## **Contents**

	Figures and Tables	viii
	Introduction	1
1	Systems and Tourism Systems	4
	Introduction	4
	Towards a Systemic View: A Short History	5
	Complex Adaptive Systems	9
	Complexity and wicked problems	14
	Tourism and Tourism Systems	15
	Concluding Remarks	19
	References	20
2	Models and Modelling	22
	Introduction	22
	How Do We Model a System?	29
	Model building	29
	Computational Models and Simulations	33
	Evaluation of computational models and simulations	37
	Calibration, fitness and sensitivity analysis	38
	Concluding Remarks	41
	Notes	43
	References	43
3	Methodological Approaches	46
	Introduction	46
	The object of study	47
	Conceptual Models	48
	Statistical Models	51
	Machine Learning	55
	Network Analysis	62

	Agent-based Models	71
	System Dynamic Models	75
	Concluding Remarks	78
	References	78
4	Advanced Modelling Methods	82
	Exponential Random Graphs Models	83
	Multilayer and Multiplex Networks	87
	Multilayer network representation	89
	Example applications	92
	Artificial Intelligence Developments: Deep Learning Systems	95
	Example applications	98
	Concluding Remarks	99
	References	100
5	Choosing a Modelling Method	102
	The Complexity of Models and Simulations	103
	Problem Statement	105
	Data	112
	Other Decision Factors	116
	Concluding Remarks	119
	References	120
6	Tourism and Hospitality Case Studies	122
	International Tourism Flows between European Countries	122
	Problem statement	122
	Methods: Choice and use	123
	Data collection and preparation	123
	Worked example	124
	Predicting Cancellations of Hotel Bookings	131
	Problem statement	131
	Methods: Choice and use	132
	Data collection and preparation	132
	Worked example	135
	The Importance of Networking for a Hotel	137
	Problem statement	137
	Methods: Choice and use	137
	Data collection and preparation	138
	Worked example	138
	Tourism Development and the Environment: A	
	Long-Term Perspective	139
	Problem statement	139

Contents	vii
----------	-----

Methods: Choice and use	140
Data collection and preparation	140
Worked example	141
Concluding Remarks	143
References	143
A Closing Remark	
References	150
Appendix 1: Further Readings	
Conceptual Modelling	151
Statistical Modelling	152
Machine Learning and Artificial Intelligence	152
System Dynamics Modelling	152
Network Science	153
Agent-based Modelling	153
Appendix 2: Software Programs	155
Programming Languages and Development Environments	156
Software Packages	157
Conceptual models	157
Statistical models	158
System dynamic models	158
Agent-based models	159
Network models	159
Machine learning	160
Beginners' Corner	161
Index	