LEARNING MADE EASY

Decision Intelligence

for dummies®

A Wiley Brand

Be decision-driven instead of data-driven

Use AI as a tool, but not the only tool

Learn why data should not have the final say

Pam Baker

Professional AI wrestler and data tamer

Decision Intelligence

by Pam Baker

for dummies®
A Wiley Brand

Decision Intelligence For Dummies®

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Contents at a Glance

Introduction 1

Part 1: Getting Started with Decision Intelligence 9

CHAPTER 1: Short Takes on Decision Intelligence 11
CHAPTER 2: Mining Data versus Minding the Answer 25
CHAPTER 3: Cryptic Patterns and Wild Guesses 39
CHAPTER 4: The Inverted V Approach 53

Part 2: Reaching the Best Possible Decision 67

CHAPTER 5: Shaping a Decision into a Query 69
CHAPTER 6: Mapping a Path Forward 81
CHAPTER 7: Your DI Toolbox 101

Part 3: Establishing Reality Checks 115

CHAPTER 8: Taking a Bow: Goodbye, Data Scientists — Hello, Data Strategists 117
CHAPTER 9: Trusting AI and Tackling Scary Things 131
CHAPTER 10: Meddling Data and Mindful Humans 151
CHAPTER 11: Decisions at Scale 165
CHAPTER 12: Metrics and Measures 179

Part 4: Proposing a New Directive 197

CHAPTER 13: The Role of DI in the Idea Economy 199
CHAPTER 14: Seeing How Decision Intelligence Changes Industries and Markets 213
CHAPTER 15: Trickle-Down and Streaming-Up Decisioning 231
CHAPTER 16: Career Makers and Deal-Breakers 251

Part 5: The Part of Tens 273

CHAPTER 17: Ten Steps to Setting Up a Smart Decision 275
CHAPTER 18: Bias In, Bias Out (and Other Pitfalls) 285

Index 291

Table of Contents

INTRODUCTION 1
About This Book 2
Conventions Used in This Book 3
Foolish Assumptions 3
What You Don't Have to Read 4
How This Book Is Organized 5
Part 1: Getting Started with Decision Intelligence 5
Part 2: Reaching the Best Possible Decision 5
Part 3: Establishing Reality Checks 5
Part 4: Proposing a New Directive 6
Part 5: The Part of Tens 6
Icons Used in This Book 6
Beyond the Book 7
Where to Go from Here 7

PART 1: GETTING STARTED WITH DECISION INTELLIGENCE 9

CHAPTER 1: Short Takes on Decision Intelligence 11
The Tale of Two Decision Trails 12
Pointing out the way 13
Making a decision 16
Deputizing AI as Your Faithful Sidekick 18
Seeing How Decision Intelligence Looks on Paper 20
Tracking the Inverted V 21
Estimating How Much Decision Intelligence Will Cost You 22

CHAPTER 2: Mining Data versus Minding the Answer 25
Knowledge Is Power — Data Is Just Information 26
Experiencing the epiphany 26
Embracing the new, not-so-new idea 28
Avoiding thought boxes and data query borders 29
Reinventing Actionable Outcomes 32
Living with the fact that we have answers and still don't know what to do 32
Going where humans fear to tread on data 34
Ushering in The Great Revival: Institutional knowledge and human expertise 36

CHAPTER 3: **Cryptic Patterns and Wild Guesses** 39
Machines Make Human Mistakes, Too. 40
Seeing the Trouble Math Makes 42
The limits of math-only approaches 42
The right math for the wrong question 43
Why data scientists and statisticians often make bad question-makers 46
Identifying Patterns and Missing the Big Picture 48
All the helicopters are broken 48
MIA: Chunks of crucial but hard-to-get real-world data 49
Evaluating man-versus-machine in decision-making 51

CHAPTER 4: **The Inverted V Approach** 53
Putting Data First Is the Wrong Move 54
What's a decision, anyway? 55
Any road will take you there 56
The great rethink when it comes to making decisions at scale 57
Applying the Upside-Down V: The Path to the Output and Back Again 59
Evaluating Your Inverted V Revelations 60
Having Your Inverted V Lightbulb Moment 61
Recognizing Why Things Go Wrong 63
Aiming for too broad an outcome 63
Mimicking data outcomes 64
Failing to consider other decision sciences 64
Mistaking gut instincts for decision science 64
Failing to change the culture 65

PART 2: REACHING THE BEST POSSIBLE DECISION 67

CHAPTER 5: **Shaping a Decision into a Query** 69
Defining Smart versus Intelligent 70
Discovering That Business Intelligence Is Not Decision Intelligence 71
Discovering the Value of Context and Nuance 72
Defining the Action You Seek 73
Setting Up the Decision 74
Decision science versus data science 75
Framing your decision 77
Heuristics and other leaps of faith 78

CHAPTER 6: **Mapping a Path Forward** 81
Putting Data Last 82
Recognizing when you can (and should) skip the data entirely . . . 83
Leaning on CRISP-DM 84
Using the result you seek to identify the data you need 85

Digital decisioning and decision intelligence 85
Don't store all your data — know when to throw it out 87
Adding More Humans to the Equation 88
The shift in thinking at the business line level 90
How decision intelligence puts executives and ordinary humans back in charge 92
Limiting Actions to What Your Company Will Actually Do 94
Looking at budgets versus the company will 95
Setting company culture against company resources 98
Using long-term decisioning to craft short-term returns 99

CHAPTER 7: **Your DI Toolbox** 101
Decision Intelligence Is a Rethink, Not a Data Science Redo 102
Taking Stock of What You Already Have 103
The tool overview 104
Working with BI apps 105
Accessing cloud tools 106
Taking inventory and finding the gaps 107
Adding Other Tools to the Mix 108
Decision modeling software 109
Business rule management systems 110
Machine learning and model stores 110
Data platforms 112
Data visualization tools 112
Option round-up 113
Taking a Look at What Your Computing Stack Should Look Like Now 113

PART 3: ESTABLISHING REALITY CHECKS 115

CHAPTER 8: **Taking a Bow: Goodbye, Data Scientists — Hello, Data Strategists** 117
Making Changes in Organizational Roles 118
Leveraging your current data scientist roles 120
Realigning your existing data teams 121
Looking at Emerging DI Jobs 122
Hiring data strategists versus hiring decision strategists 125
Onboarding mechanics and pot washers 127
The Chief Data Officer's Fate 127
Freeing Executives to Lead Again 129

CHAPTER 9: **Trusting AI and Tackling Scary Things** 131
Discovering the Truth about AI 132
Thinking in AI 133
Thinking in human 136
Letting go of your ego 137

Seeing Whether You Can Trust AI 138
Finding out why AI is hard to test and harder to understand 140
Hearing AI's confession 142
Two AIs Walk into a Bar 144
Doing the right math but asking the wrong question 146
Dealing with conflicting outputs 147
Battling AIs 148

CHAPTER 10: **Meddling Data and Mindful Humans** 151
Engaging with Decision Theory 152
Working with your gut instincts 153
Looking at the role of the social sciences 155
Examining the role of the managerial sciences 156
The Role of Data Science in Decision Intelligence 157
Fitting data science to decision intelligence 157
Reimagining the rules 159
Expanding the notion of a data source 161
Where There's a Will, There's a Way 163

CHAPTER 11: **Decisions at Scale** 165
Plugging and Unplugging AI into Automation 167
Dealing with Model Drifts and Bad Calls 168
Reining in AutoML 170
Seeing the Value of ModelOps 173
Bracing for Impact 174
Decide and dedicate 174
Make decisions with a specific impact in mind 175

CHAPTER 12: **Metrics and Measures** 179
Living with Uncertainty 180
Making the Decision 182
Seeing How Much a Decision Is Worth 185
Matching the Metrics to the Measure 187
Leaning into KPIs 188
Tapping into change data 191
Testing AI 193
Deciding When to Weigh the Decision and When to Weigh the Impact 195

PART 4: PROPOSING A NEW DIRECTIVE 197

CHAPTER 13: **The Role of DI in the Idea Economy** 199
Turning Decisions into Ideas 200
Repeating previous successes 201
Predicting new successes 202

Weighing the value of repeating successes versus creating new successes 202
Leveraging AI to find more idea patterns 203
Disruption Is the Point 205
Creative problem-solving is the new competitive edge 205
Bending the company culture 207
Competing in the Moment 207
Changing Winds and Changing Business Models 209
Counting Wins in Terms of Impacts 210

CHAPTER 14: **Seeing How Decision Intelligence Changes Industries and Markets** 213
Facing the What-If Challenge 214
What-if analysis in scenarios in Excel 216
What-if analysis using a Data Tables feature 217
What-if analysis using a Goal Seek feature 218
Learning Lessons from the Pandemic 220
Refusing to make decisions in a vacuum 221
Living with toilet paper shortages and supply chain woes 222
Revamping businesses overnight 224
Seeing how decisions impact more than the Land of Now 226
Rebuilding at the Speed of Disruption 228
Redefining Industries 230

CHAPTER 15: **Trickle-Down and Streaming-Up Decisioning** 231
Understanding the Who, What, Where, and Why of Decision-Making 232
Trickling Down Your Upstream Decisions 234
Looking at Streaming Decision-Making Models 236
Making Downstream Decisions 238
Thinking in Systems 240
Taking Advantage of Systems Tools 241
Conforming and Creating at the Same Time 244
Directing Your Business Impacts to a Common Goal 245
Dealing with Decision Singularities 246
Revisiting the Inverted V 248

CHAPTER 16: **Career Makers and Deal-Breakers** 251
Taking the Machine's Advice 252
Adding Your Own Take 255
Mastering your decision intelligence superpowers 257
Ensuring that you have great data sidekicks 257
The New Influencers: Decision Masters 259

Preventing Wrong Influences from Affecting Decisions 262
Bad influences in AI and analytics 262
The blame game 265
Ugly politics and happy influencers 266
Risk Factors in Decision Intelligence 268
DI and Hyperautomation 270

PART 5: THE PART OF TENS 273

CHAPTER 17: Ten Steps to Setting Up a Smart Decision 275
Check Your Data Source 275
Track Your Data Lineage 276
Know Your Tools 277
Use Automated Visualizations 278
Impact = Decision 279
Do Reality Checks 280
Limit Your Assumptions 280
Think Like a Science Teacher 281
Solve for Missing Data 282
Partial versus incomplete data 282
Clues and missing answers 282
Take Two Perspectives and Call Me in the Morning 283

CHAPTER 18: Bias In, Bias Out (and Other Pitfalls) 285
A Pitfalls Overview 285
Relying on Racist Algorithms 286
Following a Flawed Model for Repeat Offenders 287
Using A Sexist Hiring Algorithm 287
Redlining Loans 287
Leaning on Irrelevant Information 288
Falling Victim to Framing Foibles 288
Being Overconfident 288
Lulled by Percentages 289
Dismissing with Prejudice 289

INDEX 291

Introduction

Ready for a mind-blowing reveal on how to make great decisions, whether you're using your own brain or some supercharged artificial intelligence application? *Decision intelligence,* a methodology for forming a decision aimed at achieving a specific outcome, is here, and it's on track to change forever how businesses plan for their future.

Everybody would agree that the goal in all decision-making is to reap the best possible outcome. Decision intelligence helps you achieve that goal by requiring that you decide that outcome first and then work backward from there to identify the processes and information you'll need to make it happen!

Decision intelligence is built on science — several sciences, actually — but some of those scientific formulas can be grasped intuitively. The decision intelligence process is designed to improve your professional performance by a) ensuring that every business decision delivers the best possible outcome, b) pointing you toward innovations that are profitable, c) helping you become an industry mover by becoming a creative disruptor, and d) enabling you to flip failed AI projects into successful endeavors. What's more, decision intelligence can also be used to improve your private life via better decision-making, and you can often do it in your own head or on the back of a napkin or by using a simple table or spreadsheet.

The secret to success in decision intelligence lies in changing how you think about problem-solving and reordering your steps when it comes to the decision-making process. Ask yourself how much money, time, and effort your organization is willing to waste on yet another bad business decision or one more failed AI project, and then ask yourself whether you can afford to ignore a better way to make decisions — especially when you already have on hand much of what you'll need to take advantage of a decision intelligence approach. It's not often that you can turn your business around at little or no additional cost to you.

About This Book

The book you're holding in your hands is a guide primarily for you if you're a business or finance leader. The book aims to fill you in on decision intelligence, a new framework for making better, more profitable business decisions. It also serves as an introduction for artificial intelligence (AI) and digital decisioning practitioners to take a different approach aimed at making automated decision processes deliver desirable business outcomes. To top it all off, this guide shows you that decision intelligence is not merely a business approach — it's equally useful when making decisions about your personal life.

This book takes a studied approach to having you reimagine the decision-making, by focusing on a set of discrete tasks you need to accomplish. Here are those tasks, in no particular order:

- **Flip the data mining model from data first to data last.** You start with a decision aimed at the best possible business outcome and end with the data and the processes you need to bring about that outcome in the real world.
- **Rebalance human and machine roles.** Decision intelligence calls for a redirection from a data driven to a decision driven organization. This framework clearly casts humans as decision-makers, where AI acts as sidekick, and where data is relegated to a supporting actor.
- **Map changes caused by putting the decision first in terms of**
  - *Business impact*
  - *Processes*
  - *Tools*
  - *Business and Ethical Principles*
  - *Teams*
- **Learn decision theory and a multidisciplinary approach to decision-making:** You learn which steps you must take in order to succeed with decision intelligence, from new perspectives on
  - *Business impact*
  - *AI projects*
  - *Upstream and downstream decisioning*
  - *Disruptive innovation*
  - *Job roles*

This book answers your questions about what decision intelligence is, which conditions must be created at your company in order for it to succeed, how you can plan a project, and how to implement it successfully. I've also made an effort to ensure that this book can be used in myriad ways and by anyone, from individuals to powerful leaders of huge organizations. As such, it offers these benefits:

- An overview of the steps involved in putting the decision before the data in the decision-making process
- A guidebook with practical suggestions for the various options, overall flexibility, and choices of implementations of a decision intelligence strategy
- A reference book divided into parts, chapters, and sections so that you can quickly find the content you're looking for when you need it

This book — designed so that you can swiftly get a grasp on everything — features many examples, instructions, checklists, illustrations, and tables. It's also structured systematically according to the decision intelligence framework and its many moving parts.

Conventions Used in This Book

This book doesn't have many rules. The entire book is structured so that you can quickly find everything you need and get a grasp on the content. The detailed table of contents helps you jump right to the information you need, and each chapter begins with a brief and succinct description of the chapter's main topics. Whenever topics overlap or other chapters are mentioned, cross-references help you conveniently jump back-and-forth between the chapters. If you're interested in a particular term, you can look it up in the index.

Foolish Assumptions

This book is not (only) for decision-makers in business or finance. Decision intelligence is too crucial for improving business outcomes to be contained only to the C-suite and data scientist levels. In organizations that practice or seek data- and AI-democratization, decision intelligence should be practiced at every level of decision-making throughout the organization, even at the microdecision and mundane-decision levels. Whether you work at a company, an educational institution, a research institute, a public agency, or a nonprofit organization, you can benefit from the decision-driven approach that is at the heart of decision

intelligence. Whether you have an education in the technical, economic, management science, or social science fields, this creative approach gives you new ideas on how to use what you know (and what you have to decide) more productively.

On an individual level, the following assumptions are made in this book about readers who will most likely gain the most from the information in this book:

- You're in charge of an organization or department and you want to be decision driven instead of data driven so that every decision is productive and profitable.
- You're trying to accelerate your career plans and you want to shine by making important decisions so that the best possible outcome is realized.
- You are applying, or you are planning to apply, AI or machine learning at your organization, and you need to know how to make projects succeed in terms of measurable business impacts.
- Your company is already working with data-driven methods and falling well short of your organization's goals and expectations. You want to enhance or replace your previous work with new methods, tips, and tricks for improving its implementation, and you want a guide on how to make it work and perform consistently well over time.

You don't need to have any specific skills for this book — you only have to be curious and intent on making good decisions — every time.

What You Don't Have to Read

It's worth your time to read the entire book. You can find important tips everywhere in it. Even if you can use only a few of its suggestions, the time and money you invest will be worth it. I guarantee that you'll be able to use more than just a few elements of this information in your private life, your career, and your organization — regardless of your job role or your experience in decision-making. Some of the text in this book appears in a gray box, in order to highlight background information. You don't absolutely need this info, but it's always helpful.

How This Book Is Organized

This book is organized into six distinct parts, as described in this section. The design is intended to help you break free of any brain ruts and consider new ways of thinking about making decisions based on a variety of perspectives.

Part 1: Getting Started with Decision Intelligence

This section gives you an overview of the principles and methods in the decision intelligence framework. You can find out why being decision driven outperforms being data driven. You can also learn how to create the necessary conditions for decision intelligence projects to succeed at your organization, how to plan a project, and how to reinvent what it means to have an actionable outcome.

Part 2: Reaching the Best Possible Decision

The first phase of the decision intelligence process is all about making the decision from which you build the steps and then choosing the tools and data to realize the result of that decision in the real world. Shaping the decision, mapping a path, and choosing the right tools are essential to creating the best possible outcome. At the conclusion of deciding the impact you seek lies the beginning of the questions to be answered.

Part 3: Establishing Reality Checks

In the decision intelligence framework, you need to start with a decision, but that decision must be rooted in reality, and it must be attainable. In other words, this isn't the place for pipedreams, even if profoundly creative disruption is your goal. To keep things grounded, you simply have to take the measure of job roles and team skill diversification, play to both human and machine strengths, ensure that decisions you intend to automate at large scales actually work at scale, among other reality checks. You can't manage — or make a reality — that which you can't measure. Be sure to measure the important things and skip the unimportant to ensure your decision (as well as its expected impact) is solid.

Part 4: Proposing a New Directive

Decision intelligence has many uses and is heavily based on ideas tied directly to favorable outcomes. As such, it plays a significant role in the Idea Economy, in impacts on entire industries, and in building competitive advantage for organizations, governments, and economies. In short, disruption is the point, change is constant, and you can use decision intelligence to command or at least direct both.

Last but not least, the use of decision intelligence can also quickly build and accelerate career paths and turn decision masters into highly influential power brokers. All of these grand rewards come with varying degrees of risks, however.

Part 5: The Part of Tens

No *For Dummies* book exists without The Part of Tens. In this part, you can read about ten (or so) steps to set up a smart decision and ten (or so) pitfalls to avoid in implementing decision intelligence projects.

Icons Used in This Book

Now and then, you find symbols in in the margins of this book. Their purpose is to make you aware of important information, as described here.

TIP

This icon points to tips and tricks that should be helpful when you apply and implement an idea. They show you how you can improve your project.

REMEMBER

The Remember icon is used to highlight information that's particularly important to know or that can help clear up possible confusion later.

WARNING

This icon makes you aware of potential stumbling blocks and warns you when to *not* do something. If you avoid errors that others have made before you, you'll save time, money, and effort.

Beyond the Book

In addition to the text you're reading right now, this publication comes with a free, access-anywhere Cheat Sheet that offers a number of tips, techniques, and resources related to data science. To view this Cheat Sheet, visit `www.dummies.com` and type **decision intelligence for dummies cheat sheet** in the Search box.

Where to Go from Here

You can start immediately by choosing one of these two strategies:

- Read the book straight through, from cover to cover.
- Find individual chapters that you want to read first. (Each chapter covers an entire subject area so that you can read and understand it independently of the other chapters.) If you have no experience with decision intelligence yet, I recommend starting with Chapter 1, which offers a crash course introduction to the concept.

My advice to you: Be aware that decision intelligence, though it has a firm definition, is used more loosely by several groups. For example, people working in AI most typically use it to mean putting the decision first in programming automation or training machine learning to make better automated decisions at scale. That's an application rather than a definition, but its common use as such can cause some confusion over the meaning of the term in general reading. For the purposes of this book, decision intelligence is meant by its broader definition and not a single application. However, given its prevalence in AI, the applications there are covered in more detail than other forms of decision implementation. Therefore, I recommend that you read the Parts 1 and 2 first to ensure that you have a good grasp of the framework overall before touching on related topics in other parts or chapters.

Otherwise, experiment with the reading strategy that works best for you. Jump to different sections while you read this book, if that makes sense to you. If necessary, reread a chapter multiple times or look up individual terms in the index. The idea here is for you to come up with your own way to read this book effectively. And don't forget to keep it nearby for quick-and-easy reference as needed while you work through your first few decision intelligence projects.

1

Getting Started with Decision Intelligence

IN THIS PART . . .

Mining data verus minding the answer

Learn why math-only approaches are weak

Watching the details and missing the big picture

Discover the epiphany in the inverted V approach

IN THIS CHAPTER

- Becoming familiar with the decision intelligence approach
- Comprehending the method, principles, and priorities of decision intelligence
- Working your way from design to reality
- Seeing the difference an inverted V makes
- Implementing for the win

Chapter 1
Short Takes on Decision Intelligence

Do you find yourself looking at a spreadsheet or viewing charts or gazing glassy-eyed at a fancy visualization that some bit of artificial intelligence magic has produced for you and wondering what you should do next? You're not alone. Millions of other business and finance people are doing the same thing. So are legions of leaders and decision-makers in other industries.

While you're trying to puzzle out which parts of those "actionable insights" being handed to you *are* in fact actionable and, if so, what action would apply, you've likely wished for something a bit more cut-and dried when it comes to determining what your organization would implement — and you certainly wouldn't mind being considerably more certain about what's going to happen post-implementation.

Would your best bet in such a situation involve letting the miracle of artificial intelligence (AI, for short) make your decisions for you? Well, it turns out that AI isn't so miraculous. In fact, an estimated 80 percent of all AI projects fail, where

failure here is defined in terms of failing to deliver a measurable business value. That means most AI projects end up on the trash heap for leaning too heavily on the experimental side and being useless on the applied side.

It is painfully (and expensively) obvious that this strategy isn't quite working out the way everyone hoped. An alternative approach is needed to make data more helpful and better aligned with consistently delivering business value. One such approach flips the model from data driven processes to decision driven processes. Known as decision intelligence, human and machine decision-making skills are combined with decision theory, decision sciences, and data sciences in a customizable mix that pins decisions to a precise and expected business value.

The concept isn't entirely new — one of its oldest published mentions cropped up in 2002 in Uwe Hanning's scholarly paper "Knowledge Management + Business Intelligence = Decision Intelligence" — but it has evolved over time, incorporating long-accepted scientific formulas from several well-established sciences. This means its inner workings are well known and tested. Switching over to a decision intelligence approach is therefore no gamble — it's simply a supremely logical way for you to achieve the business outcomes you desire. Decision intelligence leaves little to chance, in either its own construct or the value it consistently delivers.

What differentiates one decision intelligence project from another is the talent and acumen of the decision makers at the helm. They make the recipe that cooks the business value into the process. And they decide when and whether to invite data and machines to the planning table.

Decision intelligence is highly agile and versatile. Decision makers can use it to make decisions either on the back of a napkin or with the help of the most sophisticated AI on the planet.

The Tale of Two Decision Trails

The business world has long been madly in love with the notion of being a data-driven enterprise, but it's also beginning to feel the pain of being in a bad relationship. Few actually want to break off their relationship with data entirely, mainly because most are loathe to ditch their significant investments in data, analytics, and related technologies. Add to this the fact that, for many, it would feel like a colossal failure and a huge embarrassment to fall short of becoming the data driven enterprise that all investors and stockholders expect these days.

Looking for a way forward, many started to ask themselves this question: "What can we do with all the data investments we've already made and already own in order to make better decisions?" In other words, folks realized that a *rethink* was needed rather than a *redo*. And many of those same folks decided that re-strategizing and restructuring how these same investments are used and aligning them with specific business impacts was the answer to the questions that had been plaguing them.

REMEMBER

A decision intelligence approach doesn't mean that there's no place for more traditional data mining tactics. Most organizations are using a combination of both, and it's already proving to be a winning play for many of them.

Pointing out the way

AI and data analytics no doubt deliver real business value in some use cases. They're helpful when it comes to recognizing patterns in massive amounts of data and spitting out equations, scores, predictions, and estimates. The point is that such facts *point to* possible decisions but suggest none. (That's why I refer to the outputs from such tools as *pointers* in this section.)

These tools are also capable of automating certain decisions based on business rules that are determined and set by you or your organization. At its core, AI is automated decisions at scale. Traditional analytics must be integrated with automation software to cause an action to occur.

But before the various software — analytics, AI, and various forms of automation — begin their work in producing insights and automating your decisions, someone has to either program the analytics and automation software, and/ or train the AI. This group of data professionals often provide the interpretations of the outputs as well (usually as visualizations and/or automated AI-generated narratives).

In other words, people in specific job roles who do these tasks typically determine which insights — pointers, in other words — are accessible to other people in the organization who either use the software in a much more limited way or only view the results on dashboards to consume the information. Given the high degree of data illiteracy throughout organizations and across countries and industries, this process is both logical and necessary.

The downside here is that it is also limiting what information end-users can access when it comes to their own decision-making processes and what prompts the direction their thinking takes. This is why data democratization and AI democratization — decentralization so that more people in the organization can use the tools — is so critical to businesses. By making these tools far more

user-friendly, professionals in other disciplines and employees at all levels of the business can make better use of these resources.

However, both data and AI democratization still require data professionals to develop more intuitive and highly automated software to remove barriers before non-data professionals can use the tools in ways that bring their own talents and skill sets to bear. Think of this as very similar to the path other software has taken. For example, Microsoft Office enables people to create documents, notes, spreadsheets, and PowerPoint presentations without knowing how to write code, what keyboard commands to give, or anything at all about how the software works. This is the path analytics and AI software are headed down now.

So, who are these data professionals who are making and/or using analytics and AI to provide you with the pointers you're currently getting from various analytics software?

Typical job roles in data mining and analytics are data scientist, business analyst, data mining specialist, and data mining engineer (and variations of the same) to reflect a specific industry such as healthcare data analyst and risk-mining data scientist.

In AI, job roles include AI scientist, AI researcher, business intelligence developer, robotic scientist, software architect, data scientist, and data engineer, among others.

All these jobs will continue to be important positions in many organizations, and the demand for people with these skills will remain high for the foreseeable future.

However, much of their work is also being automated as part of the data and AI democratization movements.

As to specific examples of the work that these professionals collectively and individually produce for use in several business areas, below are some of the more common use cases for traditional data analytics and/or AI automated decision making:

- **Anomaly detection,** also known as outlier analysis, is a step in data mining (which can be aided by AI/ML or not) that finds deviations in the data from the norm, such as events (purchases on a charge or debit card in another country from where the cardholder is known to live or be, for example), and data point changes (attempts to change a social media account's password via a device or browser that the true account holder is not known to use before, for example).

- **Pattern recognition is** the automated recognition of patterns discovered in the regularities in data. One example would be finding earlier signs of cancer in patient data than doctors and diagnosticians previously knew existed.
- **Predictive modeling,** also known as predictive analytics, analyzes historical patterns in the data using a mathematical process to predict future events or outcomes. One example would involve predicting when a machine part will need repair or replacement based upon its past usage compared to how long identical parts lasted under the same conditions.
- **Recommendation engines** analyze data to make recommendations or suggestions based on users' past behaviors. Examples include analyzing your purchasing patterns in order to offer you a coupon for a grocery item you should be ready to buy again soon, or to recommend a movie based on movies you watched and rated earlier.
- **Personalization systems** use data analysis to customize a service, product, or automated communication. Examples include marketing emails sent to large numbers of customers, each personalized with the customer's name and a custom discount offer for a favorite product or service.
- **Classification and categorization systems** automate the organization of vast amounts of data. Examples include sorting data files and data sets according to importance, topic, secrecy level, or other identifier; legal requirements governing the handling of specific data points (think of laws like General Data Protection Regulation (EU GDPR) which limit where personal data can be stored); and the nature of the data (such as structured machine data or unstructured Twitter posts). Data must be correctly classified and categorized for analytics or AI to work correctly. Automation is the ticket here because there's so much data that it's impossible to do it manually.
- **Sentiment and behavioral analysis** is contextual data mining to discover and analyze the subjective expressed responses (sentiments or feelings) about a brand, product, service, idea, political candidate, and so on in online conversations or customer channels (conversations and customer ratings found in texts, on websites and blogs, in voice recordings or streams during phone calls, and app rating systems. Did you rate that Door Dash driver's service in the app? Yeah, that sort of thing!) Behavioral analysis can extend beyond sentiment analysis to include things like how long you spent reading a news article on your phone and how many times you return to a website, to what time of day and what device you normally use to post on Facebook.
- **Chatbots and conversational systems** frequently appear as a popup sales or customer service chat box on websites where you can ask questions about a product or service or your account and get an automated answer from the resident AI-powered chatbot. Some of these are so good it's hard to tell they

aren't human customer service agents. Data on the user and on the stated problem is collected and analyzed to rapidly respond with answers the user needs. Examples of other conversational systems include every digital assistant you've ever heard of: Alexa, Siri, Google Assistant, Bixby, and Cortana. Each is a data king, with Alexa and Google Assistant reigning over two of the largest kingdoms in terms of technical and market prowess.

- **Autonomous systems** are actually a network or a collection of networks that are all managed by a single entity or organization. Data is live streamed and typically analyzed at the sensor or gateway level, although some data is often sent to a data center for additional analyses later. Think the Internet of Things, such as self-driving cars, robotic systems in manufacturing, and smart cities that use information and communication technologies (ICT) to increase operational efficiency, share information with other systems (such as self-driving cars), and promote sustainable development.

There's no question that the above list is populated with wonderous achievements that would not be possible (or at least not at such huge scales and fast speeds) without data, analytics, and AI. Nevertheless, the promised "actionable insights" produced by analytics and presented in many of today's fancy visualizations and dashboards to business users are often merely pointers. They point to something you might want to use as a key factor in your decision, but they aren't in a position to make that decision for you. You have to conjure some mad data interpretation skills and do some creative problem-solving on your part to figure that one out on your own.

Making a decision

Pointers (also known as *actionable insights*) are typically useful in so far as they go. The trouble is that they point to possible decisions but don't suggest any. Users are often unsure about what action to take, or which option would produce greater value for the business. By contrast, the decision is the be-all-and-end-all of decision intelligence, and everything else in the process supports that decision.

REMEMBER

Whether data driven or decision driven, in both cases humans are the decision makers in this context. It's just that they decide at the tail end of the process in traditional analytics, whereas they decide in the lead position of the decision intelligence process. The starting point for the decision maker matters in terms of the level of control a person has over the impact and value. It's hard to exert much control from the rear.

A history lesson

Disgruntlement with the limitations of traditional data mining is growing. Increasing frustration often leads to both the business side and the AI and IT sides starting to wonder aloud: "What's the point?" But as geeks and businesspeople are wont to do, they realized that there is a point — they just hadn't arrived at it yet.

Eventually, the data driven model was flipped into a decision driven model as people experimented with making the point first and working their way back to the start from there. Decision intelligence is the name of the game where the gamers can all be winners. Now every move made has a point — a point that has value. That's because the point is based on a decision aimed at creating a specific business impact.

The current turn to decision intelligence

Several leading AI luminaries and tech giants have been pioneers in, and first adopters of, decision intelligence. They've already added the title of chief decision scientist to their leadership ranks. One example is Google's eminent chief decision scientist, Cassie Kozyrkov, who spends her days at Google democratizing decision intelligence and developing a more reliable AI approach. She also teaches it to others via conference speeches, YouTube videos, and writings in many online publications.

Kozyrkov appears to embody decision intelligence, partly because of her formal training in economics, mathematical statistics, psychology, and neuroscience. Decision intelligence incorporates all these disciplines — and then some. Although not all who share her title possess the same skill mix, they nevertheless do share strong critical thinking skills as well as a thorough understanding of creative problem-solving strategies, decision theory, and decision science approaches. (For those not familiar with the term, *decision science* focuses on decisions as the unit of analysis; it is the interdisciplinary application of business, math, technology, design thinking, and behavioral sciences to the decision-making process.)

Every day, more leaders are stepping forward to endorse the decision intelligence framework and explain its workings. Many of them work in AI, but others hail from disciplines collectively known as the decision sciences. Business leaders outside the technical domain are also catching on and reveling in their official return to the helm, as opposed to following data's lead (which most never did anyway), and armed with a better strategy. They're also happy about being able to keep their traditional analytics and tools. You don't win battles by limiting your options or abandoning your investments.

Deputizing AI as Your Faithful Sidekick

At its essence, AI automates decisions that are executed rapidly in an exceedingly large number of instances, often simultaneously. You train it by having it work with task-related data sets so that it can recognize what it's looking at in other data sets and learn from the patterns it finds there. Then it makes decisions based on well-defined business rules. (The reality is a good bit more complicated than that, but that's pretty much the gist of it.)

For example, banking institutions use AI to automatically decide which loan applications to approve and which to reject. This is how you can get an answer on your loan application within seconds, no matter how many other people are applying for loans at the same time you are. AI makes these decisions based on the rules it has been given, such as a range of acceptable credit scores, length and types of employment history, items of public record, and other such risk weighting values. AI is able to make such decisions on each individual application, yet at enormous scale and all of it within seconds or minutes. Therefore, borrowers can receive immediate responses to their applications, and lenders can secure more loan deals in minutes than they previously were able to secure over a period of months and at the larger payroll cost of many manhours.

AI is set to continue to serve in this and other automated roles for the foreseeable future. As a technology, it will continue to improve as all technologies do, but placing it within a decision intelligence framework means that its performance will improve exponentially because it is given not only rules to follow but also a target to aim at. Its tasks will be set upon a path of specific actions necessary for creating a specific business impact, and it will faithfully pound away at these tasks until its model decays or someone makes a new model to create another path leading to another targeted impact.

REMEMBER

Other technologies, such as robotic process automation (RPA) and application programming interfaces (APIs), integrate processes. (RPAs are now called virtual workers because they mimic how human workers work, including interacting with user interfaces in the same way.) As RPAs continue to automate processes that were previously difficult to automate, AI can be added to make some automated decisions affecting these processes as well. In other words, the whole of technology engaged in decision making is getting smarter and better and more able to work together.

All this might sound like a setup for a dystopian science fiction movie, but in reality, these developments are nothing to fear. In decision intelligence, whichever technologies you end up using are chosen specifically to augment human soft