

Richard M. Adler

Bending the Law of Unintended Consequences

A Test-Drive Method for Critical
Decision-Making in Organizations

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It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be.

Isaac Asimov

Preface

Who Should Read This Book?

This book is intended for senior decision-makers in business, government, and other organizations. It will also interest managers and analysts who support such leaders and aspire to their positions, as well as teachers and students of decision-making. If you are such a person, then you are aware of the importance of *critical* decisions, by which we mean decisions that affect entire enterprises in significant ways. Examples of critical decisions in business include mergers and acquisitions, introducing new product lines, entering new markets, and developing strategies to defeat competitors. Critical decisions in government include legislation and regulations on taxes, education, and healthcare; trade and other foreign policies; and military interventions. Many critical decisions turn out poorly or even disastrously. Why does this happen? In almost every case, consequences arise that were not anticipated, consequences that lay waste to otherwise well-meaning decisions. This phenomenon is generally known as the Law of Unintended Consequences (LUC).

The purpose of this book is to help organizations anticipate and minimize the damage caused by LUC in critical decisions. Doing so will yield more of the positive consequences that decision-makers intended. Our approach to improving outcomes is straightforward: establish an explicit method for making and executing decisions and stick to it. The devil, as always, lies in the details. Our method is designed expressly to combat LUC. It targets three key sources of LUC's power: the complexity of the environments in which critical decisions are made; inherent uncertainty about future events; and the structure of the cognitive processes that drive how our minds make judgments and choices.

Executives and managers want to make better critical decisions that yield attractive outcomes, but good intentions are never sufficient. Applying the principles and methods that enable effective decision-making takes sustained focus and hard work. All too often, managerial interest and commitment erode in the face of constant operational duties and budget pressures. And yet the dangers of relying on gut-level intuition or perfunctory analyses are considerable: poor performance, degraded competitiveness, avoidable crises, and damaged reputations.

How Is This Book Different?

Books about critical decision-making abound. At one end of the spectrum are the postmortem chronicles of decision debacles—epic stories of failed mergers, corporate collapses, industrial catastrophes, and, of course, the global financial crisis of 2008.¹ Often written with a journalistic flair, they vividly recount how executive personalities, business cultures, and errors and errors in strategy interact with social, market, and economic conditions, inexorably leading to ruin.

At the other end of the spectrum are books that propose general theories of decision-making. Some of these books adopt a prescriptive approach, proposing processes and methods that organizations *should* use for making decisions.² These books tend to skim on realistic enterprise-scale examples to guide would-be practitioners. They also neglect the execution phase of decisions, which is as crucial to success or failure as making a sound decision. Other books offer descriptive accounts, using cognitive and social psychology to explain how individuals and groups make decisions in practice.³ These books often point out warning signs that help decision-makers avoid recurring mistakes. Learning how to avoid making bad decisions—what not to do—is clearly important. But what is more valuable is learning how to make and execute *better* decisions.

Bending the Law of Unintended Consequences is predominantly prescriptive; it presents a comprehensive method for improving critical decisions. However, this method builds upon lessons drawn from the descriptive and postmortem genres. The test drive method and its underlying perspective on critical decision-making offer the following novel combination of features:

1. We identify LUC as the core problem confronting the critical decision-maker. Most authors pinpoint either innate mental biases or constraints on human rationality as the sole (or dominant) cause for decisions going astray. LUC offers a unique lens for viewing these two factors as *complementary* causes. This insight is vital, because ignoring one or the other, invites calamity.
2. We exploit research in cognitive science into how decisions go wrong to defend against the dual causes of LUC. Our proposed method for making critical decisions pushes back against the constraints on human rationality as much as possible. But it also builds in features that help decision-makers and analysts resist well-known mental biases.
3. Our method offers a practical solution for minimizing encounters with LUC and improving decision quality. The central idea is to “test drive” decision options

¹Examples include Collins [3], Bruner [2], Bookstaber [1], and Lowenstein [11].

²See, for example, Russo and Schoemaker [12], Keeney [9], and Heath and Heath [7].

³Examples include psychological accounts such as Kahneman [9], Finkelstein, et al. [4], Klein [10], Hammond, et al. [6], and neuroscientific discussions such as Gazzaley and Rosen [5].

before selecting one to implement. A decision test drive helps leaders anticipate unintended consequences so that they can be avoided or mitigated.

4. Many authors with decision sciences backgrounds recommend applying one simulation technique or another to improve analysis of decision options. In contrast, the test drive method *combines* simulation techniques to improve the realism of projected outcomes. It also supplies an explicit rule for choosing the “best” alternative. This method is not simple, but neither is it unrealistically difficult.
5. The test drive method addresses the entire decision *lifecycle*, including preparation, execution, and lessons learned. These phases precede or follow the familiar “point of decision” in a robust decision-making process. Mounting defenses across the entire lifecycle of decisions is crucial, because LUC can wreak havoc at any phase of the process.
6. Many critical decisions entail significant changes to a company’s operations and culture. Implementing such decisions often generates “turbulence” that reduces focus, cohesion, and performance. We treat the problem of minimizing these virulent unintended consequences as a critical decision in its own right.
7. This book pays attention to practice as well as theory, by illustrating how the test drive method can be applied to four important types of critical decisions: competitive marketing strategy, adopting disruptive business models, managing enterprise risks, and enabling smooth organizational change. These examples illustrate the pragmatic considerations that face decision-makers who apply the test drive method in their business.

Whether a business faces growth, competition, risk, change, or other enterprise challenges, *Bending the Law of Unintended Consequences* provides concepts and practical techniques for improving critical decisions and producing more of their intended outcomes.

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Chapter 1

Introduction



At the peak of the dot-com boom in January 2000, America Online (AOL) and Time Warner announced the second largest merger ever.¹ AOL paid out \$183 billion to complete the transaction, and the combined company was valued at an astonishing \$350 billion.² AOL was the dominant provider of Internet access and online services including messaging, chat rooms, and games. Time Warner was the largest media and entertainment conglomerate, combining magazines, books, television programming, news, music, and movies, with high speed cable delivery services.³

The strategy behind the deal was widely touted as “transformative”—the vanguard for new media companies seeking to integrate digital content with communications. Time Warner had previously tried to develop an on-line presence and brand but had been largely unsuccessful. AOL offered a customer base of over 20 million subscribers for Time Warner’s content, with the potential to jumpstart growth of on-line advertising revenues. On the other side, AOL needed Time Warner to deliver faster Internet access to its customers via cable and to provide friendlier user interfaces and a rich store of proprietary content. In addition, AOL was eager to leverage its sky-high market valuation to acquire real assets and Time Warner’s revenue stream.⁴

Unfortunately, things did not go at all well. Shortly after the transaction was announced, the dot-com bubble burst in March. The NASDAQ Composite Index

¹ The 1999 acquisition of Mannesmann by Vodafone Group was slightly larger than the AOL Time Warner deal. https://en.wikipedia.org/wiki/List_of_largest_mergers_and_acquisitions.

² Although the transaction was structured as a merger, AOL purchased 55% of the new entity. https://en.wikipedia.org/wiki/Time_Warner#Merger_with_AOL, <https://www.slideshare.net/adhamghaly/aol-time-warner-merger-case-study>.

³ <http://fortune.com/2015/01/10/15-years-later-lessons-from-the-failed-aol-time-warner-merger>.

⁴ <http://www.nytimes.com/2010/01/11/business/media/11merger.html?mcubz=1>.

topped out and began a prolonged and severe decline.⁵ AOL's on-line advertising revenues dropped as a result of the dot-com meltdown.⁶ AOL's market share and profitability steadily eroded, as their customers and consumers new to the Internet subscribed to broadband providers in rapidly growing numbers. This market transition was driven by consumers' clear preference for broadband's high-speed always-on connectivity over AOL's slow telephone dialup connections.⁷ Together, these events demolished AOL's financial forecasts and the original business case for the transaction. To add insult to injury, persistent management clashes crippled operational efforts to cooperate and achieve planned technical and marketing synergies across the merged companies. These problems stemmed in large part from incompatible corporate cultures—AOL's aggressive upstart style and ad hoc organization versus Time Warner's conservative mindset and highly structured business divisions. Cultural tensions were further aggravated by the fact that top managers on both sides had been given little advance information about the transaction. Many Time Warner executives had opposed the deal from the start and their resentment towards AOL only grew with its continued failure to reach financial targets.⁸

The merger was completed in early January 2001, a full year after it was announced. By this point, the company's market value had already declined to \$205 billion. In short order—by the end of 2002—AOL was compelled to write off a further stunning \$99 billion in goodwill charges. Executive turnover was high during the troubled implementation, including the departures of Gerald Levin and Steve Case, the Time Warner and AOL architects of the deal. Overall, the transaction was blamed for destroying over \$200 billion of market capitalization. Even allowing for the dot-com crash, this was a breathtaking loss of shareholder value. Jeff Bewkes, previously the CEO of Time Warner's HBO unit and an early internal critic of the merger, eventually became the CEO of Time Warner in 2007. He described the merger as “the biggest mistake in corporate history” and spun off AOL from Time Warner in late 2009.⁹

⁵The NASDAQ Composite Index reached its peak of 5132 in March 2000. By October 2002, it was valued at 1114, representing a loss of 78% of its value in 30 months. <http://www.nasdaq.com/article/3-lessons-for-investors-from-the-tech-bubble-cm443106>.

⁶In fact, in a settlement with the SEC, Time Warner restated more than 2 years' worth of results, from the fourth quarter of 2000 through 2002, reducing advertising revenue claimed at AOL by \$500 million. <http://www.ecommercetimes.com/story/41604.html>.

⁷In 2000, 2.5% of the US population had high speed broadband, but grew rapidly to 4.5% in 2001, 6.9% in 2002, and 28% by 2012. https://en.wikipedia.org/wiki/Internet_in_the_United_States.

⁸Time Warner executives took financial hits from declining stock value. However, their hostility was fueled by direct losses in compensation because the company changed its executive incentives program from cash bonuses to stock options tied to corporate performance targets. Those targets were never met thanks to AOL's failures. https://en.wikipedia.org/wiki/Time_Warner#Merger_with_AOL, <http://www.thedailybeast.com/articles/2009/05/04/how-time-warner-blew-it.html>, http://news.cnet.com/Case-accepts-blame-for-AOL-Time-Warner-debacle/2100-1030_3-5534519.html.

⁹Ted Turner, the largest individual shareholder, lost roughly \$8 billion dollars, or 80% of his net worth! He later called the merger “one of the biggest disasters that have occurred to our country.” AOL struggled for many years before being purchased by Verizon in 2015 for \$4.4 billion. <https://www.fastcompany.com/3046194/a-brief-history-of-aol>.

The Time Warner AOL debacle exemplifies the perils of what this book calls *critical decisions*. Informally (for now), a critical decision is complex and affects diverse stakeholders and other parties external to an organization. Besides having many “moving pieces,” a critical decision addresses broad issues relating to core business strategy or enterprise-wide operations. As such, decisions are critical because of their high stakes: their outcomes shape the long-term well-being of a business and its stakeholders, not to mention the careers of the decision-makers and implementers.

Another key aspect of critical decisions is that they follow an extended trajectory over time, ranging from months to years. We commonly think of “making a decision” as a discrete event—an act that takes place at the moment when we explicitly commit to a strategy or plan. However, critical decision-making is actually an extended *process* that follows a recurring *lifecycle*: we recognize a need to act; size up the situation; identify our goals and constraints; formulate and evaluate our options; commit to a particular course of action; and then implement that decision. Errors or surprises at any stage of this process can compromise outcomes.

Mergers and acquisitions (M&A) represent a particularly visible and risk-prone category of critical business decisions. Roughly two-thirds of such transactions fail to meet their targets for cost savings, synergies from combining operations and sales, and return on investment (ROI).¹⁰ Even worse, many M&A deals end up losing shareholder value, occasionally reaching spectacular “train wreck” levels like the AOL Time Warner debacle. However, M&A decisions are by no means the only decisions that are critical. Other examples include major human resources decisions; launching new products; devising new marketing and sales strategies; making non-M&A strategic investments; and adopting new business processes, technology platforms, or information systems.

Consider, for example, voluntary early retirement opportunity (ERO) programs. These critical HR decisions aim to entice older workers to retire early without triggering the personal traumas and declines in morale caused by mandatory layoffs. EROs can cut costs by shedding above average salaries often paid to senior employees. They can also eliminate lower performing workers and enable younger workers to advance within a company. The intended outcome for an ERO strategy, then, is a smaller, more productive and profitable workforce.¹¹

However, like M&A decisions, ERO programs pose serious risks, arising most notably from poor anticipation of employee perspectives, flawed designs, and inflexible implementations. EROs that are not sufficiently attractive tend to be under-subscribed, which may necessitate further layoffs that are compulsory. But EROs that are too attractive invite excessive participation by the wrong employees. High performing professionals often jump at early buy outs: they are confident in their ability to land new jobs, and view fat retirement packages as windfall bonuses that more than compensate for the nuisance of switching jobs. At the same time,

¹⁰ Bruner [2]. See also <http://www.crossingwallstreet.com/archives/2007/10/business-deals-gone-bad.html>.

¹¹ Companies favor this approach to adjusting workforces during or after recessions, to restructure, to pay off debts from acquisitions, or to cut costs when growing too slowly for market tastes (e.g., because of mature product lines). See, for example, Hawthorne [9] and Cascio [6].

underperforming workers often decline to participate, deciding to stay put because they lack competitive resumes, confidence, and the initiative to search for new jobs. Thus, EROs can easily aggravate imbalances in a workforce. Worse still, an exodus of expert workers can produce serious deficits in strategic knowledge and skills, degrading performance and competitiveness. Companies that lose “critical mass” due to an ERO gone awry are forced to spend heavily to re-hire skilled workers, often as consultants billing at premium rates, or recruit and phase in replacements. Both routes incur increased costs and degraded productivity. These outcomes are obviously directly opposite to the intended consequences of EROs.

Many businesses, including Fortune 500 companies, have experienced unpleasant outcomes from their ERO strategies.¹² For example, in 1985, DuPont announced its first ERO to cut costs during a period of slow growth. This program, DuPont’s first try at downsizing via ERO, was designed to elicit a buyout of 5500 workers, or about 5% of the total workforce. However, 11,500 employees, or fully 9% of all workers, signed up for the ERO package. Making lemonade from lemons, DuPont’s Chairman announced that the ERO program “has turned out to be much more successful than originally forecast.” What he neglected to mention was that the plan’s unexpected popularity doubled the projected after tax costs and decreased planned savings. DuPont was forced to pay out generous bonuses to retain key valued employees who chose the ERO package, and it incurred additional costs from shifting and retraining other workers to cover remaining gaps.¹³

Critical decisions in government are equally prone to failure. All too often, laws and regulations fail to remedy the social, economic, and political problems they target, leaving those ills to fester or worsen. Military actions fail, or evolve into costly extended interventions in distant countries, as our misadventures in Vietnam, Iraq, and Afghanistan will testify.¹⁴ Common errors include flawed intelligence, poor policy design, weak implementations, and unforeseen reactions by stakeholders and other parties of interest. As in business, critical decisions that fail in the public sector can lead to severe harm, diminishing public health and safety, security, economic well-being, trust, and social stability.

Why do critical decisions disappoint us so pervasively? And what, if anything, can leaders do to prevent or at least mitigate these recurring unpleasant surprises? This book offers a diagnosis for this managerial affliction and recommends specific methods for alleviating it.

¹²Morris, et al. [13] and Abbasi and Hollman [1].

¹³“Du Pont Co.’s Early Retirement Opportunity program is successful.” PR Newswire (Apr. 16, 1985): pH508. Available at <http://www.prnewswire.com/>. See also Webber [20] and “Du Pont’s Retirement Rush.” *Time*. April 22, 1985. Note that ERO programs are difficult to design because they must not be perceived as targeting specific employees or groups in order to avoid violating Federal discrimination laws such as the Age Discrimination in Employment Act.

¹⁴Most of the examples in this book refer to critical decisions facing corporate managers and executives. However, the book’s analysis of LUC and its method for combating LUC apply directly to decisions by non-commercial organizations as well, such as government policies, legislation and regulations.

In 1785, the poet Robert Burns observed that “the best laid plans of mice and men often go astray.”¹⁵ Centuries later, Burn’s aphorism morphed into what is now called the Law of Unintended Consequences (LUC). LUC states that decisions to intervene in complex situations create unanticipated and often undesirable outcomes. This book adopts LUC as a “lens” for understanding how critical decisions such as the Time Warner AOL merger and DuPont’s ERO package produced such unexpected negative outcomes. LUC plagues business executives, inflicting losses and pain that range from the unfortunate to the tragic: declining sales, profits, and market positions; destruction of shareholder value; and stalled or derailed careers.

LUC is commonly confused with Murphy’s Law, which states that if anything can go wrong, it will. Neither statement is actually a “law”: they have no standing within either established legal venues or scientific theories. Nor are they provable by formal logical methods. Rather, they represent broad sardonic observations drawn from bitter experience.

Murphy’s Law traces back to 1949. Edward Murphy, then a captain in the United States Air Force, worked on a team that developed a rocket-propelled sled system to study the effects of rapid deceleration on people. His eponymous law was forged when he vented his frustration with a problem-prone technician working on the project, exclaiming “If there is any way to do it wrong, he’ll find it.” A project manager for a defense contractor overheard Murphy’s exasperated outburst, added a generalized variant to a list of pithy lessons he maintained, and started its viral spread. Along the way, the new “law” spawned hordes of variants documenting the inevitability of badly timed failures in equipment, organizations, processes, love, war, and other life experiences.¹⁶

Murphyism rails against the human condition—*anything* can and does go wrong. However, most Murphy-inspired “laws” go no further. They cite no identifiable causes. Instead, the culprit is implicit, impersonal, and disembodied—fate, chance, or kismet: the world at large is bent on thwarting us. At first glance, LUC posits the same dreary conclusion. However, on closer examination, LUC is not as pessimistic as Murphy’s Law. LUC only posits that *decisions* go badly, not life in general. And decisions are *made*—by individuals or groups of people. This means that the unexpected problems foreseen by LUC can be attributed to *human agency*. Or, as cartoonist Walt Kelly noted in his comic strip Pogo: “We have met the enemy...and he is us.”

This seemingly minor distinction between Murphy’s Law and LUC turns crucial when combined with the work of the American sociologist Robert K. Merton. In 1936, Merton published a paper entitled “The Unanticipated Consequences of Purposive

¹⁵Robert Burns. 1785. “*To a Mouse, on Turning Her Up in Her Nest With the Plough*”. Available at <http://www.robertburns.org/works/75.shtml>.

¹⁶<http://www.murphys-laws.com/murphy/murphy-true.html>. The project manager named the “law” and spread it in a more impersonalized form—“If things can go wrong, they will.” See also https://en.wikipedia.org/wiki/Murphy%27s_law.

Social Action.”¹⁷ Merton’s paper provided the first modern academic analysis of LUC and led to its current name.

Merton’s pivotal contribution was to *ground or justify* LUC. He did this by describing several distinct *causes* of LUC, including inadequate (social scientific) knowledge, uncertainty about future events, and decision-makers’ tendency to focus on immediate interests at the expense of other longer term objectives. As an observation, LUC provides no insight into how or why decisions turn out unexpectedly. However, by identifying and analyzing the causal mechanisms that *trigger* LUC, Merton supplied it with *explanatory and predictive value*: he provided a map for understanding why past decisions failed *and* for anticipating how prospective decisions might fail.

Merton’s analysis is important for a second reason: his list of causal factors comprise *potential targets* for developing strategies to combat the ravages of LUC. In medicine, the discovery of the cause for a disease catalyzes the development of cures or changes in behaviors needed to combat those conditions. For example, in 1854, Dr. John Snow traced the cases from an outbreak of cholera in London back to a common cause, an infected well. Sealing off the suspected well eliminated the outbreak in short order.¹⁸ Similarly, while working in Panama in 1900, Major Walter Reed conjectured and proved that yellow fever was caused by mosquito bites rather than direct contact with infected people. Reed’s work led to public health practices that significantly reduced the occurrence of yellow fever, making it possible to complete the Panama Canal.¹⁹

Merton’s causal analysis holds similar potential to help decision-makers defend against LUC. While Merton’s set of factors provided an excellent starting point, it was by no means an exhaustive catalog of causes that provoke LUC. In the decades after Merton’s paper appeared, cognitive scientists uncovered an extensive set of additional contributors that go well beyond Merton’s short list. Merton’s original causes plus these more recently identified factors can be bundled into two broad categories. Taken together, they provide a unified answer to the question of why LUC bedevils decision-makers.

The first category, *cognitive biases*, includes personal and cultural values, strongly held beliefs, and various mental shortcuts that we take more or less automatically when we make judgments or choices. Collectively, these psychological factors produce pervasive distortions in how we make and execute decisions in many contexts, including critical situations. In other words, cognitive biases cause us to think idiosyncratically, departing from purely rational decision-making behaviors.²⁰

Merton’s remaining factors belong to the second broad category of *bounded rationality*. Biases aside, we are finite and fallible beings living in a complicated

¹⁷Merton [12].

¹⁸Rogers [14].

¹⁹https://en.wikipedia.org/wiki/Walter_Reed.

²⁰Kahneman [11]. See Chap. 4.

(business) world. As Herbert Simon, a Nobel Laureate in economics observed, we have limited cognitive resources, incomplete data and imperfect knowledge about our situation, and limited amounts of time and money to craft and analyze most decisions.²¹ As a result, LUC often rears its ugly head because we lack suitable *horsepower*—both scientifically and cognitively—to think through the *dynamics* of how decision options are likely to play out. Thus, even when we make and execute decisions deliberately (and correctly given available information), we are still likely to encounter unintended consequences.

LUC is especially pernicious because it imperils our handling of *all* phases of the critical decision-making process. And the causal drivers of LUC impact individual phases in the decision lifecycle in distinct ways. For example, LUC can lead us to frame the context and boundaries of decisions badly, so that we underestimate or even miss entirely a vital dimension of our situation and the threats or opportunities it poses. Alternatively, we might fail to formulate our goals and objectives clearly or misunderstand relevant values and constraints. In later phases of the process, LUC can interfere with development of a sufficiently rich set of decision alternatives or impede the evaluation and winnowing of these options. Finally, LUC often compromises how we execute our chosen courses of action.

The poor outcomes of critical decisions by Time Warner, AOL, and DuPont are not simply dramatic outliers; rather, they attest to the ubiquitous threat posed by LUC. These decisions were engineered by executives and companies with solid track records of success. Their respective goals—leading the “convergence” of media and communications and balancing a workforce humanely—were eminently reasonable and appropriate. However, company executives made numerous errors in making judgments about their situations, in designing and evaluating strategies to achieve their goals, and in executing their chosen options.

For example, Time Warner and AOL leaders based their business case on overly optimistic assumptions about performance forecasts that ignored or discounted plausible adverse events and trends such as market downturns and intensifying competition from broadband providers. Their due diligence reviews focused narrowly on conventional legal and financial risks, excluding analysis of “intangible” social dynamics relating to decision buy-in and cultural compatibility of management teams. Above all, company executives were over-confident about their highly ambitious “all-in” strategy and their abilities to execute it effectively. DuPont executives made similar, albeit smaller scale errors in their decision-making process: they failed to gather sufficient data about employee interests in buyouts and in designing their ERO program eligibility criteria and timelines to limit exposure to excess participation.

None of these management challenges were particularly novel. Time Warner and AOL executives encountered and mishandled risks and operational challenges that were well known for M&A transactions.²² The potential pitfalls for ERO downsizing

²¹ Simon [18]. See Chap. 5.

²² Bruner [2]. Bruner [3] offers framework for identifying risky M&A transactions that might best be avoided, as well as best practices for leaders to mitigate many of those viz., risks.

strategies employed by DuPont were also familiar to HR experts.²³ Comparable knowledge of risks is available for most types of critical business decisions. In short, the glorious clarity of hindsight is *not* required to foresee potential negative outcomes of many critical decisions. And best practices are often available to help companies mitigate if not avoid most of these recurring unintended consequences. In short, Time Warner, AOL, and DuPont executives committed various mistakes in their decision-making processes. LUC provokes these and other process errors. Blunting LUC's effects requires a clear appreciation of its scope and operation, coupled with a coherent strategy to resist it.

Bending the Law of Unintended Consequences addresses these needs. First, it explains where and how intrusions by LUC disrupt various phases of the decision-making process. Second, this book describes a robust method and supporting tools for navigating the lifecycle process more safely, to improve effectiveness in making and executing critical decisions. Finally, it illustrates how this method can be applied to defend against LUC, using realistic examples drawn from ubiquitous business challenges of growth, competition, risk, and change.

To avoid raising excessive expectations, this book does not purport to *break* or *defeat* LUC. The causal factors fueling LUC are congenital. Decision makers can compensate somewhat for cognitive biases. However, most aspects of bounded rationality are simply not correctable. For example, predicting the outcomes of critical decisions with certainty is essentially impossible, on par with perfecting a perpetual motion machine.

If defeating LUC through prediction is not achievable, what remains? This book tackles the more modest goal of *bending* LUC, or more bluntly, *damage control*: what can decision-makers do to improve the likelihood of achieving more of the positive consequences they intend from critical decisions, while avoiding or minimizing *unintended* negative consequences? We propose a simple answer—do a better job of *anticipating* the future.

How does anticipation differ from prediction? Prediction consists of identifying a particular outcome for a decision—or defining a set of possible outcomes and assigning them relative probabilities of occurrence.²⁴ In contrast, anticipation entails exploring a range of possible outcomes that *might* result from a decision, without trying to pick or order “winners.” In short, anticipation aims to gain better insight into how the future plausibly *could* evolve versus trying to discern how it actually *will* evolve.²⁵

²³ERO pitfalls and best practices are summarized in Cascio [4–6], and Cline and Mason [7].

²⁴Prediction asserts that a specific event will happen at a particular time (and place). In contrast, forecasts generally anticipate an event within an interval (e.g., an earthquake of magnitude 6.5 or greater is 70% likely to occur within the next 30 years. Silver [17]. You can quantify the certainty of a prediction with a confidence factor (e.g., predicting that an event X will occur with certainty of 90%). Hubbard [10].

²⁵Chapter 9 introduces the method of scenario planning, which provides a discipline for better anticipating the future. See, for example Schoemaker [15], Schwartz [16], van der Heijden [19].

Suppose that you could anticipate the possible outcomes of your decision options more clearly. You could then compare the consequences you *intend* against those outcomes more effectively. This would enable you to avoid decision options with serious potential for disaster. You could also refine viable less-flawed options to produce results that match your intentions more closely. Insights into possible outcomes also guide which tasks and metrics to monitor most carefully as you implement your chosen decision option. The earlier you detect emerging discrepancies from expected results, the sooner you can make mid-course corrections to better ensure intended outcomes.

In short, anticipating the future better can reduce negative impacts from LUC across both decision-making and execution. And unlike making predictions with certainty, LUC does not preclude anticipation out of hand. Granted, bounded rationality imposes serious limits on decision-makers, but these constraints also offer some slack or leeway—people possess sufficient intelligence to create powerful tools for exploring possible futures and preparing robust responses to them. It is both prudent and feasible to exploit these aids to counter LUC.

The approach we propose for bending LUC derives from the familiar process of test driving cars. A test drive enables consumers to experience (at least partially) what it would be like to own a vehicle *before* purchasing it. The resulting insights into handling, comfort, finish, controls, and so on reduce the buyer's risk of costly mistakes or disappointment. By analogy, a *decision* test drive should offer a business some insight into what it would be like to live with the consequences of a strategy *before* they commit to it: is that course of action likely to meet the company's wants, expectations, and needs?

Test driving a business decision consists of projecting the likely outcomes of adopting and executing strategies over time, both for a company *and* other parties of interest, such as customers and competitors. This process is obviously less tangible than test driving a car, but no less valuable. In effect, decision test drives enable businesses to *practice* decisions before committing to them, and to learn safely from virtual rather than real mistakes.²⁶ Consumers generally test drive several vehicles, ideally over different types of roads and conditions, and then *compare* their impressions to identify the most suitable one for them to buy. Analogously, companies should test drive their decision options against diverse possible futures, and then compare their projected outcomes to determine the best candidate to adopt.²⁷

Our proposed method for test driving decisions combines three primary elements:

- Scenario planning, a proven technique for thinking about the future in a disciplined manner
- “What-if” simulations—software-based models that project how decisions are likely to play out over time. Computers enable people to run simulations and

²⁶ War games also help businesses practice decisions. See Gilad [8] and See Chap. 8.

²⁷ The test drive method can also be applied, with some modifications, to monitor decisions as they are being executed, to detect emerging threats promptly and mid-course corrections to ensure success. The best analogy for this “mode” is an Early Warning System (EWS) (cf. Sect. 9.6).

compare outcomes with superior ease, detail, and consistency relative to what can be done in their heads.

- Guidelines for identifying the *best* decision option from available alternatives. “Best” is determined using metrics tied to particular types of decisions. For example, the desirability of outcomes for mergers can be quantified through metrics such as ROI, earnings growth, and stock price. Intuitively, the best option in the face of LUC is the one that produces superior performance across a broad range of foreseeable futures.

None of these elements is novel. What is unique—and crucial—is how the decision test drive method *combines* these pieces. None of the three in isolation suffice to bend LUC. Instead, the three pieces interlock and reinforce one another to provide the necessary strength.

While the test drive method mainly targets the bounded rationality dimension of LUC, it contributes to countering cognitive biases as well. This is crucial, given that LUC impacts the decision lifecycle process differently across its various phases. Mounting an effective defense requires assembling a rich set of weapons to blunt LUC’s multi-faceted reach. Techniques that reduce the impact of cognitive biases are embedded within the test drive process, providing a unified approach for taking on both causes of LUC.

The remainder of *Bending the Law of Unintended Consequences* fleshes out the details of this sketch in four parts.

Part I (Diagnosis) explores the causal “mechanics” of LUC and how it imperils critical decision-making. This discussion draws on research results from sociology, cognitive psychology, economics, biology, and artificial intelligence (AI).

Part II (Treatment) lays out the methods and tools required to combat LUC and explains how to combine them to improve the odds of selecting and implementing decision options to produce favorable outcomes. These components include: techniques that help compensate for cognitive biases; information technologies for business intelligence (BI) and predictive analytics; and modeling and simulation methods that enable decision test drives. This last category of tools helps decision-makers leverage their *available* business information and scientific knowledge more effectively.

Part III (Praxis) illustrates how the test drive method is applied to realistic critical decisions. Four examples describe recurring business challenges and then present detailed test drives models tailored to help decision-makers face those problems. The four decision topics are competitive marketing, disruptive growth, risk management, and organizational change.

Finally, Part IV (Coda) summarizes the case for adopting the test drive method to improve critical decisions. Skeptical executives ask several elemental questions when presented with novel methods for critical decision-making. These questions revolve around trust, quality, ROI, and uncertainty. For example, how does the new method address the problems of “garbage in, garbage out” (GIGO) and unknown unknowns? Part IV responds to these frequently asked questions. It concludes by recapping the steps of the test drive method and their roles in bending LUC.

Robert K. Merton's seminal work on LUC deserves a broader audience because it unifies the psychological and analytical problems of critical decision-making into a single coherent framework. This book attempts to revive Merton's ideas and update them to reflect subsequent advances by cognitive scientists. It also seeks to extend Merton's work by combining techniques drawn from decision and computer science into a method for combating his causes of LUC. Our intended consequences are to help decision-makers minimize damages inflicted by LUC on their businesses and stakeholders.

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Part I

Diagnosis

This book examines critical decisions that determine the health, competitiveness, and even survival of businesses. Examples include pursuing new avenues for growth, countering competition, and managing enterprise-level risk. The high stakes for such decisions warrant a concerted effort to improve their quality and outcomes. The first step in this undertaking is to learn how and why critical decisions go wrong.

Chapter 2 introduces a set of criteria for defining criticality of decisions and explains why these properties provoke susceptibility to the Law of Unintended Consequences (LUC). It also provides a reference model for the critical decision-making process in business and assesses the status quo for performance. Chapter 3 presents a diagnosis for why critical decisions go awry, based on Robert K. Merton's analysis of LUC. Chapters 4 and 5 review the scientific underpinnings of the causes of LUC that Merton identified, drawing primarily on pioneering cognitive research by Amos Tversky, Daniel Kahneman, and Herbert Simon. This diagnosis informs the “treatment protocols” set out in Part II to alleviate LUC “symptoms” and improve critical decisions.

Chapter 2

Critical Decisions



Bending the Law of Unintended Consequences explores the problem of improving critical decisions and their outcomes. This chapter sets the stage for this inquiry by defining *criticality* and explaining why it is so difficult to make critical decisions effectively. Section 2.1 explains criticality by proposing four defining criteria and then providing illustrative examples. Section 2.2 explains how these four defining criteria complicate the lives of critical decision-makers. Section 2.3 argues that decision-making should be viewed as a process rather than an event, and it presents a reference model for that process. Section 2.4 argues that existing approaches for making critical decisions are ineffective at protecting businesses from the Law of Unintended Consequences (LUC).

2.1 What Makes a Decision Critical?

Companies make decisions continually. Most of these decisions dictate routine business operations. Examples include designing and manufacturing products; delivering services; marketing and sales; finance; procurement; logistics; and staffing and training. Workers at all levels of a business make these types of tactical operational decisions regularly.

Other decisions are broader in nature, relating to enterprise-wide operations, policy, or strategy. This class of decisions is decidedly non-routine and is typically reserved for senior managers or executives responsible for setting overall business direction.¹ Such *critical* decisions generally fall into the following categories:

- *Business strategy*—addresses core business model questions such as what goods or services to produce; how and where to make them; who to market and sell them to and how; and whom to partner with and how²

¹Hogarth [16] terms them “future-choice” decisions.

²Porter [27].

- *Strategic transactions*—include creating new lines of businesses; starting new firms; undertaking mergers, acquisitions, and divestitures; going public or private; and pursuing major financing or investment initiatives
- *Corporate re-organizations*—include downsizing and consolidating or breaking up business units
- *Managing key personnel*—decisions about their hiring, firing, development, compensation, and succession are vital to a company’s performance
- *Switching core business processes or enterprise platforms*—platforms consist of business assets that enable operations and promote competitive advantage, such as key technologies, production equipment, information systems, and product line architectures.

What determines whether a decision is critical or not? We consider a business decision to be critical if it exhibits the following four properties³:

- Entails significant risk for the company⁴
- Extends beyond the boundaries of the business into its markets
- Plays out over extended time frames—months or years rather than hours, days, or weeks
- Affects diverse parties with divergent and often conflicting interests and agendas: customers, investors, employees, partners, competitors, and regulators.

Internet marketplaces offer a representative example of critical decisions. In the late 1990s, entrepreneurs started building Web sites with the aim of revolutionizing business-to-business (B2B) commerce. Prior to this point, many industrial companies retained independent brokers to find suitable trading partners and negotiate long-term contracts that committed supplies at fixed prices for many months at a time. Examples include bulk ore and metals, commodity and specialty chemicals, and mechanical and electronic components.

Internet marketplaces aggressively automated B2B trading processes in selected markets. They created and integrated suites of Internet-based services that enabled industrial companies to find each other directly; negotiate short-term (or “spot”) contracts and prices on-the-fly; and manage the execution and fulfillment of trades, including financing and transportation.⁵ Also called net markets or B2B exchanges, these new trading companies captured the attention of the press and investors and helped fuel the dot-com boom. The resulting fever resembled the California Gold

³Critical decisions are largely *irreversible*: you can’t simply unwind them and try again. They expend both resources (e.g., time and capital) and intangible assets like trust and good will (e.g., with partners, customers, or employees) that can’t be reconstituted if they don’t turn out well. Rosenzweig [28].

⁴Although this book focuses on businesses, most of this discussion applies with minor adjustments to critical decisions made by governments and other non-commercial organizations as well.

⁵eSteel and ChemMatch were two pioneering net markets, supporting B2B trading for steel and steel products and bulk chemicals, respectively. Chapter 11 discusses the details of decisions facing net market entrepreneurs and their would-be customers (buyers and sellers of materials and products)

Rush. It attracted hordes of entrepreneurs and consultants and forced industrial businesses to re-examine their B2B strategies.

B2B marketplace decisions met all four criteria for criticality. By reworking supply chains and sales channels, net markets held the potential to completely transform how industrial companies engaged with their markets. Decisions were complex: businesses could pursue strategies to build and join multiple net markets at once. This required careful planning to distribute purchasing needs and allocate outputs across net markets and existing B2B channels. Net market decisions were also highly fluid: market landscapes evolved continually and rapidly, driven by changing casts of new net markets, market participants, and new technologies and services. Most importantly, B2B strategy decisions promised high risks and rewards. Positive outcomes would propel growth, market share, profit, and competitiveness, creating wealth for business owners and shareholders. Failed decisions could disrupt supply chains and stunt or destroy customer and channel relationships and demand, crippling or killing companies. And given the scale of potential change for industrial markets, decisions to build a B2B marketplace vs. joining one vs. deferring a choice took years to play out.⁶

In contrast, many familiar business decisions *don't* qualify as critical because they fail to meet one or more of these four criteria. For example, managing inventories and setting prices, while clearly important, are routine decisions. They are sharply constrained with respect to business scope and time horizons. Many such operational decisions are now performed by software programs that automatically generate orders or dynamically change posted prices when necessary. Scheduling workers and making minor adjustments to workforce size are similarly tactical operational decisions. These non-critical decisions are significantly less susceptible to LUC than their critical counterparts.

Personal life decisions fail to qualify as critical decisions as well. Familiar examples include going to college, pursuing particular careers, marrying and having children, buying homes, and investing for retirement. Such decisions clearly shape our lives, and frequently affect our families and friends. However, they lack the scope and scale required by our criticality criteria.⁷

2.2 What Makes Critical Decisions So Difficult?

Criticality entails serious challenges that impede our best efforts to make critical decisions competently and successfully:

⁶These tectonic disruptions largely failed to materialize. Virtually all net markets failed during the dot-com bust (see Chap. 11).

⁷Other methods are generally simpler (and effective) for personal life and bounded operational business decisions. That said, the test drive method can be applied to everyday decisions in an informal way, without dragging out the “heavy artillery” of computer-based simulations (see Chaps. 8 and 9).

- Low frequency
- Limited data (about the behaviors of relevant parties of interest, future conditions and events)
- Interdependencies among decision elements
- Complex tradeoffs among decision objectives
- Unavailability of exact analytic methods for “solving” the decision problem
- Decisions *not* to act entails equal or greater risk than committing to active strategies.

Most companies make critical decisions relatively infrequently. Granted, a few very large companies make frequent acquisitions, and have developed substantial expertise and repeatable processes for carrying out such transactions efficiently and consistently.⁸ However, most companies do not sustain such high rates for mergers, switching operating platforms, and so on. This means that they have difficulty accumulating and retaining relevant knowledge and skills, which decreases their likelihood of success.⁹

As Yogi Berra famously observed, prediction is very hard, especially about the future. Because critical decisions play out over extended intervals, analysis is crippled by a shortage of high quality real-time data about future conditions and trends. The impressive advances in business intelligence (BI) in amassing big data and applying predictive analytics are often not applicable (cf. Sect. 7.2).

Critical decisions also feature numerous “moving parts.” Solutions generally require allocating materiel, personnel, and funds over time, with complex constraints on where and when those resource deployments occur. In other words, they represent *portfolio management* problems: Critical decisions must balance myriad resources, activities, timing issues, investments, and risks.¹⁰ Businesses that fail to design and manage portfolio decisions correctly jeopardize business functions, well-being, and long-term survival.

Non-critical decisions tend to have simple performance metrics for judging the strengths and weaknesses of alternative decisions. For example, supply chains can be measured in terms of turnover or refresh rates; shortages of materials or “stock outs” of goods; and excess inventories and carrying costs. In contrast, critical decisions involve assessments spanning numerous metrics that interact and often conflict with one another. They cannot be reduced to simple go/no-go thresholds or straightforward

⁸Large “serial” acquirers are common in technology, health care, and finance (e.g., Microsoft, Oracle, Anthem, Thermo Fisher Scientific, Sanofi Genzyme). General Electric was previously well-known for its acquisition acumen. Ashkenas et al. [1].

⁹Similarly, medical “centers of excellence” that perform large numbers of transplants or other complex operations produce superior patient outcomes. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5516836/>.

¹⁰Portfolio theory aims to maximize the expected return on investment (ROI) of a set of financial assets for a given amount of risk. <https://faculty.washington.edu/ezivot/econ424/introductionPortfolioTheory.pdf>. But most critical decisions involve more than two factors (e.g., ROI, risk) and often factors that are difficult to quantify precisely, making them harder to model mathematically and determine optimal solutions.

optimization problems. For example, financial managers must balance returns on investment against available budgets and capital, speed to results, tolerances for risk, stakeholder approval, positioning for the future, alternative investments, and other factors.

General Eisenhower observed that battle plans become obsolete the moment that combat starts.¹¹ Key assumptions grounding those plans invariably prove to be false, either at the outset or over time. Markets, like battlefields, evolve continually in ways that are difficult to anticipate. Success depends not simply on devising a potent strategy and executing it competently; decision-makers must also recognize when conditions shift in ways that invalidate initial assumptions and then make prompt and appropriate mid-course corrections to plans for action.

A primary cause for this flux is that the parties of interest in critical decisions are *intentional*—they have goals and objectives that they continually attempt to achieve. In other words, people and organizations *adapt* in response to perceived changes in their positions or the actions of others. For example, if a company adopts a business strategy that proves successful, their competitors will soon notice a leveling off or decline in their revenues, market share, or rate of growth. They are likely to change their strategies, acting to restore their place in the market to ensure *their* continued prosperity. Detecting and overcoming such responses is often difficult; anticipating and countering responses *in advance* is even more challenging, because decisions by other parties are influenced by *their* emotions, values, histories, and cognitive biases.¹²

The scarcity of accurate data about the future, the complex trade-offs among performance metrics, and human intentionality intersect to pose formidable challenges to analysts and their decision modeling tools. Not surprisingly, reliable algorithms for *optimizing* or *solving* most critical business decisions are scarce or non-existent.

Finally, critical decisions can't simply be avoided or deferred: decisions *not* to act are just as critical and prone to failure as decisions to act.¹³ For example, Yahoo CEO and co-founder Jerry Yang and his board of directors rejected Microsoft's bid to acquire the company for \$45B in January 2008, arguing that the bid significantly undervalued the company. Yahoo was ultimately acquired by Verizon in 2017 for a much reduced \$4.5B.¹⁴ The company's refusal to act—coupled with management's inability to sustain growth—led to substantial losses for shareholders.

¹¹ It must also be noted that Eisenhower placed great store on the planning process itself as a vital preparation for action, observing that while “plans are useless, but planning is indispensable.”

¹² Chapter 8 describes game theory, a branch of decision sciences that developed expressly to model the dynamic interactions of decision-making parties with competing or overlapping interests.

¹³ Chapter 4 discusses “stability” biases that encourage inertia and the preservation of status quo despite emerging opportunities and impending threats from competitors or changing market tastes.

¹⁴ See <http://news.bbc.co.uk/2/hi/business/7239220.stm> and <https://qz.com/741056/the-stunning-collapse-of-yahoos-valuation/>. The bulk of Yahoo's residual value lay in Yahoo's 40% stake in Alibaba, a Chinese e-commerce company.

2.3 Critical Decisions Are Processes, Not Events

How do businesses go about combatting LUC to improve decision outcomes? From this perspective, the most important property of critical decisions is their extension over time. We are accustomed to thinking about decision-making in terms of a discrete event. The so-called “point” of decision is the particular instant in time when we select and commit to a plan, a strategy, an investment, or other course of action. It is often a tense and memorable moment. However, contrary to this common perception, critical decision-making is viewed more accurately as a *process*.¹⁵ And the activities that precede and follow the unjustly celebrated point of decision tend to be more significant for achieving—or failing to achieve—intended consequences.

Decisions that qualify as critical don’t occur spontaneously or in a vacuum. Business leaders recognize a need to act in response to some event, an emerging or escalating problem such as competitive threats, or an insight about opportunities such as an unmet market need or gap. That awareness triggers an effort to understand the situation better and determine how to respond. Preparing responses, in turn, requires articulating goals and objectives for taking action, formulating alternative strategies, and evaluating their attractiveness. Collectively, these activities comprise the *leading edge* of critical decisions.

Returning to our previous example, entrepreneurs in the late 1990s perceived opportunities for exploiting Internet technologies to transform B2B commerce. Drilling down, they identified inefficiencies in how buyers and sellers of industrial products, components, and raw materials find each other, negotiate prices, and transact trades. Net marketers then set about designing online marketplaces that would disrupt the status quo of brokered contracts by allowing businesses to find and trade with one another directly, using automated, Internet-based services.

Critical business strategies are initially painted in fairly broad strokes. Converting them into actionable form requires considerable elaboration and refinement of details. Businesses must then implement the resulting directives, plans, schedules, and so on. These activities constitute the *trailing edge* of a critical decision. For example, net marketers had to recruit management teams, persuade investors to fund their concept, and line up partners such as consultants and software vendors. The real work of executing their start-up decision would then begin: nailing down specific B2B services and functionality; testing and refining their revenue models; designing and building relevant information technology (IT) components; and managing budgets, staffing, and schedules. At the same time, entrepreneurs had to market and sell to attract membership commitments from buyers and sellers for the day when the virtual doors would open for B2B trading.

Figure 2.1 displays the *lifecycle* stages of a process for making critical decisions.¹⁶ It also highlights the fact that LUC impinges on all of these phases.¹⁷

¹⁵Garvin and Roberto [10].

¹⁶See, for example, Russo and Schoemaker [29], Davenport [6], and Choo [3].

¹⁷Das and Teng [5].

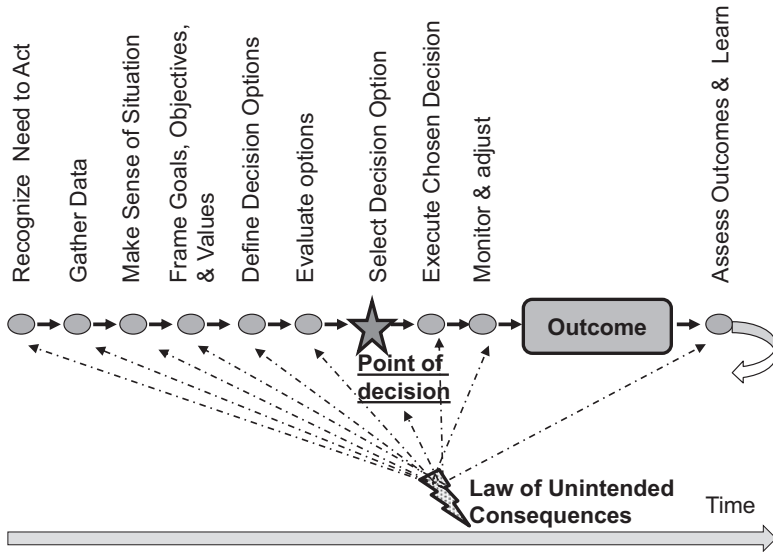


Fig. 2.1 Lifecycle process for critical decision-making

The need to develop robust decision options and identify the best alternative on which to act, and the risks from LUC for erring in these phases, should be obvious. Of course, unpleasant surprises only emerge afterwards. The sequence of activities trailing the point of a critical decision is where most people expect LUC to rear its ugly head. As decisions are made and their execution starts to produce results, the world continues to change. In addition, stakeholders and other parties of interest in a decision respond to both those situational changes and actions to implement decisions, often in unexpected ways. These dynamics often invalidate the assumptions underlying critical decisions.

The risks of failure from bungling the execution of promising strategies or foundering in the face of unexpected events are broadly recognized. And recommendations about how to execute decisions effectively in the face of change abound. Popular advice from consultants calls for cultivating business agility, sense and respond capability, and peripheral vision. Agility refers to flexibility and speed for adapting to changing business conditions. Sense and respond amounts to monitoring business performance and environment and being prepared to make appropriate mid-course corrections. Peripheral vision consists of scanning actively for “weak signals”—data that provide early indicators of new technologies, business models, or other disruptive trends that emerge gradually in a market.¹⁸

The activities preceding the point of decision are much less appreciated. Yet, businesses are at least as likely to mishandle crucial tasks leading up to the point of critical decisions as they are to err during follow-on steps. And front-end missteps

¹⁸Day and Schoemaker [7].

compromise their hard work downstream in the decision-making lifecycle. Thus, it is crucial to recognize the importance of early decision lifecycle phases to producing intended outcomes and pay them the serious attention and effort they deserve.

The first opportunity to run afoul of LUC arises when businesses fail to recognize changes in their environments or unmet market needs that signal emerging or future threats or opportunities. This generally results in being unprepared and surprised when threats emerge or experiencing regret when a business recognizes missed opportunities for gain.¹⁹ Examples include Xerox's failure to capitalize on computing technologies developed by its PARC unit and Kodak's inability to shift to digital photography.

Information gathering is rarely straightforward for critical decisions because of their broad scope and duration.²⁰ Determining what information is *relevant*, and then collecting, verifying, and maintaining it can be difficult and costly. Judging what information is unnecessary to making a sound decision is also important; knowing what can be ignored safely helps focus attention, and conserves valuable time and other resources for creating and evaluating strategies.

As the name implies, *sensemaking* is basically an exercise to understand the current situation and explore its implications for a business.²¹ Sensemaking produces a shared model or narrative that ties together available data about a company's current state; background economic and market conditions, trends and forces; and a history of how it came to be in that position.²² This exercise is often iterative, interrupted by bursts of data collection to validate or flesh out the model. The products of sensemaking are captured as stories, documents, diagrams, databases, or simulations. Regardless of their form(s), the goal is to generate an explicit assessment of the present situation to which the management team collectively agrees. This picture also establishes the time frame or horizon for decision options, and calibrates the team's sense of urgency, setting a tempo for carrying out the rest of the decision-making process.

An important but perennially underappreciated phase of the decision-making process relative to LUC is *framing*. Edward Russo and Paul Schoemaker explain this task as “determining the viewpoint from which decision-makers look at the issue and set parameters for which aspects of the situation they consider important and which they do not...[Framing] determines in a preliminary way what criteria would cause them to prefer one option over another.”²³

¹⁹Christensen [4] describes the dynamics of innovative companies to maintain their leadership. See also Collins [41].

²⁰See, for example, Gilad [11] and Fuld [9].

²¹See, for example, Snowden [34], Snowden and Boone [35], Weick [38], and Choo [3].

²²Reconstructing a reliable history is deceptively challenging. Experience is a cryptic oracle at best, given our predispositions towards vivid narratives and positing clear causality retroactively. Watts [42].

²³Russo and Schoemaker [29] p. 6, and Nutt [24].

Ralph Keeney also emphasizes the importance of framing decisions, which he calls *value-focused thinking*.²⁴ He contrasts this deliberate front-loaded analysis with “alternatives-based” or “solutions-based” decision-making, which is prone to rushing to judgment and poor outcomes.²⁵ Keeney argues that focusing prematurely on solutions leads to three key problems: (1) confusing objectives that are means from those that are ends; (2) considering only alternatives that are immediately obvious at the expense of viable alternatives that are never identified; and (3) developing decision options that do not match up cleanly against the objectives. For example, some objectives may remain unmet, or decision options may expend resources on factors outside of objectives the decision is supposed to target.

A simple analogy supports Keeney’s thesis. Projects to develop information processing systems frequently fail.²⁶ More often than not, the problem traces back to deficiencies in analyzing end-user requirements rather than to the design or implementation of systems to satisfy those requirements.²⁷ That is, even though technologists may exceed schedule and budgets, they often succeed in building systems correctly “to spec.” Unfortunately, those specs frequently fail to reflect what the intended system users wanted—or actually needed. Similarly, Keeney argues that critical decisions are prone to fail if companies are cavalier in defining their goals, objectives, values, and metrics. Metrics are crucial because they establish the methods and standards for measuring progress and assessing degrees of success and failure in outcomes relative to objectives and values.

Keeney also suggests several reasons why companies neglect or mishandle framing: First, he notes that decision-makers think they understand their goals and objectives better than they actually do. This is one element of executive over-confidence in their “golden gut” instincts. Second, stockholders exert well-known pressures on executives to produce strong financial results every quarter. This discourages efforts to articulate and align objectives, particularly those that contribute to longer term payoffs and sustainable competitive advantage. Third, he charges that there is “a serious lack of structured approaches to promote systematic and deep thinking” about objectives and values.²⁸ In short, framing, is a phase of decision-making that poses significant exposure to LUC and unintended consequences. Absent careful framing, decision-makers don’t really know what they are trying to achieve; how to

²⁴ Keeney [18].

²⁵ Strong framing ensures that the team properly identifies and agrees to both the questions to be asked and the decisions to be made as a (business) strategy is developed. Bradley et al. [40].

²⁶ See for example <https://www.computerworld.com/article/2533563/it-project-management/it-s-biggest-project-failures%2D%2D%2D%2Dand-what-we-can-learn-from-them.html>, and <https://www.cio.com/article/3068502/project-management/more-than-half-of-it-projects-still-failing.html>.

²⁷ Nuseibeh and Easterbrook [22].

²⁸ Keeney’s book responds to this problem by recommending a decision theory technique called utility theory (cf. Sect. 7.3).

assess their preferences in ranking decision options; how to measure progress accurately; or how to determine whether they have succeeded or failed.²⁹

Part II Treatment

The Law of Unintended Consequences (LUC) states that critical decisions tend to produce unexpected and unpleasant outcomes. Part I traced the sources of this congenital malady to two primary causes—cognitive biases and bounded rationality. These factors can act independently or jointly to provoke LUC. So the moral of Part I is that decision-makers can't afford to ignore either one. Part II lays out two “treatment protocols” for combating the scourge of LUC: one targets cognitive biases, while the other addresses bounded rationality.

The treatment prescribed for cognitive biases is defensive. The System 1 intuitions that precipitate cognitive biases are spontaneous, pre-empting more deliberate System 2 thinking. These intuitive rushes to judgment and choice can't be blocked. But the distortions they produce can be counteracted *after the fact*. Chapter 6 describes System 2 reasoning techniques that help decision-makers and analysts validate intuitive judgments and choices, or, if necessary, override them. Compensating for System 1 reasoning flaws reduces the incidence and severity of run-ins with LUC.

In contrast, bounded rationality must be treated proactively rather than reactively. According to Herbert Simon, people are forced to satisfice rather than optimize when making critical decisions. Satisficing consists of doing the best that a person can, given limited time and effort, to find a decision option capable of producing acceptable outcomes. Thus, the key to bending LUC is to satisfice *more productively* despite the bounds of rationality. Productivity can be enhanced by improving the quality and quantity of System 2 reasoning across the critical decision process: making more judgments that are considered rather than intuitive; defining more decision options; anticipating more contingencies; projecting outcomes for decision options with more depth and consistency; and comparing tradeoffs among options more thoroughly.

Chapters 7 and 8 introduce the analytical building blocks for implementing this System 2 strategy: business intelligence (BI), predictive analytics, decision modeling, and dynamic simulation. These techniques and tools *amplify* people's bounded cognitive capabilities to make judgments and anticipate decision outcomes. They supply knowledge and computational capacity with far greater coverage, accuracy, and consistency than people can marshal unaided. Adding one or another of these

System 2 “piece parts” to a decision-making process will improve an organization’s satisficing incrementally.

However, bending LUC more dramatically requires a more sophisticated and coordinated strategy. Chapter 9 describes a novel decision “test drive” method that combines the individual techniques from Chap. 8 into a more powerful framework for decision support. Analogous to road testing cars before buying them, our method helps companies “try out” decisions *before* committing to them, so that unintended consequences can be detected and avoided or mitigated. And the test drive method offers additional protection from LUC both prior to and following the point of decision.

Part III Praxis

Part I explored how cognitive biases and bounded rationality derail critical decisions despite our best intentions and efforts. Part II recommended methods to combat these drivers of the Law of Unintended Consequences (LUC). Deliberate reasoning helps to override intuitive missteps and prevent them from compromising critical judgments and choices. The test drive method pushes back against the bounds of human rationality by increasing the effectiveness of decision satisficing: it does this by improving our abilities to anticipate outcomes in the face of uncertainty and identify decision options that minimize unwelcome surprises from LUC.

The benefits of decision test drives sound attractive in theory. But the rubber meets the road in Part III. Chapters 10 through 13 present four examples that illustrate how this method is applied in practice. Each example describes a test drive model for a critical decision commonly faced by businesses:

- Competition—anticipating and countering responses by rival businesses
- Growth—launching disruptive new products, services, or business models
- Risk—allocating scarce resources to defend against threats
- Change—dampening the turbulence created by major changes in operations or strategies.

These four examples follow a common format. Each chapter reviews relevant background for the critical decision of interest. It then defines a schematic test drive model for that type of decision in terms of three elements—performance metrics, data inputs, and the simulation techniques used to project decision outcomes. Next, it reviews results from test driving realistic dynamic scenarios. Finally, each example discusses how its test drive model improves the quality of decision satisficing and reduces the impacts of LUC. This immersive approach is far more effective for learning than experimenting with the individual techniques described in Chapter 8 unaided. Videos are available that explain and demonstrate the test drive solutions for decisions for competitive drug marketing strategy (Chap. 10) and enabling organizational change (Chap. 13).

The test drive method does not repeal or neutralize LUC, or otherwise guarantee successful decisions. Rather, the method enables decision-makers to explore, validate, and refine decision options. It thereby increases the chances of achieving the consequences intended by decision-makers.

Part IV

Coda

Part II presented a method for test driving critical decisions that defends against the Law of Unintended Consequences (LUC). This method harnesses dynamic modeling and simulation techniques to test and refine decisions prior to and during execution. Part III described test drive models for four types of critical decisions. These guided tours explained how piece parts—performance metrics, situational data, and selected simulation techniques—are combined to create dynamic decision models. They also illustrate the types of insights into possible outcomes afforded by these models.

Critical decisions about competition revolve around anticipating the impacts of marketing strategies and possible responses by rivals. So the model for test driving this type of decision relies on predictive analytics and decision rules for adaptive agents. The dominant uncertainty for disruptive growth strategies is anticipating customer receptivity to innovative products, services, or business models. So this decision test drive model applies utility theory and agent-based decision rules to explore how individual customer preferences give rise to aggregate changes in purchasing behaviors. The principal uncertainty in managing enterprise risk lies in anticipating how the elements of complicated plans collectively reduce risk over time, and at what cost. Process-based models are well-suited to respond to this type of uncertainty. Finally, the core uncertainties for enabling organizational change lie in anticipating how change initiatives alter personal and group readiness to change and how those impacts are aided or inhibited by situational forces, trends, and events. So test drives for change strategies exploit process models and system dynamics (SD).

Even if a company never test drives a critical decision formally, it can reduce exposure to LUC simply by considering the questions raised by the example test drive models:

- What are appropriate performance metrics for assessing decision outcomes?
- How will proposed decision options impact those metrics over time?
- What are the primary sources of situational uncertainty that influence decision outcomes—forces, trends, events, or stakeholder motivations and behaviors?

- How can available data and knowledge be harnessed to explore the dynamics that shape decision outcomes and provoke LUC?

LUC poses serious threats to critical decision-makers. This book has explained and illustrated methods for reducing those threats and improving the odds of achieving intended outcomes. Bending LUC clearly requires commitment and work. Part IV presents the case for adopting the decision test drive method. Chapter 14 answers the questions and concerns that executives frequently raise about new decision-making methods. Chapter 15 summarizes the decision test drive method and reiterates its principal motivations and benefits.

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