

# Short Table of Contents

<b>Foreword</b>	<b>V</b>
<b>Preface</b>	<b>IX</b>
<b>List of Figures</b>	<b>XIX</b>
<b>List of Tables</b>	<b>XXI</b>
<b>List of Source Code Clippings</b>	<b>XXV</b>
<b>List of Abbreviations</b>	<b>XXVII</b>
<b>Summary</b>	<b>XXIX</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Fundamentals of Customer Relationship Management</b>	<b>11</b>
<b>3 The Drivers of Cross-Buying Behavior in Non-Contractual Settings</b>	<b>49</b>
<b>4 Stochastic Models for Predicting Customer Activity and Future Best Customers in Non-Contractual Settings</b>	<b>91</b>

<b>5</b>	<b>Support Vector Machines for Predicting Customer Activity and Future Best Customers in Non-Contractual Settings</b>	<b>135</b>
<b>6</b>	<b>Reflections on Developing and Maintaining Customer Relationships in Non-Contractual Settings</b>	<b>171</b>
<b>7</b>	<b>Customer Relationship Management in the 21<sup>st</sup> Century</b>	<b>183</b>
	<b>References</b>	<b>192</b>
<b>A</b>	<b>Additional Tables and Figures</b>	<b>229</b>

# Table of Contents

<b>Foreword</b>	<b>V</b>
<b>Preface</b>	<b>IX</b>
<b>List of Figures</b>	<b>XIX</b>
<b>List of Tables</b>	<b>XXI</b>
<b>List of Source Code Clippings</b>	<b>XXV</b>
<b>List of Abbreviations</b>	<b>XXVII</b>
<b>Summary</b>	<b>XXIX</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Exigency for Analytical Customer Relationship Management . . . . .	1
1.2 Research Scope . . . . .	5
1.3 Proceedings of the Study . . . . .	8
<b>2 Fundamentals of Customer Relationship Management</b>	<b>11</b>
2.1 From Relationship Marketing to Contemporary Customer Relationship Management . . . . .	11
2.2 Valued-Based Customer Relationship Management . . . . .	16
2.2.1 Customer Relationships and Shareholder Value . . . . .	16
2.2.2 Customer Lifetime Value and Customer Equity as Metrics for the Value of Customer Relationships . . . . .	19
2.2.3 The Chain from Marketing Investments to Shareholder Value	22
2.3 Customer Life Cycle . . . . .	26

2.3.1	Relationship Length, Depth, and Breadth as Behavioral Dimensions of Customer Relationships . . . . .	26
2.3.2	Research Findings on the Behavioral Dimensions of Customer Relationships . . . . .	32
2.3.2.1	Relationship Length . . . . .	32
2.3.2.2	Relationship Depth . . . . .	33
2.3.2.3	Relationship Breadth . . . . .	40
2.3.3	The Necessity of Further Investigation of Relationship Length, Depth, and Breadth in Non-Contractual Settings . . . . .	44
<b>3</b>	<b>The Drivers of Cross-Buying Behavior in Non-Contractual Settings</b>	<b>49</b>
3.1	Introduction . . . . .	49
3.2	Theoretical Contributions to Explaining Cross-Buying . . . . .	51
3.2.1	Theory Pluralism in Explaining Cross-Buying . . . . .	51
3.2.2	Learning Theory . . . . .	53
3.2.3	Risk Theory . . . . .	53
3.2.4	Social Exchange Theory . . . . .	56
3.2.5	Transaction Cost Theory . . . . .	57
3.3	Antecedents of Cross-Buying Behavior . . . . .	58
3.3.1	Convenience . . . . .	58
3.3.2	Merchandise Quality . . . . .	60
3.3.3	Commitment . . . . .	61
3.3.4	Payment equity . . . . .	63
3.3.5	Social benefits . . . . .	64
3.4	Short Recapitulation of the Theoretical Background of Cross-Buying	65
3.5	Research Design . . . . .	68
3.5.1	Research Context . . . . .	68
3.5.2	Purchase Intention and Purchase Behavior . . . . .	69
3.5.3	Data . . . . .	72
3.5.4	Measurement of Latent Variables . . . . .	74
3.5.4.1	Overview . . . . .	74
3.5.4.2	Reliability and Validity . . . . .	75

3.5.5	An Econometric Model of Value-Added Service Purchase Behavior . . . . .	80
3.5.6	An Econometric Model of Cross-Category Purchase Behavior . . . . .	81
3.6	Analysis Results . . . . .	83
3.7	Discussion . . . . .	88
<b>4</b>	<b>Stochastic Models for Predicting Customer Activity and Future Best Customers in Non-Contractual Settings</b>	<b>91</b>
4.1	Introduction . . . . .	91
4.2	Heuristics in Managerial Practice . . . . .	92
4.3	Stochastic Customer Base Analysis Models . . . . .	94
4.3.1	Overview . . . . .	94
4.3.2	Pareto/NBD Model . . . . .	95
4.3.3	BG/NBD Model . . . . .	96
4.4	Data . . . . .	97
4.5	Analysis of Predictive Performance . . . . .	100
4.5.1	Overview . . . . .	100
4.5.2	Parameter Estimation . . . . .	100
4.5.3	Prediction of Customer Activity . . . . .	102
4.5.4	Prediction of Future Purchase-Levels . . . . .	106
4.5.5	Prediction of Future Best Customers . . . . .	108
4.5.6	Sensitivity Analysis with Respect to Holdout Period Length and Time Unit Granularity . . . . .	114
4.6	Analysis of the Pareto/NBD Model Estimators . . . . .	116
4.6.1	Discrepancy between Recommendation and Application of the Pareto/NBD Model . . . . .	116
4.6.2	Parameter Estimation . . . . .	117
4.6.2.1	Two-Step Estimation . . . . .	117
4.6.2.2	Maximum Likelihood Estimation . . . . .	119
4.6.2.3	Reasons for the Abnormal Behavior of the Maximum Likelihood Estimator on the Apparel Data Set . . . . .	126
4.7	Discussion . . . . .	132

<b>5</b>	<b>Support Vector Machines for Predicting Customer Activity and Future Best Customers in Non-Contractual Settings</b>	<b>135</b>
5.1	Introduction . . . . .	135
5.2	Supervised and Unsupervised Learning in Data Mining . . . . .	137
5.3	Structural Risk Minimization . . . . .	138
5.3.1	Expected and Empirical Risk . . . . .	138
5.3.2	Vapnik-Chervonenkis Dimension . . . . .	141
5.3.3	An Upper Bound for the Expected Risk of a Learning Machine . . . . .	142
5.4	Introduction to the Support Vector Machine . . . . .	144
5.4.1	The Maximum-Margin Support Vector Machine for Linearly Separable Data . . . . .	144
5.4.2	The Soft-Margin Support Vector Machine for Non-Linearly Separable Data . . . . .	149
5.4.3	Linearization of Complex Structures using the Kernel Trick . . . . .	151
5.4.4	Cost-Sensitive Learning using the SVM . . . . .	155
5.5	Research Methodology . . . . .	157
5.5.1	Research Design . . . . .	157
5.5.2	Classifier Evaluation with Respect to Financial Performance . . . . .	159
5.5.3	Analysis . . . . .	161
5.5.3.1	SVM Training and Validation . . . . .	161
5.5.3.2	Profit Optimization . . . . .	163
5.6	Analysis Results . . . . .	164
5.6.1	Prediction of Customer Activity . . . . .	164
5.6.2	Prediction of Future Best Customers . . . . .	166
5.7	Discussion . . . . .	170
<b>6</b>	<b>Reflections on Developing and Maintaining Customer Relationships in Non-Contractual Settings</b>	<b>171</b>
6.1	Summary of Main Findings . . . . .	171
6.2	Research and Managerial Implications . . . . .	174
6.3	Limitations of the Studies . . . . .	179
<b>7</b>	<b>Customer Relationship Management in the 21<sup>st</sup> Century</b>	<b>183</b>

---

7.1	Future Challenges for Customer Relationship Management . . . . .	183
7.2	Accounting for a Cross-Functional View of CRM . . . . .	184
7.3	Accounting for Customer Behavior and Marketplace Dynamics . . .	187
7.4	Accounting for Customers' Privacy . . . . .	190
<b>References</b>		<b>192</b>
<b>A Additional Tables and Figures</b>		<b>229</b>
A.1	Additional Tables for Customer Activity Prediction . . . . .	229
A.2	Additional Tables for Purchase-Level Prediction . . . . .	238
A.3	Additional Tables for Future Best Customer Prediction . . . . .	240