Modelling and Simulations for Tourism and Hospitality

TOURISM ESSENTIALS

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TOURISM ESSENTIALS: 6

Modelling and Simulations for Tourism and Hospitality

An Introduction

Jacopo A. Baggio and Rodolfo Baggio

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To a woman (mother and wife) who inspired our lives and will not read this book.

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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

Methods: Choice and use 140
Data collection and preparation 140
Worked example 141
Concluding Remarks 143
References 143

A Closing Remark 146
References 150

Appendix 1: Further Readings 151
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 162

Figures and Tables

Figures

Figure 1.1	A graphical rendering of the main concepts related to complex systems	12
Figure 1.2	A logistic map	14
Figure 1.3	Problems and their characteristics	15
Figure 2.1	The Ptolemaic model of the solar system and the deferent/epicycle model for the motion of a planet	23
Figure 2.2	Drawing of a medieval planispheric astrolabe	23
Figure 2.3	Level of aggregation and modelling technique	27
Figure 2.4	System dynamic representation of strategy adoption	28
Figure 2.5	Representation of the system dynamic model as an agent-based model	29
Figure 2.6	Representation of the model building process	30
Figure 2.7	A schematic view of modelling and simulation	42
Figure 3.1	The city of Cremona, Italy	47
Figure 3.2	The conceptual mode of local food consumption (A) and the outcomes of its empirical verification (B)	50
Figure 3.3	Schematic view of the main classes of ML techniques	57
Figure 3.4	Schematic view of a machine learning model implementation	59
Figure 3.5	Rapidminer workflow	60
Figure 3.6	Most frequent origins of Cremona visitors	62
Figure 3.7	Most frequent destinations for Cremona visitors	62
Figure 3.8	A simple network with its adjacency matrix	63
Figure 3.9	The Cremona network and its cumulative degree distribution	68
Figure 3.10	Average clustering coefficient as a function of degree	69

Figure 3.11	Modularity analysis of Cremona network	70
Figure 3.12	The NetLogo diffusion model	74
Figure 3.13	Simulation results: (A) the cumulative distribution of infected individuals and (B) the differential distribution	74
Figure 3.14	Causal loop diagram	75
Figure 3.15	Stock and flow diagram	76
Figure 3.16	CLD for a Bass diffusion model	76
Figure 3.17	Stock and flow diagram for the Bass model	77
Figure 3.18	Bass model outcomes when changing simulation parameters	77
Figure 4.1	Graphlets examples	85
Figure 4.2	Multilayer network	88
Figure 4.3	Multilayer network with its supra-adjacency matrix representation	90
Figure 4.4	Layered network and examples of micro-configurations (motifs)	91
Figure 4.5	Representation of an artificial neuron	96
Figure 4.6	A simple neural network	96
Figure 5.1	Balancing the confidence and complication of a model	105
Figure 5.2	Problem statements, data and modelling techniques	117
Figure 6.1	NetLogo interface of the model implementation	126
Figure 6.2	Difference between observed and simulated tourist flows from country *i* to country *j*	129
Figure 6.3	Rapidminer operators for the prediction of cancellations	134
Figure 6.4	Rapidminer setting for the application of a model on H2	134
Figure 6.5	Prediction of cancellations	135
Figure 6.6	Correlation between hotels' occupancy and quality of network position	139
Figure 6.7	Schematic representation of the system dynamic model	141
Figure 6.8	NetLogo system dynamic build and model interface implementation	143
Figure c.1	Interrelation between cognitive acts without (A) and with (B) action and model of values	148
Figure c.2	A possible approach for studying tourism systems	149

Tables

Table 1.1	Characteristics of simple, complicated and complex systems	10
Table 3.1	A conceptual model for tourism activities and governance in Cremona	50
Table 3.2	Opinions on Cremona	54
Table 3.3	Regression model results	55
Table 3.4	Sample from the input data set	60
Table 3.5	Sample association rules for travellers coming to Cremona	61
Table 3.6	Sample association rules for travellers outgoing from Cremona	61
Table 3.7	Cremona network composition	68
Table 3.8	Main Cremona network metrics	69
Table 3.9	Most relevant actors in the Cremona network	71
Table 5.1	Generalised problem statement and preferred modelling technique	111
Table 5.2	Main features defining the quality of data	114
Table 5.3	Data type and availability and preferred modelling technique	116
Table 6.1	Fitness (*ff*) and average traveller's discrepancy between simulated and observed (Avg ΔPop) data for the top 10 fitness evaluations	128
Table 6.2	Fitness (*ff*) loss when changing parameters by 10%	130
Table 6.3	Confusion matrices for the data set H1	136
Table 6.4	Confusion matrices for the data set H2	136
Table 6.5	Percentage difference between models for H1 and H2	136
Table 6.6	Correlation coefficients	138

Introduction

Essentially, all models are wrong, but some are useful. This famous aphorism, attributed to the renowned statistician George Box, seems to be a standard beginning for any book on modelling and simulation. Despite its resemblance to a joke, the aphorism contains an essence of truth: that this is more an art than a science.

Even though a vast array of scholars and practitioners of all disciplines have produced and implemented a wide number of methods and tools, the assembly and operation of a set of techniques that can supply meaningful answers to a question is a task that requires not only good technical competences but, even more importantly, good experience and a familiarity with many, often not completely clear, concepts.

Moreover, given the contemporary landscape, it would be quite uncommon for one individual to have all the skills and the practice required. Modelling is thus a multidisciplinary endeavour, in which diverse know-hows need to be composed in a smooth and harmonious way.

The tourism domain has progressed considerably in its ability to understand the phenomenon and the components that make this one of the most interesting and fascinating areas. However, the tourism researcher's or analyst's toolbox has seen little improvement. Most of the works published use rather traditional approaches and methods and concentrate more on a wide number of detailed investigations, often losing sight of the larger issues.

With the recognition, nowadays well grounded, of the complex nature of the phenomenon, of the systems involved and of their relationships, internal or external, there is a need, well expressed on several occasions, to proceed towards different perspectives. Today, this is also imposed by the incredible advances in information and communication

technologies that have made available a wealth of means, algorithms and techniques that can be usefully employed for the purpose.

With this work, we try to raise the awareness of tourism and hospitality researchers by providing an essential introduction to the most popular methods useful for modelling and simulating systems and phenomena of interest for those who deal with the intricate and complex world of tourism.

We are well aware that we only scratch the surface of the domain, and we do not pretend to provide a fully fledged manual, as this would be an almost impossible endeavour. Some of the techniques described here require a highly complicated and sophisticated technical background and the interested reader can refer to specific textbooks on such techniques. Here, we have chosen to focus on the main concepts and avoid, as much as possible, the technicalities and descriptions of the nuts and bolts of the methods introduced.

We think that a compact and documented work providing an overview of techniques and methods representing the complexity of these methods can be useful in raising awareness and in pushing researchers and practitioners to enhance and enrich their toolboxes to achieve a better and more profound knowledge of their field, so important in today's social and economic settings.

The book is organised as follows.

Chapter 1 discusses the static and dynamic attributes of a complex system, the basis for justifying the use of modelling and simulation techniques. When choosing a method for exploring a phenomenon or a subject, we inevitably make assumptions on their nature. These assumptions direct the way we formulate questions, or arrange theories and models, carry out empirical work and interpret evidence. It is well known that a complex system must be treated in a holistic way and that many of the conventional methods are unable to correctly provide insights on specific issues, problems and questions. This is also true in the study of tourism and other connected areas.

Chapter 2 contains a series of considerations on what modelling is and the importance and the usefulness of simulation activities. Models describe our beliefs about how the object of our studies functions, which are translated into some formal language. In some cases, this language is the language of mathematics, and the relationships we write may give full account of the peculiarities and the behaviours of our target. In most cases, however, we cannot easily produce relationships, or we are unable to solve the equations and we need to resort to numerical models. In either case, building a reliable model and running a successful simulation

requires attention to a number of elements that are discussed in the chapter.

Chapter 3 describes the features and introduces the most used modelling methods. Conceptual, statistical, machine learning, network analytic, system dynamic and agent-based models are briefly sketched and worked examples are proposed to better grasp the modelling and simulation methods of interest to the tourism community. These are, rather obviously, all numerical computational methods that analyse several aspects, from the structural characteristics of a tourism destination, the most important object of study in the tourism domain, to the examination of different facets of the preferences, the needs and the behaviours of travellers and tourists.

Chapter 4 briefly outlines some of the most interesting advanced methods in the fields of network analysis and artificial intelligence. The most elementary methods used for analysing networks, although proven quite effective in the tourism domain, hardly scratch the surface of the issues in a complex environment like tourism. Multiple types of relationships and different temporal activations call for approaches that are able to render this multiplicity, and with so diverse systems a consistent way to assess the results is needed. Finally, the recent incredible results achieved in the field of artificial intelligence and machine learning are already hitting the field and it is important to have a basic understanding of their functioning and applicability.

Chapter 5 is dedicated to the intricate issue of choosing a modelling technique. Here, we describe some of the possible criteria that can be used in selecting one or more of the different methods and how to combine them into a rational and effective approach. We also take a look at how developments and implementations can further assist in the difficult art of modelling.

Chapter 6 contains case studies that show how different approaches can be combined to create models or simulations used to solve issues or gather insights that are interesting from a theoretical and practical point of view.

The book ends with an appendix containing some further reading suggestions and an appendix with references to some of the most popular and used software programs, and some tutorials dedicated to those who want to start using the main techniques discussed in this work.