THE APPLIED BUSINESS ANALYTICS CASEBOOK

APPLICATIONS IN SUPPLY CHAIN MANAGEMENT, OPERATIONS MANAGEMENT, AND OPERATIONS RESEARCH

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Consulting Editor, **BARRY RENDER, Ph.D.**

The Applied Business Analytics Casebook

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Applications in Supply Chain Management, Operations Management, and Operations Research

Matthew J. Drake, Ph.D., CFPIM

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For my wife, Nicole, and my daughter, Noelle.
You are the inspiration for
everything that I accomplish.

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Preface

The field of business analytics has been thrust into the global spotlight in recent years. This surge in popularity is largely because of a barrage of books and periodical articles highlighting its potential to help firms create a competitive advantage. Although some techniques contained within the umbrella of business analytics, such as data mining, text mining, and neural networks, truly represent cutting-edge methodologies that mainly appear in advanced graduate courses, the building-block techniques of business analytics, such as statistical analysis, optimization, and decision trees, are mainstays in business-school curricula around the world.

Business analytics can be broadly defined as "the scientific process of transforming data into insight for better decision making."[1] As a result of this focus on decision making, courses that cover material related to business analytics can benefit greatly from utilizing case studies as a supplement to the core analytical material. Case studies are an effective method for exposing students to the entire decision-making process because they put the student in a simulated active role as a decision maker who must perform the analysis and use the output to recommend a course of action.

Although cases are a mainstay of many graduate business courses, they are used somewhat less frequently in undergraduate courses. One reason for this lack of extensive case adoption in undergraduate courses is the preponderance of long cases published by the major case libraries. Cases appropriate for undergraduates need to be somewhat more focused because the students do not have as much experience as graduate students. Many textbooks include one- or two-page cases at the end of a chapter to illustrate the application of the techniques presented in the chapter. Because they are so short, these cases often amount to little more than a slightly expanded homework problem.

[1] http://www.informs.org/About-INFORMS/What-is-Analytics

This collection of cases is designed to supplement core material covering business analysis techniques in courses as varied as statistics, operations management, management science, supply chain modeling, and decision analysis. This book fills the gap in the library of business analytics case materials appropriate for undergraduate students with cases of moderate length. The cases are also appropriate for introductory-level graduate courses, as instructors can focus the analysis and discussion on more of the complex issues raised in the cases.

The cases in the collection are grouped by the primary analytical technique appropriate for each decision environment. Part 1, "Forecasting and Process Analysis," includes three forecasting cases and one case that focuses on quality control and process improvement. Part 2, "Optimization and Simulation," contains cases that utilize the classic management science methods of optimization and simulation. The optimization cases address inventory control and logistics network design, and the simulation case addresses the management of process flows. Part 3, "Decision Analysis," includes cases that require the application of a variety of decision analysis tools from decision trees and factor rating to the Analytic Hierarchy Process (AHP), multi-criteria decision analysis, and group decision making. The decision environments vary from facility location to sustainability management. Part 4, "Advanced Business Analytics," contains two advanced cases—one that is truly a "big data" case with a large data set and another centered on vehicle routing, a traditionally difficult problem in logistics.

It is my hope that the cases in this collection expose students to the power of business analytics and the utility of these techniques in the decision-making process. Students armed with an effective toolbox of analytical skills and techniques are well positioned to make thoughtful, reasoned decisions informed by data analysis for their

companies and organizations. These analytical skills are transferrable across companies and industries and can enhance students' attractiveness and value to employers throughout their careers.

Matthew J. Drake
Pittsburgh, Pennsylvania, USA
August 2013

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