

CHRISTOPHER
FRANK

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PAUL
MAGNONE

DODED
NETZER

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Decisions

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OVER

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Decimals

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Striking the Balance

●
between Intuition

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and Information

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Additional Praise for *Decisions Over Decimals:
Striking the Balance between Intuition
and Information*

“The authors have developed an innovative, practical framework for decision-making that is based on a synthesis of data analytics and experience-based intuition. Their approach is broadly applicable across industries, including health care.”

—**ELLIS M. ARJMAND**,
Surgeon-in-Chief, Children’s Hospital New Orleans

“The ability to make fast, yet informed decisions in a world where data is replicating so quickly is becoming an imperative skill-set for executives. The authors approach for Quantitative Intuition™ is a great balance of data and insights with experience. Readers will greatly benefit from learning this balance and using it to make better decisions (and actions).”

—**TRACI GUSHER**,
Data, Analytics and AI Management Consultant

“Frank, Magnone, and Netzer have created a framework that systematically challenges human cognitive biases, providing a methodical approach that allows decision-makers to see meaningful patterns in a chaos of data. This book is a foundational guide to any executive on how to leverage the power of your System 1 intuition to make meaningful data driven business decisions at speed.”

—**TODD TRAUTZ**,
Chief Innovation and Solutions Officer, Maru, author of *Feel, Behave, Think—The Pathway to Human Decision Making*

“High-stakes decision-making boils down to seeking truth and getting things ‘approximately right.’ Several quantitative-only methods run the risk of getting it ‘precisely wrong’ while offering a false sense of security. Techniques described in *Decisions Over Decimals* lead you to the truth and improve the odds of getting to balanced business decisions.”

—**ASIF HASAN**,
Co-Founder, Quantiphi, Inc

“*Decisions Over Decimals* is an insightful and thought-provoking book for any new leader or established executive and their teams. Insights without Quantitative Intuition and interpretation are still just data on the page. Frank, Magnone, and Netzer do an amazing job at making the big data world a little smaller and clearer.”

—**TRACIE KAMBIES,**

Founder and CEO of IQRush, Former Global Analytics Executive
and Big 4 Consulting Partner

“The ambitious premise that human judgment in decision-making can be codified, taught, and honed is proven in *Decisions Over Decimals*. The authors articulate a process that right-sizes the Goldilocks compromise between data paralysis and gut feel—and do this credibly through their collective experience from companies ranging from startups to the most data-rich organizations.”

—**BRANT CRUZ,**

Vice President, Platforms and Audiences Practice Leader,
Chadwick Martin Bailey

“*Decisions Over Decimals* is an excellent reminder that as we navigate vast seas of information, we must bring our intuition along on the journey. This book is a must read for any insights and analytic professionals that want to enhance their ability to impact and influence decisions to drive action.”

—**THOMAS WALKER,**

Senior Director, Global Consumer Insights

“The most important decisions are often the most uncertain and often on the razor’s edge. Frank, Magnone, and Netzer masterfully provide a framework to make better decisions faster in a way that can be explained to your stakeholders.”

—**ALEX SHARPE,**

Sharpe Management Consulting LLC

Decisions Over Decimals

*Striking the Balance between
Intuition and Information*

CHRISTOPHER FRANK

PAUL MAGNONE

ODED NETZER

WILEY

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This book is dedicated to our foundation and our future:

Rocco and Florence, Alberto and Grazia, Max and Drora

Michelle, Suzanne, and Susan

Alexander, Lauren, Luke, Eve, Talia, Ella, and Aviv

Cherish your past. Remain curious.

Chart a bold future.

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Foreword

Striking the Balance between Intuition and Information

— Christopher Frank, Paul Magnone, Oded Netzer

In February 2020 before the world as we knew it changed forever, I walked onto Columbia University’s upper west side campus as a guest speaker to Chris, Paul, and Oded’s executive seminar on Quantitative Intuition (QI)TM. Having worked closely with Paul for years in business and knowing of his work with Chris and Oded at Columbia, I was eager to engage as both a speaker and a student myself. The 45 business, government, and institutional leaders attending the session were diverse, formidable in their fields and an extremely talented group. So why did they come?

The saying “hindsight is 20/20” speaks to the wisdom of seeing things clearly in retrospect. But what if you could flip the switch to enhance your foresight materially?

Decisions Over Decimals is rooted in over 7 years of evolving QI coursework taught 4 times a year and the decades of collective experiences of the authors in varying fields. It offers both an enlightened understanding of how and why you think and process information a certain way, while giving you a repertoire of tools and techniques to fundamentally make more thoughtful, better choices.

This collaborative effort brings together each author’s unique perspectives, valuable insights, and relatable experiences to you. The structure provides a clear end-to-end framework that taken in its parts, or as a whole, will up your strategic thinking and execution

One important tradeoff the authors DO NOT ask of their QI students and readers of this book is that better foresight comes at the expense of speed. Their goal is to accomplish the opposite -- how can you make more effective AND efficient decisions.

I see the byproduct of this dichotomy with my clients and business partners regularly. Being effective and efficient simultaneously often paralyzes organizations who desperately need both insights and speed. The breakthrough of *Decisions Over Decimals* is the holistic approach that bridges data analysis with human insight for balanced decisions.

As an avid reader of business-oriented leadership and management books, *Decisions Over Decimals* complements any portfolio and is refreshingly action-oriented and pragmatic. I have applied the authors' approach to target large scale business opportunities, to shape board approvals, and to align stakeholders to play to win—It is comprehensive. It has thoughtful guardrails and exposes potential blind spots. It helps one to strike a better balance between intuition and information that often can be overweighted one way or the other.

In a world that comes at us each day with increasing velocity and exponential data availability, *Decisions Over Decimals* is a timely guide to give you greater comfort with uncertainty and clarity in the most important choices you make.

— **Thomas M. Galizia**

Chief Commercial Officer, Alphabet Google at Deloitte
Principal, Deloitte Consulting LLP

Preface

What distinguishes a person who makes smart, confident data-driven decisions? It is not exceptional analytic skills. Instead, successful decision-makers balance data, experience, and intuition. They quickly sort through information, apply judgment, and are fierce interrogators of data to cultivate sharp insights. They know there is more to decision-making than just the data. They resist being intoxicated by information. Instead, they apply first-order principles to understand what the decision really is, why it must be taken, and to what end. They then seek the relevant data to help make that decision. In short, they make informed decisions with incomplete information.

This approach to fast decision-making taps into a different set of skills, requiring a change in mindset by combining information and intuition. We call this approach Quantitative Intuition (QI)TM. QI is the product of years of discovery about making effective and efficient decisions. For too long, the debate has been on the value, veracity, and variety of Big Data. This trend has shifted the problem from data exploration to data sifting. This book dives into this emerging method to reimagine making decisions with imperfect information. By sharing a set of rapid response tools to get to the core of any business challenge, QI enables the reader to quickly interrogate and integrate data to make quick, effective, and often bold decisions. QI emphasizes the need to break the allure that an abundance of data is a crystal ball to eliminate all uncertainty and lead to perfect decisions.

With so much information available, leaders often falsely expect the data to provide both the question and the answer. They focus on what nuggets of insights can be found in the data, rather than on what the essential question to solve is. They think they're moving forward, but they're often just churning, working hard, but achieving little.

The authors of this book have worked in highly competitive, fast-paced industries where the temptation to simply drowning in data is immense. We have seen this from working for startups to the most iconic technology brands, from teaching at notable institutions to working with colleagues worldwide.

Decisions Over Decimals uniquely bridges theory and practice. Oded Netzer is the Vice Dean of Research and the Arthur J. Samberg Professor of Business at Columbia Business School and an affiliate of the Columbia University Data Science Institute; he also works at Amazon as an Amazon Scholar. Christopher Frank is at American Express and formerly at Microsoft, and Paul Magnone is at Google and previously at IBM and Deloitte Consulting. Chris and Paul are Adjunct Professors at Columbia Business School, and along with Oded, teach Quantitative Intuition™ at Columbia. Oded says:

If you were to describe me in one word, it would be *nerd*. If you want to use two words, it would be *data nerd*. I am the type of person who likes to stare at data and look for patterns and business applications. Sometimes I miss insights in the data, and sometimes I see patterns that are not there, and occasionally, I find some really interesting and useful nuggets. More seriously, what I do for a living is to preach what I practice when it comes to data-driven decision-making. I preach through teaching data-driven decision-making to undergraduate students, MBA students, data science graduate students, doctoral students, and executives in executive education programs. I practice in terms of my research and consulting work. My research focuses on one of the major business challenges of the data-rich environment: developing quantitative methods that leverage data to gain a deeper understanding of customer behavior and guide firms' decisions. Similarly, my consulting work with Fortune 500 companies and entrepreneurial startups, as well as my work at Amazon as an Amazon Scholar, focuses on making better decisions with data.

After graduating with an engineering degree, I started my love-hate relationship with data-driven decision-making. I began in consulting: talk about a place where quantitative meets intuition. Over a few years, I realized the tools consultants used to solve complex questions were too simplistic for the problems. That is what led me to the other side of research in academia. I did

my M.S. in statistics and Ph.D. in Marketing Analytics at Stanford University. It would take me a good 15 minutes to explain what I was doing at a cocktail hour (needless to say the “data nerd” wasn’t the life of the party!). Today, it is easier to describe my area of focus since *data science* has become a household term. I then traded the sun of California for the city life of New York. For the past 18 years, I have been at Columbia University teaching executives and executives-to-be. One of the key learnings for me from years of teaching data-driven decision-making was that people are often afraid of using data to make decisions because they erroneously believe that data-driven decisions are reserved for those who were top of their class in math in school. As we discuss in this book, this is a myth. There are many skills needed to make data-driven decision but strong math skills is not one of them. I share in this book many of the learnings from the years of teaching, research, and work with companies about how to pour good amount of intuition and business acumen to convert numbers to effective business decision making.

Christopher is the Vice President of Amex Insights at American Express, leading the Global Advertising, Brand, and Communications research practice.

My background is in technology, startups, and consulting. I graduated from Stevens Institute of Technology with a Master of Science. I thrive in quantitative analysis, but quickly learned that was not enough. When I began my career, as an IT developer simply executing what the business needed. From there, I went into consulting. I applied the scientific method to tackle business problems using systematic observation, measurement, and the formulation, testing, and modification of hypotheses.

From consulting, I spent 10 years at Microsoft as Senior Director in the Corporate Marketing Research and Insights Group. When I started on the research team, we were eight people, and when I left, we were 103, reinforcing the increasing role of analytics in making decisions. While I am comfortable with numbers and quickly learned that the most valuable role I play is translating the numbers to business outcomes. I serve as the connector between analytics and strategy to create demand for the

products and desire for the brand. My day-to-day focus is linking attitudes, behaviors, and outcomes with customers' needs, wants, and desires to fuel growth. I have developed a series of approaches to elevate the customer point of view, so it is influential at the highest levels to enable more thoughtful decisions. In the following pages, I share how to apply these practical techniques to everyday decision-making to help teams operate at a higher level, leading to greater impact.

This everyday application is where Paul Magnone contributes a unique voice.

While Oded and Chris approach decision-making from an analytic perspective, I come at it from building teams, structuring deals, and establishing strategic partnerships. Chris and I went to the same university, so we have a common foundation in the scientific method and approach to problem-solving. Currently, I work at Google, but if we go back in time, like Oded, I'm a recovering engineer. Yes, an engineering-only mindset is curable.

I spent my first 20 years after engineering school at IBM. About 10 years into it, after working with complex customers, I moved to the frontlines of the dot-com era working with venture capital firms and their portfolio companies in Silicon Valley, Europe, and Israel. After some time with the VCs, we realized we had all the resources to be creative, and I found myself in an entrepreneur-in-residence (or intrapreneur) role starting emerging IBM business units, developing a few patents, conducting business in over 30 countries, and driving acquisition integration of smaller software firms. So, a funny thing happens when you ask how do I reach a great decision and not just a good one; did I miss the turn? The difference between a good success and a billion-dollar business may be just a small handful of choices. How do you see the right alternative and make that choice? This is where coffee played a significant role because Chris and I would have virtual coffee on the weekends, and I'd say, "Chris, you do market research for a living. What am I missing? How am I not finding that needle in the haystack?" That was the genesis for the material in this book. It was the origin of marrying research with the frontline application.

From IBM entrepreneur-in-residence, I moved to a small telecom software firm at the forefront of 5G networking, then to a Deloitte Consulting Innovation group. Now I am at Google in the cloud business. I appreciate the academic view and helped form a lot of the strategic models in this book, but I also have experience working in the trenches, trying to understand what practical techniques will help sort out the blend of intuition and the quantitative—the head and the heart.

Bringing the head and the heart together is where leaders and teams struggle—striking the right balance so you can quickly move forward with confidence. This is the focus of the book. We identify specific techniques to do that swiftly and effectively from working on the frontlines. There is a clear thread among Chris, Paul, and Oded. We landed on the notion of Quantitative Intuition from our collective experience, from teaching thousands of executives and managers-to-be, and from our interactions with global teams in highly matrixed, competitive industries.

There are many terrific books on decision-making. We are striving to add to the pantheon of knowledge by discussing how to strike a balance between data intelligence and human judgment. This book is written to share practical techniques to make smarter decisions. You do not need to have gone to math camp to read this book, but you will acquire the necessary counterpart to IQ: QI. This book teaches you that to be an effective decision-maker you should rely on data, but at the same time you must resist being intoxicated by information.

Decisions Over Decimals underscores how the process of decision-making can be streamlined. This book is intended as a career tool, not a single-use one. Readers should be able to come back repeatedly as they progress through their careers, shifting upwards and sideways. It's not industry or geography-specific, and the value of QI can extend well beyond the confines of the corporate world.

QI aims to raise awareness of the power of thinking beyond Big Data without neglecting it, and chasing the perfect decision while appreciating that such a thing can never really exist.

Prologue: The Certainty Myth

We want to start by debunking two common myths. The first is the common view that you need to be a math savant to make decisions with data, which deters many people from using data for decision making. This is an erroneous belief. The reality is that making decisions with data is not a choice anymore, it's a necessity. Whether you were top of your class in math or not, you need to make data-driven decisions. However, having deep math skills is not a core requirement to be a great decision-maker. This is much like a race car driver who does not need to be a mechanical engineer but is a better driver given awareness of the underlying mechanics. Aptitude and depth in math are quite different from what is truly needed from a business leader—an appreciation for numbers and how they apply to your business.

The second myth is the illusion that, with the abundance of Big Data that surrounds us, we can finally get to the nirvana of making certain decisions—the perfect decision. The challenge in today's world is not the lack of information but the judgment to use it. This goes back to the first myth that you need to be a math whiz to make smart data-driven decisions. Rather, you need to balance the information with human judgment, experience, and intuition. These ingredients are at the heart of what we call Quantitative Intuition (QI)TM.

Consider the following scenario, one that is quite familiar to many of us—the presentation has been going on and on. Slide after slide of numbers and figures. We are on slide number 25 and suddenly, you hear a sharp voice from the back of the room. One of the executives in the room raises her hand and announces, “Hold on, help me understand this, the revenue number at the bottom of this slide doesn't make sense, it doesn't match the production number you showed us before on slide 9.” What just happened? The executive

did what good QI leaders do. She did not just evaluate the plethora of numbers at face value. She also avoided the temptation to simply look at the numbers in the table in front of her. She put the data in the context of her experience and the previously presented figures. Did she solve calculus equations or re-run the spreadsheets multiple times in her head to make this statement? Did she need to be top of her class in math to identify a gap in the pattern and a flaw in the plan? No, possibly she used fifth-grade math by multiplying the unit sold found on slide 9 by the price of the product to arrive at a sales figure on slide 25. In fact, her gut probably told her that the sales figure on slide 25 seemed off, which sparked her interrogative mindset. This type of interrogative mindset and the ability to put the data in context make for a good quantitative intuition-oriented leader. It is the ability to correlate your gut intuition with the data, put the data in the context of the business environment, and ask precise questions.

Quantitative Intuition (QI)TM

The list of examples of corporate and public policy failures is as long as history itself. It includes Coca-Cola introducing the New Coke formulation and walking back its launch a few months later, NASA's decision to launch the *Challenger* space shuttle on an unusually cold night in Florida, or Juicero, a company that briefly made and sold high-end Wi-Fi-connected juice machines for \$700 before disappearing. What is common to all of these examples, which we discuss in detail later in the book, is that the problem was not in the lack of data or the data itself, but rather in the judgment employed in converting the information to sound decision-making. As data becomes more ubiquitous, and as our temptation to draw grand conclusions from it becomes more difficult to resist, it's critical that we chalk up case studies like these as invaluable lessons to learn. *Decisions Over Decimals* describes the Quantitative Intuition techniques to allow for better navigation through problem exploration to reach a sound decision more effectively.

Quantitative analysis is valued because it tends to be considered unambiguous. Numbers are a universal language that everyone speaks more or less uniformly. Humans tend not only to be terrified of failure but also of the unknown, so if we're given data that can

be feasibly interpreted as solid, we tend to jump to two conclusions: first, that it will save us from failure, and second, that it will provide certainty. Both are categorically wrong.

Data and numbers tend to provide the comfortable feeling of accuracy and certainty, but they rarely tell us the full story. Numbers alone can never provide a perfect solution or answer, and they will never immunize decision-makers from faltering. At the other end of the analytics spectrum, intuition—which is difficult to measure—often receives a poor reputation for being subjective and susceptible to biases and manipulations. And yet, intuition is visceral and grounded in understanding fundamental beliefs, which in corporate terms is business acumen. The inner voice that you may work to ignore may be a guidepost along the way to a better decision if it is well contrasted and combined with the data.

Quantitative intuition (QI)—the combination of data and analytics with intuition—might sound like an oxymoron at first, but it is actually the key to effective decision-making.

Simply put, QI is the ability to make decisions with incomplete information via precision questioning, contextual analysis, and synthesis to see the situation as a whole (see Figure P.1).

Quantitative thinking balanced with intuition is the necessary mix to make decisions in the data-driven world we all live in. QI equips us to be more confident when making decisions in

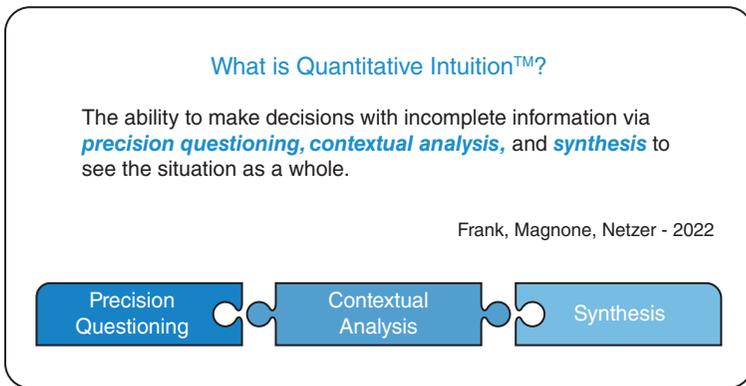


FIGURE P.1 Quantitative Intuition definition

the face of uncertainty. By striking the right balance between data intelligence and human judgment, QI helps us navigate between risk and certainty.

We live in a world of Big Data, yet we are always seeking more data, often questioning the data we have and feel frustrated by inaction. By allowing ever more data and analysis to drown out our human judgment, we neglect a powerful combination that can lead to a comprehensive view of a decision to be made. No amount of purely quantitative information will provide certainty and the answers needed to run an organization, grow a business, or lead a team. Combining quantitative information with intuition—human judgment developed through experience and close observation—is indispensable. *Decisions Over Decimals* busts the Big Data myth by putting forward a set of QI techniques that teach you to bridge the gap between analytics and intuition.

So, what is intuition? In the context of decision-making, intuition is human judgment developed through experience and observation. *Intuition* can be further defined with reference to three distinct features: it is a *subconscious process*, it involves *parallel thinking* (holistic, rather than sequential or analytical thinking), and it involves *your “gut” as well as your brain*. These three features are worth looking at more closely.

Intuition is primarily a subconscious process. Even if you use your conscious mind to formulate the problem or rationalize the result of intuitive judgment, intuition occurs without having to apply mental effort.

This distinction is elaborated in Nobel laureate Daniel Kahneman’s seminal book *Thinking, Fast and Slow*, in which the Israeli-American psychologist and economist introduces the concepts of System 1 and System 2 thinking to describe the different ways the brain forms thoughts.

System 1 is rapid, automatic, and unconscious; it kicks in when we pull our hand away from a hot stove or step out of the street as we see a car racing toward us. System 1 is probably at work right now if you’re a competent reader. You are making connections and associations without even realizing it.

System 2 is much slower, rational, and effortful. We rely on this system when we have to recall a series of numbers from memory or

read a particularly technical passage of text. What's 45 multiplied by 97? Your system 2 just got to work.

Intuition falls squarely into the domain of System 1 thinking. It tells us the answer to something before we even know we know the answer. It gets us to the top of the stairs, both literal and metaphorical, before we even become aware of moving our legs.

The second characteristic of intuition is that it is parallel rather than sequential. When we employ intuition, we see a problem holistically, and simultaneously considering all of its features and components. Synapses fire furiously so that we can appreciate the whole picture swiftly, much like a talented chess player looking multiple moves ahead to map out the future consequences. In the context of decision-making, analysts are trained to think systematically and sequentially about the steps of data analysis. On the other hand, decision-makers are often required to, and benefit from, consuming and synthesizing different pieces of information in parallel to arrive at a decision.

Finally, intuition involves your "gut" as well as your brain. Of course, that's not physiologically accurate—our stomachs can't think—but when we say "use your gut," we are talking about human judgment that feels visceral and instinctive.

One famous case study that demonstrates all three of these characteristics vividly, but particularly the last, is featured in Malcolm Gladwell's best-selling book *Blink*. Gladwell recalls a researcher, Gary Klein, telling him a story of a team of firefighters being called to a burning house. The fire in the house appears to be coming from the kitchen, but when the crew tries to extinguish it with their water hoses, it continues to rage. After spending a few minutes in the burning house and observing the situation, the lead fireman tells everyone to evacuate the house immediately. Just seconds after they do so, the floor collapses. They likely would have been killed almost instantly if anyone had still been inside.

After the drama, it emerged that the source of the fire had not been in the kitchen but in the basement. But when asked what had triggered him to make the snap decision and urgently order everyone outside, the lead fireman was unable to give a real answer. He'd had no concrete information to inform a rational decision, but something had told him what had to be done. He purportedly felt it in his gut. He just sort of knew.