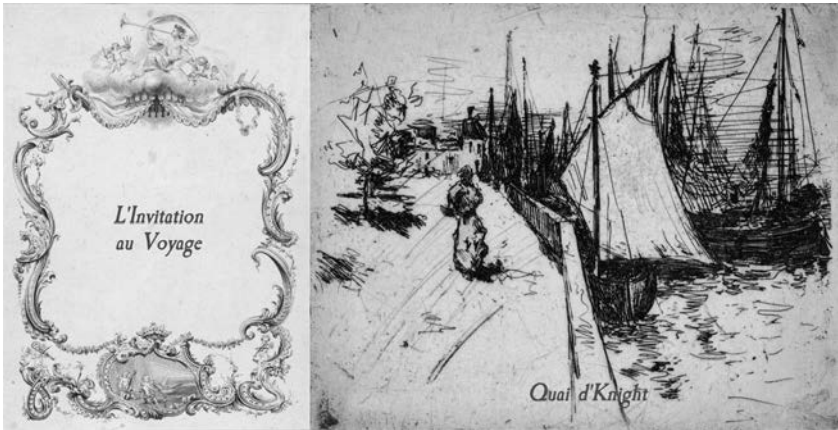


# PART I

## INVITATION TO THE VOYAGE



### Notes:

1. Adapted from the Smithsonian's Open Access online collection. The image to the left (ca. 1750) is described as "Frame for the Title or the Dedication of a Music Book, or a Program of or an Invitation to a Concert." The image on the right (ca. 1883–1884) is John Henry Twachtman's *Woman on the Quay, Honfleur*.
2. Charles Baudelaire's poem "L'Invitation au voyage" was published in *Les Fleurs du mal* in 1857, a book denounced as *une outrage aux bonnes mœurs* — "an insult to good manners" or "morality" (Gotrich 2018).
3. As mentioned in the Preface, we sail from Knight's dock, not on Knight's ship. Hence, *Quai d'Knight*.

# 1

## The Offering

Uncertainty fascinates and challenges. An entirely predictable existence would be unbearably dull. The excitement of climbing a mountain, organizing a movement, developing a new technology, or starting a business comes from not knowing what awaits us, from outcomes that we cannot fully control, and that nature or providence have not preordained. Our enthusiasm for new products and experiences demands the prospect of a surprise. But we also struggle against uncertainty. Daring mountaineers plan and prepare diligently, leaving as little to chance as they can. Human artifice has battled natural misfortunes since prehistory, building shelters against storms, cultivating crops to provide more reliable food than hunting or foraging, and digging wells for predictable water supplies. Yet uncertainty defies conquest. Bold or cautious, impulsive or deliberate, we constantly face choices whose consequences we cannot foretell.

Scientific and industrial revolutions made it easier for people to reduce the impact of bad luck. Between 1550 and 1650, one in five ships sailing between Portugal and India were lost because they relied on “dead reckoning”—crude guesswork—to navigate. John Harrison’s pathbreaking clocks reduced sailors’ uncertainties about their locations,<sup>1</sup> making long-distance trade more routine and reliable. Medical knowledge and instruments (such as stethoscopes and X-rays) made diagnoses more accurate. Interchangeable components, automation, and statistical defect control reduced variability in manufacturing. Actuarial science and annuity calculations reduced the risks of providing life insurance and pensions. New legal technologies and instruments (such as letters of credit) improved commercial predictability across time and distance.

Innovations in this millennium have continued to increase predictability. Medical research and diagnoses are less hit-or-miss: Genetic advances have helped biotech researchers find precise targets for drug development and physicians identify individuals with a high propensity for several diseases. DNA tests help track down murderers and rapists—and overturn the convictions of innocents. More accurate weather forecasts provide life-saving storm alerts. Businesses have benefited from Six Sigma techniques that can nearly eliminate defects. Big-data algorithms help Google and Facebook personalize advertising and airlines fill their airplanes profitably. Consumers can predict when their Amazon packages and Uber cars will arrive with surprising accuracy. Online

marketplaces like Airbnb provide pictures and ratings that help price-conscious travelers find suitable accommodation more confidently.

Scientific discoveries and technological innovations have not, however, eliminated uncertainty. In medicine, reliable diagnoses of common afflictions such as sleep apnea and muscle cramps remain frustratingly elusive. Diagnostic imaging now provides reliable evidence of coronary heart disease, but the causes remain a puzzle. Early detection can create new uncertainties: mammography can locate tiny, incipient breast tumors, raising the question of when and what treatment is best. Tests for very early-stage prostate cancers raise similar questions. And despite high-tech medical testing, missed, wrong, or delayed diagnoses occur in up to one in seven hospital admissions in the United States.<sup>2</sup>

Airbnb pictures and reviews have not ended unpleasant surprises. The commercial success of ad-serving programs on Google and Facebook shows their superiority over blind advertising. Yet most ads I see are laughably unrelated to anything I would buy. The outcomes of entrepreneurial initiatives remain highly unpredictable. Despite nearly unlimited financial resources, vast troves of data, formidable analytical capabilities, and the savviest talent money can buy, Google and Facebook repeatedly fail to launch successful new products and services and instead rely on acquisitions to sustain their growth. Most businesses backed by the brightest and best venture capitalists (VCs) flop. Legendary VCs also often dismiss opportunities that later achieve stunning success.

And put aside radical uncertainties and life-altering possibilities. Nothing is certain under the sun. Our knowledge of the world—or our future wants—is incomplete and fallible. Nor can we be sure about others' opinions or wants. We can only imagine. Yet resolute action requires confidence in our individual and collective choices. Where does confidence come from, especially when we imagine something new? How do we justify judgments prone to mistake and disagreement?

Managing uncertainty also imposes costs. Techniques for making predictions about large groups and agglomerations often rely on standardized procedures and statistical models that ignore contextual and personal differences. These “one-size-fits-all” systems can cause widespread harm. Yet the experts who design or operate defective systems carry on, their power unchecked. People's frustration with unaccountable experts can empower authoritarian demagogues. Therefore, while technology increases the possibilities of predictability and control, it also raises difficult questions about when and how to rely on technical solutions and experts.

The kind of evidence used to justify uncertain choices poses related problems. Satisfying demands for “evidence-based” justification now often requires statistical validations and randomized controlled trials. This is sometimes prudent: it would be reckless for the US Food and Drug Administration (FDA) to authorize

new vaccines without large-scale trials. In other instances, however, statistical justification is impossible or unwise: Supreme Court justices cannot base their rulings on a statistical model. Similarly, choices about whether and how to treat incipient breast tumors or early-stage breast cancers should consider individual patients' case histories, not just the results of clinical trials. But dogmatic reliance on statistics to resolve all kinds of uncertainties—and on experts who claim a supernatural capacity for such resolution—has become widespread.

## 1. Elusive Prospects

Given Frank Knight's stature—Knight is sometimes remembered as the father of Chicago economics—his classic book on uncertainty might seem an obvious source for insights. But extracting insights on significant contemporary issues isn't easy.

Briefly, Knight's 1921 book *Risk, Uncertainty and Profit* distinguished uncertainty from risk thus: Risk can be objectively calculated from historical statistics (as in constructing life expectancy tables) or from probability theory (like the chance of successive "heads" in a coin toss). Knight defined uncertainty by *exclusion*—as situations when we *cannot* calculate probabilities from statistical distributions or mathematical laws. For example, picking the Best Movie Oscar winner five years from now involves incalculable uncertainty because we cannot even know which films will be in the running then. Knight further attributed to entrepreneurs the crucial role of taking "responsibility" for uncertainty rather than risk (as explained in chapter 4). This attribution helped secure Knight's place as a pioneering researcher of entrepreneurship.

Knight's definition of uncertainty as the absence of calculable risks has immediate intuitive appeal, but this definition has also become a reason for its neglect. Most real-world situations and problems—which dish to order in a new restaurant, for example—don't naturally map into statistical distributions or mathematical calculations. We know this intuitively. But the very banality of this vast residual "nonrisk" space has encouraged interpretations that are hard to understand or apply.

Some present-day references, for example, restrict "true" Knightian uncertainty to "unknown unknowns." This restricted interpretation puts uncertainty in the metaphysical sphere, making practical application or analysis impossible.

Knight's exposition, which swings between the straightforward and the mystical, contributes to these obstacles. On the straightforward side, he calls uncertainty a "probability situation" in which "there is *no valid basis of any kind* for classifying instances" (italics in the original)<sup>3</sup> because "the situation is in a high degree unique."<sup>4</sup>

Knight's "best example" pertains to "the exercise of judgment," namely, the formation of opinions about future events, which "guide most of our conduct."<sup>5</sup> If our opinions about what will happen if we do something are favorable—and we have sufficient confidence in our opinions—we act.

But, adds Knight, the "ultimate logic, or psychology, of these deliberations is obscure, a part of the scientifically unfathomable mystery of life and mind. We must simply fall back upon a 'capacity' in the intelligent animal to form more or less correct judgments about things, an intuitive sense of values."<sup>6</sup> Fair enough; such mysteries of life and mind are indeed unfathomable. But practically, such language pushes uncertainty into a metaphysical realm, better suited for scholastic disputation. Yet economists—like other social scientists—have no interest in such disputes. They prefer to work with constructs they can observe and, better yet, measure.

What's more, as we see in later chapters, mainstream economic theories now make no distinction between "probability situations" that are, in Knight's words, "to a high degree unique" and those that are not. Uncertainty is banished to the unexaminable, occult world of unknown unknowns. Even in the entrepreneurial sphere, where promoters tout the distinctiveness of their ventures, mainstream theorists prefer to look at other matters, such as incentives and information asymmetries. And while economists might sympathize with Knight's claim that profit is impossible when the risks are known, their usual theories of profit do not include uncertainty.

Textbook economics also tells us little about justifying sincere, carefully reasoned beliefs and resolving honest disagreements. Standard theories focus on lying and cheating, and behavioral economists focus on thoughtless biases and blunders. The give-and-take of grounded yet imagined reasons about imagined possibilities are beyond their scope.

## 2. Unradical Aims

While my perspective and methods are unconventional, my project isn't radical. I aim to stimulate inquiry into neglected questions about the role of uncertainty in human affairs and improve our understanding of how to manage it. I do not offer grand theories or manifestos. Instead, I propose some conjectures about the justification of imagined choices illustrated by applications in entrepreneurship. My conjectures and applications also complement rather than challenge mainstream economics; I have no interest in overthrowing the results of its uncertainty-free theories. To return to the e-bike analogy of the Preface, I propose an electrically assisted bicycle, not an all-electric scooter. Instead of refuting existing theories, I focus on what mainstream economics can't easily examine or explain.

Thus, my uncertainty-based applications aim to show how and why self-financed founders, wealthy “angel” investors, venture capitalists, and large corporations occupy different entrepreneurial niches and often play symbiotic roles. I also show how imaginative uncertainty-reducing discourse—which is excluded from the purview of mainstream economic theories—helps entrepreneurs secure resources for their ventures. I do not, however, reexamine Knight’s original thesis that true profit requires uncertainty. I believe that is a lost cause in economics—although I stress the dictum in teaching entrepreneurship to analytically obsessed business students.

My contextual, “abductive” reasoning and “narrative mode” discourse<sup>7</sup> may trouble economists and other social scientists more than my conjectures and applications themselves. I make no apologies. Facts that aren’t numerical and evidence about unique circumstances affect what we routinely do and how confident we feel about our choices. They deserve a place in accounts of our economic and social conduct. That such facts and evidence resist mathematical or statistical treatment does not justify their exclusion. Much of human reasoning and discourse has, throughout human history, included such facts and evidence. Adapting how the older learned professions—law and medicine—use nonnumerical contextual data and “think in cases”<sup>8</sup> can broaden our understanding of human conduct.

But again, as with the results of mainstream economics, I aim to broaden, not attack, conventional methodologies. While discouraging careless observation and theorizing, the prevailing math, statistics, or nothing convention also limits the range of problems examined and the completeness of explanations. More acceptance of other approaches will broaden what economists and like-minded social scientists can explore and explain.

### 3. Crossover Readership

This book targets a crossover but not a mass audience. I hope to inform and persuade economists willing to consider approaches outside accepted paradigms and a select group of noneconomists. The latter include academics outside economics departments, policymakers, and practitioners with intellectual interests and scholarly dispositions.

Writing for this dual target poses challenges. Like other natural and social scientists, economists regard journal articles as the primary means for communicating scholarly ideas. As the philosopher of science Thomas Kuhn put it, scientific research is now usually reported in “brief articles addressed only to professional colleagues . . . whose knowledge of a shared paradigm can be

assumed and who prove to be the only ones able to read the papers addressed to them.” In contrast, scientific books are “usually either texts or retrospective”; the scientists who write them are more likely to find their “professional reputation impaired than enhanced.”<sup>9</sup> Worse, I explain things the professional economist already knows well and include intellectual histories that are not technically necessary. I offer no model or statistics. All this does not help me make my unconventional case to mainstream scholars.

In contrast, other readers may find even my simplified summaries of established economic ideas challenging. For the same reason, they should get more from the summaries than academic economists. And being less preconditioned by existing theory, other readers may more readily follow my reasoning. The absence of actionable prescriptions may disappoint practically minded readers, however. This book is not a “how-to”; I have long been skeptical of generalized remedies. Effective practice, I believe, must reflect specific circumstances.

Yet, a conceptually guided understanding of how the world generally works has practical value. Even “madmen in authority, who hear voices in the air, [distill] their frenzy from some academic scribbler of a few years back,” as John Maynard Keynes wrote.<sup>10</sup> As it happens, I have no interest in stirring up madmen in authority, but I hope to raise questions that could help worldly readers develop their own practical insights.

Anticipating a diverse—if select—readership, I have organized this book into modular parts. After the introductory Part 1, you can read the next three parts sequentially or in any other order. For example, the practically minded reader could go to the applications in Parts 3 and 4 and then return to the more theoretical Part 2. The text also includes shaded boxes to enrich and enliven the main text through biographical sketches, in-depth examples, and technical explanations. The shaded boxes can be read in the order in which they appear, postponed for later perusal, or, depending on the reader’s interests and expertise, skipped.

My language and presentation favor nonacademic readers. Besides simplifying the technical material and using shaded boxes, I have put many details in the endnotes. I use bullet points, numbered sections, and other visual markers to make the chapter structures transparent.\* I also avoid long or made-up words, idiomatic references that might puzzle readers from outside the Anglosphere, and “maybes” and “perhapses” to qualify every argument (although I deeply mistrust certitudes). These choices may undermine my credibility with some academic readers. But I hope that even objectors will secretly like an easy-to-follow format and that its transparency will encourage refutations and corrective research.

\* David Ogilvy’s *Confessions of an Advertising Man* (1963) had numbered paragraphs, along with boxed articles. I have not gone that far.

To complete this prospectus for modernization: the following three chapters outline, in turn, how I modify Knight's concept of uncertainty, the conjectures that follow from my reconceptualization, and the applications of my conjectures to entrepreneurship. Taken together, the chapters in this part of the book distill the book's argument. But the value and pleasures of a book, like its evils, lie in its details, so I hope Part 1 stimulates rather than satisfies the reader's interest.

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