

Contents

About the Authors	x
Preface	xii

Chapter 1	Describing Data	2
1.1	Introduction	2
1.2	What Is Data?	2
1.2.1	<i>Basics of Data</i>	2
1.2.2	<i>The History of Data: A Brief Overview</i>	4
1.2.3	<i>Characteristics of Data</i>	13
1.2.4	<i>Different Types of Data</i>	16
1.3	Defining Data Literacy	20
1.3.1	<i>Transforming from Data, to Information, to Knowledge, to Wisdom</i>	20
1.3.2	<i>Describing Central Tendency and Spread with Data</i>	23
1.3.3	<i>Analysing Data</i>	25
1.3.4	<i>Presenting Data (from Text, to Graphics, to Dashboard)</i>	33
1.4	The Characteristics of Data Literacy	40
1.4.1	<i>Becoming Data Literate</i>	40
1.4.2	<i>The Tripod of Data Literacy: Curiosity, Creativity, Critical Thinking</i>	42
1.4.3	<i>Mastering Data Literacy</i>	44
1.4.4	<i>Reading and Speaking the Language of Data</i>	47
1.5	Putting It All Together: Looking Back, Looking Forward	51
1.5.1	<i>Case Study: Data in the Museum</i>	51
1.5.2	<i>Case Study: The Dawn of Tabulation</i>	55
1.6	Summary and Reflection	56
	Notes	57

Chapter 2	Data and Information Technology	60
2.1	Introduction	60
2.2	Information Technology and Data	60
2.2.1	<i>The Binary World</i>	60
2.2.2	<i>The Rise of Digital Technologies</i>	61
2.2.3	<i>The World of Digital Computing</i>	64
2.3	Technology Literacy and Data Literacy	66
2.3.1	<i>The Binary System</i>	66
2.3.2	<i>The Numeral System</i>	67
2.3.3	<i>How Do Computers Read Text?</i>	70
2.3.4	<i>How Do Computers See Images?</i>	72
2.4	The Digital and Data Landscape	73
2.4.1	<i>Big Data: An Overview</i>	73
2.4.2	<i>Dimensions of Big Data</i>	74
2.4.3	<i>Applications of Data Analytics</i>	75
2.4.4	<i>Potential of Big Data Application in Different Industries</i>	78
2.4.5	<i>A Whole New Ballgame of Social Connection</i>	81
2.4.6	<i>Why Is Social Media a Concern?</i>	82
2.5	Putting It All Together: Data-Driven Information Technology	86
2.5.1	<i>Case Study: Machine Intelligence vs Human Intelligence</i>	86
2.5.2	<i>Case Study: The Tasty Power of Data</i>	87
2.6	Chapter Summary and Reflection	87
	Notes	88
Chapter 3	The Application of Data	90
3.1	Introduction	90
3.2	The Digital Landscape	91
3.2.1	<i>The Smart City</i>	91
3.2.2	<i>Smart Parking Meter: A Case of Smart Mobility</i>	96
3.2.3	<i>Biometrics in Online Banking: A Case of Smart Living</i>	98
3.3	The Economic Impact of AI	101
3.3.1	<i>Dawn of a New Era</i>	101
3.3.2	<i>The Growth Trajectory</i>	103
3.4	Issues Surrounding Deployment of Artificial Intelligence Solutions	104
3.4.1	<i>What Is Artificial Intelligence?</i>	105
3.4.2	<i>The Benefits and Drawbacks of AI</i>	108
3.4.3	<i>Applying AI: The Quest for Data Literacy</i>	110
3.5	Cybersecurity	117
3.5.1	<i>Cybersecurity: An Overview</i>	117
3.5.2	<i>Emerging Cybersecurity Threats</i>	117
3.5.3	<i>Cybersecurity Risks</i>	121

3.5.4	<i>The Future Is Cybersecurity with Data Literacy</i>	124
3.6	Putting It All Together: Data in Your Life	130
3.6.1	<i>Case Study: The Data Falsehood</i>	130
3.6.2	<i>Case Study: Unveiling the Truth in Numbers</i>	132
3.6.3	<i>Case Study: Exploring the Treasure of Data</i>	132
3.7	Summary and Reflection	139
	Notes	140

Chapter 4 **Protecting and Regulating Data** **144**

4.1	Introduction	144
4.2	Data Protection Principles: An Overview of Key Jurisdictions	145
4.2.1	<i>Data Protection Principles at a Glance</i>	145
4.2.2	<i>Impact of Information and Communication Technology (ICT)</i>	153
4.2.3	<i>The OECD Privacy Framework</i>	161
4.3	Data Security and Control	166
4.3.1	<i>Cyberspace</i>	167
4.3.2	<i>Cybercrime</i>	179
4.3.3	<i>Cryptography</i>	188
4.4	Privacy Protection	194
4.4.1	<i>What Is Privacy?</i>	194
4.4.2	<i>The Legislation Framework</i>	199
4.4.3	<i>A Case Study: Data Protection Legislation in Hong Kong</i>	201
4.4.4	<i>Electronic Monitoring</i>	213
4.5	Putting It All Together: Legal Pitfalls in the Digital World	220
4.5.1	<i>Case Study: Licensed to Destroy</i>	220
4.5.2	<i>Case Study: Wiping Out a Data Business in Seconds</i>	223
4.5.3	<i>Case Study: Making the Best for the Worst</i>	225
4.6	Summary and Reflection	226
	Notes	227

Chapter 5 **Making Decisions with Data** **230**

5.1	Introduction	230
5.2	Data Management and Data Governance	231
5.2.1	<i>Framework of Data Governance</i>	231
5.2.2	<i>Data Literacy Learning</i>	235
5.2.3	<i>Culture and Data Literacy</i>	237
5.2.4	<i>Data Quality Management</i>	241
5.2.5	<i>Navigating the World of Data</i>	246
5.3	The Hype of Data Analytics	249
5.3.1	<i>Data-Informed Decision-Making</i>	249
5.3.2	<i>Making Better Choices</i>	256

	5.3.3 <i>Intuition in the Data World</i>	258
5.4	Thinking about Thinking	262
	5.4.1 <i>Two Modes of Thinking</i>	262
	5.4.2 <i>Intuition at Work: The Sixth Sense of Danger</i>	266
	5.4.3 <i>The Negative Aspects of Intuition</i>	269
	5.4.4 <i>A Historical Perspective on Thought Systems</i>	273
5.5	Putting It All Together: Making Business Decisions with Data	275
	5.5.1 <i>Case Study: Two Sides of the Same Coin</i>	275
	5.5.2 <i>Case Study: What Numbers Are Telling You</i>	277
	5.5.3 <i>Case Study: Failing with Data Illiteracy</i>	278
5.6	Summary and Reflection	282
	Notes	283
Chapter 6	Ethical Use of Data	286
	6.1 Introduction	286
	6.2 Ethics in a Nutshell	286
	6.2.1 <i>What Is Ethics?</i>	286
	6.2.2 <i>Ethical Perspectives</i>	290
	6.2.3 <i>Ethical Standards of Data Usage</i>	293
	6.3 A Practical Approach to Ethical Decision-Making	298
	6.3.1 <i>A Framework of Ethical Decision-Making</i>	298
	6.3.2 <i>Ethicality vs Legality</i>	300
	6.3.3 <i>Ethical Guidelines</i>	301
	6.3.4 <i>Challenges in Implementing and Executing the Ethical Guidelines</i>	304
	6.4 A Case Study: Data, Freedom of Speech, and Internet Defamation	309
	6.4.1 <i>The Good, the Bad, and the Ugly</i>	309
	6.4.2 <i>How Do We Sue Someone for Online Defamation?</i>	310
	6.4.3 <i>What Constitutes Online Defamation?</i>	313
	6.5 Putting It All Together: Ethics in Play	316
	6.5.1 <i>Case Study: Nothing Right or Wrong, Only Right or Left</i>	316
	6.5.2 <i>Case Study: Perception Is Reality</i>	318
	6.5.3 <i>Case Study: Misleading with Numbers</i>	319
	6.5.4 <i>Case Study: Data Doesn't Lie. People Do</i>	319
	6.6 Summary and Reflection	321
	Notes	321
Chapter 7	Moving Forward: What's Ahead of Us	324
	7.1 Introduction	324
	7.2 Thriving in the Digital Economy	324
	7.2.1 <i>The Digital Revolution</i>	324
	7.2.2 <i>The New Normal</i>	326

7.2.3	<i>Riding on the Digital Superhighway</i>	332
7.2.4	<i>Being Human in the World of Data</i>	338
7.3	Centre of the Digital Ecosystem	339
7.3.1	<i>Storm Clouds Gather</i>	339
7.3.2	<i>Digital Leadership</i>	340
7.3.3	<i>A Dream about Wisdom</i>	341
7.4	The Road to Transformation	342
7.4.1	<i>The Future of Work</i>	342
7.4.2	<i>The Missing Link</i>	343
7.4.3	<i>Restoring Connectivity</i>	344
7.4.4	<i>Key Competencies in the Digital World</i>	346
7.4.5	<i>Soft Skills: The New Essentials in the Digital Age</i>	349
7.4.6	<i>Navigating the Road of Digital Transformation</i>	350
7.4.7	<i>From Data Literate to Data Fluent to Data Excellent</i>	351
7.5	Putting It All Together: Data as Our New Leadership	354
7.5.1	<i>Case Study: The Main Cause of Problems Is Solutions</i>	354
7.5.2	<i>Case Study: The Lone Rangers of the Data Road</i>	358
7.6	Summary and Reflection	360
	Notes	361