A spreadsheet Approach to Business Quantitative Methods

by

John Flaherty

Ric Lombardo

Paul Morgan

Basil deSilva

David Wilson

with contributions by:

William McCluskey

Richard Borst

Lloyd Williams

Hugh Williams

For further information contact:

John Flaherty

School of Marketing, RMIT

239 Bourke Street,

Melbourne, 3000

Australia

Phone 61 3 9925 5546

FAX: 61 3 9925 5559

Email: john.flaherty @rmit.edu.au

A Spreadsheet Approach to Business Quantitative Methods

This textbook represents a major revision of the previous textbook "Quantitative Methods in Property" by the same authors.

Several new chapters have been added and much of the existing material has been refined and improved upon. A significant improvement with the new edition is the explicit use of the Excel spreadsheet throughout.

Some of the new chapters added include:

- Selected Features and Functions in Microsoft Excel

The key Excel features used throughout the text and presented in this chapter to focus attention of a number of some of the more recent enhancements to the spreadsheet. A brief introduction to the VBA programming language is included to suggest ways of further harnessing the power of the spreadsheet.

- Simulation

The use of simulation as a decision and planning tool is becoming more prevalent. Spreadsheets are ideal to introduce many simulation concepts and to demonstrate their usefulness in a wide variety of areas. When more specialised simulation tools are required users can move to Excel plug-ins such as @R1SK (not discussed in the text).

- Geographic Information Systems

GIS is now a widely used tool in the property profession and in the wider business community. Applications to department

store location are discussed in the text.

Supplementary resources

- Solutions manual for all exercises
- Web site containing examples and applications using Excel

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PART I Building the Foundations

Mathematical Preliminaries

1.1 Review of Basic Algebra

1.2 Functions

1.3 Exponents and Logarithms

1.4 The Mathematics of Finance

1.5 Introduction to Calculus

1.6 Maximization and Minimization of Functions

1.7 Summation Notation

References

Exercises

2. Selected Features and Functions in Microsoft Excel

2.1 Introduction

2.2 Using Excelto Chart Data

2.3 The Analysis ToolPak

2.4 Lookup and Reference Functions

2.5 Hyperlinks

2.6 Offset Function

2.7 Data Tables and Array Formulae

2.8 Using the Trend Function

2.9 Introductiont o Solver

2.10 GoalSeek

2.11 Recording a Macro

2.12 Creating Your Own Functions

2.12 Some Common Limitations in Excel

Part II Basic Statistical Concepts

7. **Elements of Hypotheses Testing and Interval Estimation**

7.1 Tests of Hypotheses for the Population Mean

7.2 Tests of Hypotheses for the Population Proportion

7.3 The P-value approach to hypotheses testing

7.4 Confidence Interval Estimation

7.5 Other Approaches to Testing Hypotheses

7.6 Quality Control (include Acceptance Sampling)

References

Exercises

8. **Nonparametric Statistics**

8.1 Introduction

8.2 DataTypes

8.3 Measurement Scales

8.4 Parametric Methods

8.5 NonParametric vs Parametric Methods

8.6 Contingency Tables

8.7 Wilcoxon Signed -Rank Test

8.8 Mann-Whitney Test

References

Exercises

9. Analysis of Variance

9.1 Introduction

9.2 ANOVA - Single Factor

9.3 ANOVA - Two Factor without Replication

Part V Heuristics and Optimisation

1 7. Simulation

17.1 Introduction

17.2 Simulating The Price of Residential Units

17.3 Freezing Randomly Generated Numbers

17.4 Using The Spreadsheet to Generate Distributions Creating Other Distributions Using Excel

17.5 Simulating Demand Using a Data Table

17.6 Monte Carlo Simulation of the Least Squares Model References Exercises

18. **Linear Programming**

18.1 Introduction

18.2 The General LP Problem

18.3 Maximisation, Minimisation and the Duel

18.4 TheSimplexMethod

18.5 The Dual Simplex Algorithm

18.6 LP Applications in Property References Exercises

1 9. Transportation, Assignment, and Transshipment Problems

20. **Network Analysis / Project Management**

20.1 Basic Terminology

20.2 Shortest Route Problem

20.3 CPM and PERT

20.4 Earliest Time, Latest Time and Activity Slack

20.5 Activity Time Statistics and Project Completion Times

23.1 Input-Output Analysis

23.2 Markov Chain Analysis

23.3 The Use of Markov Chains for Optimal Decision Making

23.4 The Application of Markov Chains to Input Output Analysis

23.5 Using Excel and Minitab

References & Exercises

2 4. Inventory Models

24.1 Introduction

24.2 Derivation of the EOQ Formula

24.3 Quantity Discounts

24.4 When to Place an Order and Safety Stock

24.5 Lead Time Variation

24.6 Some Illustrative Examples

References & Exercises

2 5. Queuing Theory

26. **Artificial Neural Networks and Genetic Algorithms** (McCloskey/Borst)

26.1 Introduction

26.2 Main Elements of a Neural Network System

26.3 Case Study

2 7 Geographic Information Systems (Lloyd & Hugh Williams)