
26.2.5	Summary: Lessons on How to Model Acquisition and Retention	689
26.3	Optimal Acquisition and Retention Spending	690
26.3.1	Optimizing the Blattberg/Deighton Model with No Budget Constraint	691
26.3.2	The Relationship Among Acquisition and Retention Costs, LTV, and Optimal Spending: If Acquisition “Costs” Exceed Retention “Costs”, Should the Firm Focus on Retention?	695
26.3.3	Optimizing the Budget-Constrained Blattberg/Deighton Model.....	698
26.3.4	Optimizing a Multi-Period, Budget-Constrained Cohort Model	702
26.3.5	Optimizing the Reinartz et al. (2005) Tobit Model	705
26.3.6	Summary: When Should We Spend More on Acquisition or Retention?	706
26.4	Acquisition and Retention Budget Planning.....	708
26.4.1	The Customer Management Marketing Budget (CMMB)	708
26.4.2	Implementation Issues	709
26.5	Acquisition and Retention Strategy: An Overall Framework ..	710

Part VI Managing the Marketing Mix

27	Designing Database Marketing Communications	715
27.1	The Planning Process	715
27.2	Setting the Overall Plan	716
27.2.1	Objectives	716
27.2.2	Strategy.....	717

27.2.3	Budget	717
27.2.4	Summary	718
27.3	Developing Copy	719
27.3.1	Creative Strategy	719
27.3.2	The Offer	723
27.3.3	The Product	726
27.3.4	Personalizing Multiple Components of the Communication	736
27.4	Selecting Media	737
27.4.1	Optimization	737
27.4.2	Integrated Marketing Communications	739
27.5	Evaluating Communications Programs	739
28	Multiple Campaign Management	743
28.1	Overview	743
28.2	Dynamic Response Phenomena	744
28.2.1	Wear-in, Wear-out, and Forgetting	744
28.2.2	Overlap	749
28.2.3	Purchase Acceleration, Loyalty, and Price Sensitivity Effects	750
28.2.4	Including Wear-in, Wear-out, Forgetting, Overlap, Acceleration, and Loyalty	752
28.3	Optimal Contact Models	753
28.3.1	A Promotions Model (Ching et al. 2004)	755
28.3.2	Using a Decision Tree Response Model (Simester et al. 2006)	756
28.3.3	Using a Hazard Response Model (Gönül et al. 2000)	758
28.3.4	Using a Hierarchical Bayes Model (Rust and Verhoef 2005)	760
28.3.5	Incorporating Customer and Firm Dynamic Rationality (Gönül and Shi 1998)	763
28.3.6	Incorporating Inventory Management (Bitran and Mondschein 1996)	765
28.3.7	Incorporating a Variety of Catalogs (Campbell et al. 2001)	768
28.3.8	Multiple Catalog Mailings (Elsner et al. 2003, 2004)	772
28.3.9	Increasing Response to Online Panel Surveys (Neslin et al. 2007)	774
28.4	Summary	777
29	Pricing	781
29.1	Overview – Customer-based Pricing	781

29.2 Customer Pricing when Customers Can Purchase Multiple One-Time Products from the Firm.....	783
29.2.1 Case 1: Only Product 1 Is Purchased	786
29.2.2 Case 2: Two Product Purchase Model with Lead Product 1	786
29.3 Pricing the Same Products/Services to Customers over Two Periods	788
29.3.1 Pessimistic Case: $R < q$ – Expectations of Quality are Less than Actual Quality	789
29.3.2 Optimistic Case: $R > q$ – Expectations of Quality are Greater than Actual Quality	790
29.3.3 Research Issues	790
29.4 Acquisition and Retention Pricing Using the Customer Equity Model	791
29.5 Pricing to Recapture Customers	794
29.6 Pricing Add-on Sales.....	796
29.7 Price Discrimination Through Database Targeting Models ...	797
References	801
Author Index	847
Subject Index	859