Contents

About the Author 1

Acknowledgments 3

Dedication 7

Preface 9

Chapter 1 Setting the Stage: Technology and the Modern Enterprise 17

1.1 Tech's Tectonic Shift: Radically Changing Business Landscapes 17

1.2 It's Your Revolution 24

1.3 Geek Up—Tech Is Everywhere and You'll Need It to Thrive 27

Finance 27

Accounting 28

Marketing 29

Operations 29

Human Resources 30

The Law 30

Information Systems Careers 30

Your Future 32

1.4 The Pages Ahead 33

1.5 Endnotes 38

Chapter 2 Strategy and Technology: Concepts and Frameworks for Achieving Success 41

2.1 Introduction 41

The Danger of Relying on Technology 42

Different Is Good: FreshDirect Redefines the Grocery Landscape in New York City and Beyond 43

But What Kinds of Differences? 45

2.2 Powerful Resources 47

Imitation-Resistant Value Chains 47

Brand 50

Scale 50

Switching Costs and Data 51

Differentiation 52

Network Effects 52

Distribution Channels 54

What about Patents? 56

2.3 Barriers to Entry, Technology, and Timing 58

2.4 Key Framework: The Five Forces of Industry Competitive Advantage 60
2.5 Endnotes 63

Chapter 3 Zara: Fast Fashion from Savvy Systems 65

3.1 Introduction 65
Why Study Zara? 67
Gap: An Icon in Crisis 67
3.2 Don't Guess, Gather Data—Make Small Batches of What Customers Want & Ship It Fast! 70
Design 71
Manufacturing and Logistics 71
Stores 73
3.3 Moving Forward 77
3.4 Endnotes 79

Chapter 4 Netflix in Two Acts: Sustaining Leadership in an Epic Shift from Atoms to Bits 81

4.1 Introduction 81
Why Study Netflix? 82
4.2 Act I: David Becomes Goliath: Crafting Killer Assets for DVD-by-Mail Dominance 84
Brand Strength from Best-in-Class Customer Experience 85
Scale from the Distribution Network 85
Scale from Selection: The Long Tail 85
The Big Customer Base—Delivering True Economies of Scale 86
Leveraging the Data Asset: Collaborative Filtering and Beyond 87
Winning Act I 87
4.3 Act II: Netflix and the Shift from Mailing Atoms to Streaming Bits 89
Content Acquisition: Escalating Costs, Limited Availability, and the "Long-Enough Tail" 91
Exclusives and Original Content 93
Streaming and the Data Asset 95
Streaming Changes Viewing Habits and Frees Creative Constraints 97
Customer Experience, Complexity, Pricing, and Brand Strength 98
Streaming and Scale Advantages 98
The March to Global Dominance 99
It's a Multiscreen World: Getting to Netflix Everywhere 100
A Crowded Field of Rivals and Other Challenges 103
No Turning Back 106
4.4 Endnotes 111

Chapter 5 Moore's Law and More: Fast, Cheap Computing, and What This Means for the Manager 115

5.1 Introduction 115
Some Definitions 115
Get Out Your Crystal Ball 118
5.2 The Death of Moore's Law? 128
Buying Time 129

5.3 The Power of Parallel: Supercomputing, Grids, Clusters, and Putting Smarts in the Cloud 132
5.4 e-waste: The Dark Side of Moore's Law 137
5.5 Mickey's Wearable: Disney's Magic Band 143
Experience Examples 144
Big Data and Big Benefits 145
Magical Experiences Cost Serious Coin 145
Magical Experiences can Require Magical Coordination 146
Look to the Future 147
5.6 Endnotes 148

Chapter 6 Disruptive Technologies: Understanding Giant Killers and Tactics to Avoid Extinction 151

6.1 Introduction 151
The Characteristics of Disruptive Technologies 151
Why Big Firms Fail 152
Don't Fly Blind: Improve Your Radar 154
Potential Disruptor Spotted: Now What? 154
6.2 From Bitcoin to Blockchain and Beyond: A Disruptive Innovation for Money and More? 158
How It Works 159
Benefits 160
Examples of Blockchains in Action 161
Concerns 163
What Do You Think? 166
6.3 Endnotes 168

Chapter 7 Amazon: An Empire Stretching from Cardboard Box to Kindle to Cloud 171

7.1 Introduction 171
Why Study Amazon? 173
7.2 The Emperor of e-Commerce 174
Fulfillment Operations—Driving Selection, Customer Convenience, and Low Price 176
Amazon's Cash Conversion Cycle—Realizing Financial Benefits from Speed 179
Internet Economics, Scale, and Pricing Power 180
The Advantage of Being Big: Realizing Scale Advantages as the Retail e-Commerce Leader 180
Customer Obsession 182
Leveraging the Data Asset—A/B Testing, Personalization, and Even an Ad Business 183
Selection and Network Effects 185
Acquisitions and Category Expansion: Fewer Rivals, More Markets, and More Customer Choice 187
7.3 The Lord of Logistics 189
Building a Delivery and Logistics Business Inside the Business 189
7.4 Beyond Clicks: More Bricks 193
Amazon as Your Campus Bookstore 194
Bezos's "Brick-based" Bookstores 194
More "Green" from Groceries? 195

Hello Machine Learning, Goodbye Checkout Line 196
7.5 Amazon's Disruptive Consumer Hardware Businesses: Kindle, Fire, Alexa, and More 198
The Kindle Line: Igniting Possibilities on e-Book and Tablet 199
Amazon for Your TV 199
Echo, Alexa, and the Breakout Success of Amazon's Voice Interface and AI-powered Assistant 200
Ordering At Your Fingertips: Courtesy of the Internet of Things 200
Amazon Gets into Content Publishing 202
Channel Conflict and Consolidated Power 203
7.6 Amazon and the Cloud: From Personal Storage to AWS 206
7.7 Endnotes 210

Chapter 8 Platforms, Network Effects, and Competing in a Winner-Take-All World 213
8.1 Introduction 213
8.2 Platforms Are Powerful, But Where Does All That Value Come From? 215
Exchange 215
Staying Power 215
Complementary Benefits 216
8.3 One-Sided or Two-Sided Markets? 218
Understanding Network Structure 219
8.4 How Are These Markets Different? 220
8.5 Competing When Network Effects Matter 224
Move Early 224
Subsidize Adoption 225
Leverage Viral Promotion 226
Expand by Redefining the Market 227
Alliances and Partnerships 229
Leverage Distribution Channels 230
Seed the Market 230
Encourage the Development of Complementary Goods 231
Leverage Backward Compatibility 231
Rivals: Be Compatible with the Leading Network 232
Incumbents: Close Off Rival Access and Constantly Innovate 232
Large, Well-Known Followers: Preannouncements 233
8.6 Endnotes 235

Chapter 9 Social Media, Peer Production, and Leveraging the Crowd 237
9.1 Introduction 237
9.2 Blogs 245
9.3 Wikis 249
9.4 Social Networks 252
Corporate Use of Social Networks 254
9.5 Twitter and the Rise of Microblogging 260
Organic Reach and Advertising 262
Twitter and Platform Challenges 264

Tackling Trolls and Battling Bots 264
Challenges: So How Big Is This Thing Gonna Be? 265
9.6 Prediction Markets and the Wisdom of Crowds 267
Blockchain for Better and Unrestricted Prediction Markets 269
9.7 Crowdsourcing 271
9.8 Get SMART: The Social Media Awareness and Response Team 274
Creating the Team 275
Responsibilities and Policy Setting 276
Monitoring 280
Establishing a Presence 281
Engage and Respond 282
9.9 Endnotes 285

Chapter 10 The Sharing Economy, Collaborative Consumption, and Efficient Markets through Tech 289

10.1 Introduction 289
10.2 Boom Times and Looming Challenges in the Sharing Economy 291
Share On! Factors Fueling the Rise of Collaborative Consumption 292
Winning in Electronic Markets 292
Social Media for Virality and Trust Strengthening 294
Share Everything? The Myth of the Market for Your Neighbor's Power Drill 295
Can You Share Nice? Challenges of Safety and Regulation 296
10.3 Future Outlook: Established Players Get Collaborative 299
10.4 Airbnb—Hey Stranger, Why Don't You Stay at My Place? 301
At Airbnb, Big Data is a Big Deal 303
A Phenomenal Start, but Not Without Challenges 303
10.5 Uber's Wild Ride: Sharing Economy Success, and Lessons From a Fallen Founder 305
Driven by Data 308
APIs to Expand Reach 310
How Big Can This Thing Get? 310
10.6 Endnotes 315

Chapter 11 Facebook: Platforms, Privacy, and Big Business from the Social Graph 319

11.1 Introduction 319
The Rise of Facebook and Growing Concerns 319
Why Study Facebook? 321
11.2 Lengthening Leaders, Quick Catch-Ups, and the Challenging Rise of Mobile 323
The Social Graph and Why Facebook's Is So Strong 324
Facebook Feed: Viral Sharing Accelerated 325
Facebook's Dominance on the Desktop 326
Facebook Takes on Search 327
Why Mobile Is Different and in Some Ways Better than the Desktop 328
Snapping Snapchat's Lead with Stories 329
Big Bets: Bringing Potential Rivals and Platform Powerhouses into the Facebook Family 329

11.3 Lessons from Platform Facebook: Big Growth, Bad Partners, APIs and a Mobile Melee 336
Mobile Is Tougher, But Global Players Have Big Mobile Platforms 340
Messenger: A Pillar Business Building Facebook's Future 340
APIs, Playing Well with Others, and Value Added: The Success and Impact of Open Graph 342
Strategic Concerns for Platform Builders: Asset Strength, Free Riders, and Security 343
11.4 Advertising and Social Networks: A Challenging Landscape but a Big Payoff 346
Content Adjacency Challenges: Do You Really Want Your Brand Next to *That*? 346
Attention Challenges: *The Hunt* versus *the Hike* 347
Facebook Ads: Despite Post-IPO Concerns, a Massive Potential Upside is Realized 348
Precise Targeting 348
Mobile Revenue on the Upswing 349
Ads in Feeds: Better Performance Even as Fewer Ads are Shown 350
Beyond "Right Margin" Display Ads: Big, New Winners Emerge 350
11.5 Move Fast and Breaks Things: Fumbles, Fake News, and Global Growth Challenges 354
Beacon Busted—Management Lessons on Tech Planning and Deployment 356
Faked Out by Fake News 357
Challenges of Going Global: Low ARPUs, Legitimate Rivals, and Unreachable Users 360
The Admirable Goals and Unintended Consequences of Internet.org 361
11.6 Endnotes 364

Chapter 12 Rent the Runway: Entrepreneurs Expanding an Industry by Blending Tech with Fashion 367

12.1 Introduction 367
Rental and Subscription: Here's How it Works 368
Rental and Subscription: Here's How it Works 368
A Fashion Company with a Technology Soul 368
12.2 Founding the Business: Are We On To Something? 370
Customers Like It—But What About Suppliers? Growing the Customer Base and Creating a Win-Win 371
Customer Evolution 372
12.3 Customer Engagement (Mobile, Social, and Physical Storefronts) 374
Mobile 374
Social 374
Physical Retail—When Brick and Mortar Has a Role in an Online Business 376
12.4 Data 378
12.5 Operations and Logistics 380
Fulfillment as a Service 382
12.6 Subscription: Bigger than Rental 383
12.7 Conclusion 384
12.8 Endnotes 386

Chapter 13 Understanding Software: A Primer for Managers 389

13.1 Introduction 389

What Is Software? 390
13.2 Operating Systems 391
13.3 Application Software: Apps, Desktop Products, and Enterprise Systems 395
And That's Just the Start 398
13.4 Distributed Computing, Web Services, and APIs: The Platform Builders 400
Formats to Facilitate Sharing Data 404
13.5 Writing Software 407
13.6 Software Development Methodologies: From Waning Waterfall to Ascending Agile, plus a Sprint through Scrum 411
A Brief Introduction to Popular Approaches to Developing Software 411
13.7 Beyond the Price Tag: Total Cost of Ownership and the Cost of Tech Failure 414
Why Do Technology Projects Fail? 415
13.8 Endnotes 419

Chapter 14 Software in Flux: Open Source, Cloud, Virtualized, and App-Driven Shifts 421
14.1 Introduction 421
14.2 Open Source 423
14.3 Why Open Source? 426
14.4 Examples of Open Source Software 428
14.5 Why Give It Away? The Business of Open Source 430
14.6 Defining Cloud Computing 432
14.7 Software in the Cloud: Why Buy When You Can Rent? 434
The Benefits of SaaS 435
14.8 SaaS: Not without Risks 437
14.9 Understanding Cloud Computing Models: PaaS, IaaS, and Motivations and Risks 440
Challenges Remain 443
14.10 Clouds and Tech Industry Impact 445
14.11 Virtualization: Software That Makes One Computer Act Like Many 448
14.12 Apps and App Stores: Further Disrupting the Software Industry on Smartphones, Tablets, and Beyond 450
14.13 Make, Buy, or Rent 451
14.14 Endnotes 453

Chapter 15 Data and Competitive Advantage: Databases, Analytics, AI, and Machine Learning 455
15.1 Introduction 455
15.2 Data, Information, and Knowledge 459
Understanding How Data Is Organized: Key Terms and Technologies 459
15.3 Where Does Data Come From? 462
Transaction Processing Systems 463
Enterprise Software (CRM, SCM, and ERP) 463
Surveys 463
External Sources 464

15.4 Data Rich, Information Poor 468
Incompatible Systems 468
Operational Data Can't Always Be Queried 469
15.5 Data Warehouses, Data Marts, and Technology behind "Big Data" 470
Hadoop: Big Insights from Unstructured "Big Data" 472
15.6 The Business Intelligence Toolkit 476
Query and Reporting Tools 476
Data Mining 479
15.7 Artificial Intelligence, Big Data, and Machine Learning: It's Now Everywhere! 482
Understanding Popular Types of AI 483
Examples of AI in Action 485
It's Not as Easy as the Press Might State: Technical, Organizational, Legal, and Societal Challenges of AI and Machine Learning 486
15.8 Data Asset in Action: Technology and the Rise of Walmart 490
A Data-Driven Value Chain 491
Data Mining Prowess 491
Sharing Data, Keeping Secrets 492
Betting Big on e-Commerce: Acquiring Jet.com, Bonobos, Flipkart and More 493
Challenges Abound 493
15.9 Endnotes 494

Chapter 16 A Manager's Guide to the Internet and Telecommunications 497
16.1 Introduction 497
16.2 Internet 101: Understanding How the Internet Works 497
The URL: "What Are You Looking For?" 499
IP Addresses and the Domain Name System: "Where Is It? And How Do We Get There?" 503
16.3 Getting Where You're Going 507
TCP/IP: The Internet's Secret Sauce 507
16.4 Last Mile: Faster Speed, Broader Access 514
Cable Broadband 516
DSL: Phone Company Copper 516
Fiber: A Light-Filled Glass Pipe to Your Doorstep 517
Wireless 517
Satellite Wireless and Schemes to Reach the Remote 518
Wi-Fi and Other Hotspots 520
Net Neutrality: What's Fair? 521
Summing Up 522
16.5 Endnotes 524

Chapter 17 Information Security: Barbarians at the Gateway (and Just About Everywhere Else) 527
17.1 Introduction 527
Got a Bank Account or Credit Card? You've Been Hacked! 527
A Look at the Target Hack 528
17.2 Why Is This Happening? Who Is Doing It? And What's Their Motivation? 530

17.3 Where Are Vulnerabilities? Understanding the Weaknesses 536
User and Administrator Threats 537
Technology Threats (Client and Server Software, Hardware, and Networking) 543
Push-Button Hacking 548
17.4 Taking Action 553
Taking Action as a User 553
Taking Action as an Organization 554
17.5 Endnotes 561

Chapter 18 Google in Three Parts: Search, Online Advertising, and an Alphabet of Opportunity 563

18.1 Introduction 563
Why Study Google? 567
18.2 Understanding Search 568
18.3 Understanding the Increase in Online Ad Spending 575
18.4 Search Advertising 576
How Much Do Advertisers Pay per Click? 578
IP Addresses and Geotargeting 579
18.5 Ad Networks: Distribution Beyond Search 583
Ad Networks and Competitive Advantage 586
18.6 More Ad Formats and Payment Schemes 587
18.7 Customer Profiling and Behavioral Targeting 589
18.8 Profiling and Privacy 594
18.9 Search Engines, Ad Networks, and Fraud 599
Busting the Bad Guys 600
18.10 The Battle Unfolds 602
Strategic Issues 605
More Ads, More Places, More Formats 607
YouTube 609
Google Pay 611
Google and Social 611
Apps, Cloud, and the Post-Hard-Drive World 612
18.11 Endnotes 617

Index 621