Preface

Business Analytics (BA) focuses on identifying and leveraging business opportunities. BA is based on a decision-analysis process that uses data, computers, statistics, and mathematics to solve business problems. BA can be basically defined as the science of making better decisions.

Some well-known and often studied decision modeling methods often encounter a great deal of difficulty when faced with the challenge of solving hard problems related to predictive and prescriptive analytics that abound in the real world. Vitally important applications not only in business, but also in engineering, economics, and science cannot be tackled with any reasonable hope of success, within practical time horizons, by solution methods that have been the predominant focus of academic research throughout the past three decades (and which are still the focus of many textbooks). The metaheuristic approaches are dramatically changing our ability to solve problems of practical significance and are extending the frontier of problems that can be handled effectively, yielding solutions whose quality often significantly surpasses that obtained by methods previously applied.

Spreadsheet packages provide a popular way to first build decision models of business problems, and then solve them. Unfortunately, the main solution tools within popular electronic spreadsheet software such as Microsoft Excel are based on the so-called classical methods that include linear programming, branch and bound, or interior point methods. Tools based on metaheuristics technology are for the most part ignored or poorly executed. This is why when practitioners need to solve real-world business problems, they often experience frustration with the techniques that are available in the environment that is most familiar them, namely electronic spreadsheets. The limitations are not only on the size of problems that they are able to solve but also on the real-life complexities that they are able to include in their models.

This book's goal is to provide the basic principles and fundamental ideas that will allow master-level business students to create valuable applications based on metaheuristic technologies. The book includes the Visual Basic for Excel source code of the procedures introduced in each chapter. The code, in most cases, is meant as an illustration on how to create solution procedures for a variety of

problems. The modular design of the code allows students to piece together solutions to new problems that they will encounter in practice or as end-of-the-chapter exercises. As the goal of this book series states, this book is meant to fill the gap between traditional textbooks and research papers. Traditional textbooks in business analytics and decision modeling focus on showing how the so-called classical optimization methods can be used to find solutions to business problems, while research papers in the metaheuristic literature focus on development of techniques and pay little attention to the business problems that these procedures could tackle. Additionally, the implementation of metaheuristic methods in research articles is usually accomplished with general-purpose languages that are meant for commercial applications, such as C++ or Java, and which are incomprehensible to those without computer programming expertise. This book shows not only how to model a business problem on a spreadsheet but also how to design and create a Visual Basic application in Excel based on metaheuristic principles.

Madrid, Spain — Abraham Duarte
Boulder, USA — Manuel Laguna
Valencia, Spain — Rafael Martí
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