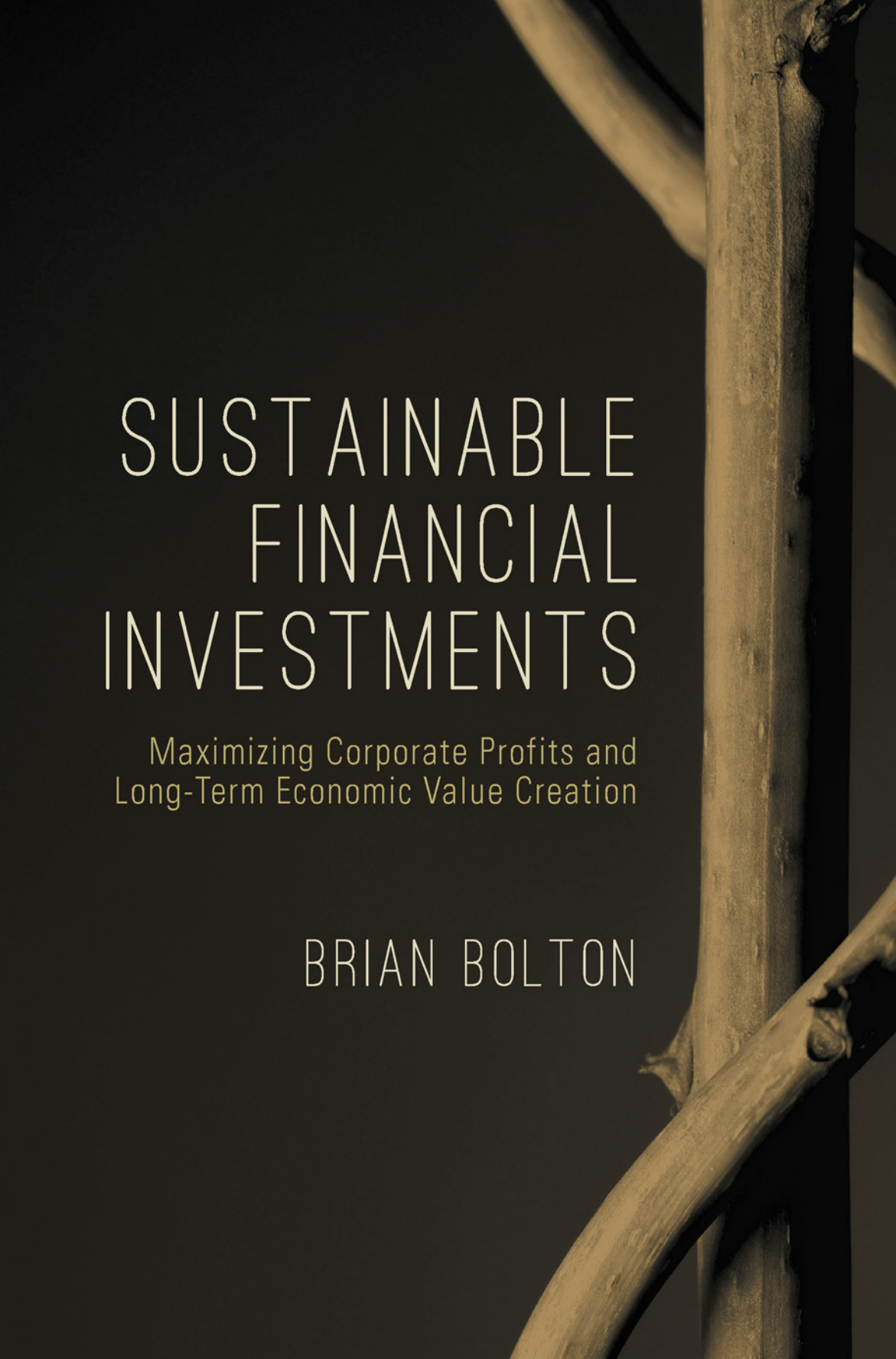

SUSTAINABLE FINANCIAL INVESTMENTS

Maximizing Corporate Profits and Long-Term Economic Value Creation

BRIAN BOLTON

Sustainable Financial Investments

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Brian Bolton

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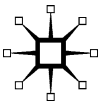

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To Mom

To Dad

To my students

All of the author's proceeds from sales of this book will be donated to three nonprofits, based in Portland, Oregon, that are working every day to change lives and communities:

The Pixie Project
Providing a unique, personalized approach to pet rescue and adoption
(www.pixieproject.org)

New Avenues for Youth
Empowering homeless and at-risk youth through hope and education
(www.newavenues.org)

Forest Park Conservancy
Protecting and supporting the largest urban forest in the United States
(www.forestparkconservancy.org)

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Preface

"This investment is good for the firm's profitability and also good for the environment."

This is a statement that I hear frequently—in the popular press, in academic articles, and in class. I teach an MBA course titled Economics and Sustainability of the Firm, which is designed as a managerial economics course and includes analysis of human, social, and environment-focused investments. We regularly discuss current events and case studies; we analyze what firms should do in certain situations or with certain investments. And when I hear a student claim that an investment is not only good for the firm's financial profitability but is also good for the environment—or for employees or for the community—I usually ask the following questions: What's the difference? Must the two be mutually exclusive? Is it possible for the investment to be good for the firm's profitability without also being good for the environment, employees, or community?

This book is about exploring these questions. We will do this based on some finance and economics fundamentals and with examples of firms that incorporate sustainability into their business strategy; there will also be some mildly rigorous financial analysis (sorry). Spoiler alert: it is extremely difficult for firms to make investments that are good for the firm's financial profitability without also being good for the environment, community, or society. Profitability and value are created by the firm having a unique competitive advantage—in products or processes—and many different stakeholders are the sources of such unique competitive advantages. Every firm is different and every situation is different; however, as natural resources become more limited and more difficult to access, as generational priorities and situations change, and as societal preferences evolve, the interdependence of financial, human, social, and environmental factors in corporate decision making is becoming increasingly evident.

In economics, scarcity is a source of value creation. If you are the owner of a unique, scarce resource, you can charge more for it. Its scarcity gives it value. For individuals and corporations

using these scarce resources, they are more expensive. As of 2014, the global population amounted to around 7 billion people; the US Census Bureau and the United Nations each project the global population will likely reach 8 billion around 2025 and will peak at around 9 billion in the 2040s.[1] The global population may only be increasing at a rate of 1–2 percent per year, but it is increasing. More and more people are using limited resources. In a world with increasing competition for limited resources—by both individuals and corporations—understanding the costs of using those resources is critical. It will be equally important to understand the benefits of using those resources. Economics is predominantly about costs and benefits; making investments where the benefits are greater than the costs is what leads to financial profits and to long-term value creation. This book will provide a philosophical and a technical perspective on how individuals, corporations, and other organizations can make investments that lead to such value creation.

This book is titled *Sustainable Financial Investments* because it is about financial investments. It is not a book purely about sustainability. It does not preach sustainability for sustainability's sake. It is a book about making investments that are sustainable and that create value over the long term; after all, investments are only sustainable if they create value. This value creation largely comes from efficient and appropriate utilization of human, social, and environmental resources. This is not new. Value creation and competitive advantage have always come from human, social, and environmental sources.

But what does "sustainable" mean? In an economic sense, being "sustainable" means to persist or survive over the long term. In more common usage, "sustainable" describes actions relating to human, social, environmental, community, or other pursuits that do not appear to be driven by profit motives alone. For most corporations, sustainability is about the effect these actions have on the corporations' economic health. At times, my use of "sustainable" may be frustratingly vague; that's because I'm an economist. To economists, every investment should be designed as a sustainable financial investment; every investment is designed to create value, regardless of the source of that value creation. It doesn't matter whether that investment involves building an oil pipeline across wetlands, denying employees health-care benefits, disposing of contaminated

waste into a river or protecting the wetlands, providing generous employee benefits, or voluntarily cleaning up a river that others have polluted. The economic analysis is the same; the assumptions and variables will obviously be different, but the economic analysis and financial valuation process are both the same. Economics and finance are indifferent to the character of any investment; they are primarily concerned with factors like costs, benefits, cash flows, time, and risks.

The purpose of this book is to connect these seemingly disparate ideas and to show how to incorporate economic costs, benefits, cash flows, and risks into the evaluation of any type of investment. I hope that by the end of the book, you will have an appreciation for at least two important issues: (1) the common process used in the analysis of all types of investments, and (2) the specific assumptions and variables that are necessary to include in the valuation analysis of sustainability-related investments—or those related to human, social, and environmental factors.

The end result of this analysis will typically be a spreadsheet showing the value created or destroyed by an investment. Creating a spreadsheet that thoroughly and accurately analyzes a particular investment is not easy. Nevertheless, you will never gain a competitive advantage with your spreadsheet mastery. Spreadsheets merely process and present the information you enter into them. They don't think and they don't really analyze anything: 2 + 2 will always equal 4, regardless of how amazing your spreadsheet is. The art of investment valuation is in knowing whether or not 2 and 2 are the data you care about. Spreadsheets are science; the art of investment analysis is in the stories behind the numbers in a spreadsheet. Telling those stories is not easy; you have to understand the business and the economics of the investment. But telling these stories is where you can gain a competitive advantage. Analyzing sustainable financial investments is as much an art as it is a science; keeping this in mind as you read this book will help you see where the real value in this process is.

Chapter 1 provides the overview for why value creation is the purpose of any firm; it presents the perspectives this book takes, and it provides some generic definitions for concepts you will encounter throughout the text. One of the main ideas will be a discussion of who owns the firm, which leads into the discussion of agents, principals, and stakeholders in chapter 2. Chapter 2 shows

that the stakeholders in the firm—whether they are shareholders concerned about stock price or employees concerned about salaries or anyone else—are the ones who define and determine how value is created. Chapter 3 focuses explicitly on the economics of this value creation. It presents the framework for how economic transactions occur and how they create value for the stakeholders. Every decision to do or not to do something is an economic decision. Chapter 3 provides the theoretical foundation for how these decisions are made. The same principles apply whether you're thinking of building Elon Musk's hyperloop transportation system or you're thinking of taking a nap. Chapter 4 considers the nature of sustainability-related investments and shows how these investments can create value for firms, possibly in ways that other investments cannot. We discuss similarities and differences between these and traditional investments. Importantly, chapter 4 provides a framework for incorporating these similarities and differences into economic value creation.

This model for economic value creation is explicitly presented in chapter 5; in that chapter the theoretical frameworks discussed in chapters 3 and 4 are applied to a rigorous valuation model. Chapter 5 focuses on the financial analysis of value creation, but it also shows how strategic and abstract economic issues impact this analysis. The appendix to chapter 5 presents a detailed discussion of the financial analysis framework applied to an investment in a rooftop solar system. There is some math in this appendix, but I hope you won't find it too offensive. While this chapter may appear to be more science than art, you should see that understanding the art of the economics is what drives that science. Chapter 6 concludes this discussion of value creation from a systemic and strategic perspective. It integrates the concepts introduced in earlier chapters to provide an interconnected, firmwide view of value creation. A company's decisions are not made in isolation; every decision or investment a firm makes impacts other areas of the firm. Chapter 6 shows how economic value creation is the result of all these decisions. Finally, with the investment valuation framework in place, chapter 7 applies this investment perspective to large-scale economic development initiatives, such as those led by the United Nations and the World Bank. While these initiatives may involve very different stakeholders from those involved in firm-level investments, the analysis of economic value

creation is pretty much the same, regardless of who is making those investments.

The purpose of any investment is to add or create value; hopefully, by the end of this book, your investment in reading it will add value to your ability to think about and evaluate any investment. Thank you for reading.

1
The Purpose of the Firm

> *Sustainability is about survival. It is about optimally using resources, about successfully fending off competitors, about determining one's own future. It is about growth and about adaptation. These tenets are true for any business—whether a publicly traded, for-profit firm, a private firm or a non-profit. Success for any business comes from achieving its mission within its economic, natural, and social environments. The purpose of the firm is to create value. Sustainability comes from value creation and value creation comes from sustainability.*

What is value? How do we measure value? And who gets to measure what is valuable? Which investments create value and why? This book explores these issues and translates traditional economic and finance perspectives on value and value creation into an approach that everyone can understand and apply to his or her own specific situations.

The focus of this book is on making and evaluating sustainable financial investments. That is, this book is about making investments. It is not, per se, a book about sustainability. But one of the core objectives of this book is to demonstrate that there is no difference between profitable financial investments and sustainable financial investments. Successful investments are both profitable and sustainable; they are investments that create value. Investments that do not add value—that are neither profitable nor sustainable—should not be made, regardless of the nature of the investment. Investments that do not add value are not sustainable.

The nature of the investment refers to the source of the cash flows or the source of the value created by any investment. Financial

economists are less concerned with where value comes from but focus on understanding how that value is created. In practice, however, the character of any investment does matter because it influences the economics of the investment. In making investments, we are trying to predict the future: we are trying to predict what return we will receive on what we do today. In doing so, we need to be concerned with who will benefit and how they will benefit. Different investments—and different types of investments—will benefit different people in different ways. This requires measuring the costs and benefits of the investment. One of the greatest challenges for anyone who makes investments is to identify exactly what the costs and benefits are for any investment. An oil pipeline will have different costs and benefits than a wind farm. A corporate bond will have different costs and benefits than an electric car. The details of any financial analysis will be different for different investments, but the overall process will be the same. Understanding the character of any investment will help us understand what these costs and benefits associated with that investment are and how value is created by that investment.

The standard approach to learning the art and science of valuing investments is to focus on the science, to focus on the expected costs and benefits without being overly concerned with the story behind that science. In these contexts, valuation is a math problem—and not a very difficult math problem. In reality, the value of the process is in the art of valuation. The art of valuation is driven by the economic story of the investment far more than by the math. The story of any investment is about the future, and stories about the future are difficult to tell—at least accurately.

Telling the story about a corporate bond can be relatively simple: we make an investment today, and there is a legally binding contract that outlines when and how we will receive a return on that investment. Nothing about the future is certain, so we may overestimate the company's ability to repay our investment. But our expectations are not likely to be very far off.

Telling the story about the future of an oil pipeline, a fair-trade coffee shop, or a wind farm is far more complicated. In order to tell these stories and thus, in order to be able to do the math associated with valuing these stories, we need to incorporate a multitude of issues. We need to know who cares about these investments. We need to know how much they care. We need to know how long the costs and benefits associated with these investments will persist. We

need to consider government support and competitive dynamics. We need to consider macroeconomics, natural resources, human resources, and many other factors. In short, we need to consider all stakeholders involved in this investment and we need to estimate all future economic costs and benefits associated with this investment. This is no easy task.

This book provides some perspective on how we do this—on how we value stories. This book is as much about philosophy as it is about finance and economics though we won't be discussing Plato or Aristotle. Rather, we will discuss the philosophy of financial investments, how stories about economic decisions become sustainable financial investments. Every investment has a story behind it. This book connects these stories with the science of the valuation process. While anyone can make investments, our focus is on investments made by businesses because these have the largest impact. The art and the science of making sustainable financial investments are the same regardless of who is making those investments, but focusing on investments made by firms provides the most general and holistic view of investing. Firms have the most competing interests and the greatest resources. To appreciate the art and science of stories becoming investments, we start our story with understanding why and how firms decide to make investments. But first we need more context.

What do we mean by "sustainability"?

In the purest biological sense, "sustainability" relates to the ability of Earth to support living systems. When applied to business sustainability, the definitions become more varied and nuanced. One interpretation might relate to the ability of the firm to persist and to stay in business over the long term. Another interpretation might relate to how a firm incorporates human, social, and environment-focused investments into its business model and operations. This latter approach has become popular of late and attempts to direct the focus of the firm away from short-term profit maximization and toward long-term value creation.

If this book accomplishes nothing else, hopefully it will convince you that there is absolutely no difference between these two definitions. That is, in order to persist and stay in business over the long term, businesses must understand how human, social, and environmental dynamics impact the business and its mission. At the

heart of this approach is the idea that there is no such thing as a noneconomic factor. Everything a firm does has economic implications; everything a firm does either creates value or destroys value. Granted, we rarely know in advance whether an economic decision creates or destroys value. All business decisions are attempts to predict the future—the future of customer preferences, of regulations, of competitors' actions. At the same time, customers, regulators, and competitors are making their own efforts to predict the future, which complicates matters considerably.

Throughout this book, the term "sustainable" will relate to this combined definition of the business persisting and staying in business over the long term and of how human, social, and environmental initiatives fit into the standard valuation model. The term "sustainability-related investments" will be used to refer to investments that are focused on human, social, and environmental factors. The term "corporate social responsibility," or CSR, will also occasionally be used to refer to these human, social, and environmental investments. To many people, CSR and business sustainability are very different concepts and combining these terms or their related activities is inappropriate. There may be different managerial or strategic implications related to CSR and business sustainability. However, we will not worry about this distinction, as we will try to keep the discussion about value creation as generic as possible. That is, the economic and finance issues explored throughout this book can be applied to any type of investment—whether it is a CSR investment, a sustainability-related investment, an oil pipeline, or an assembly line.

The purpose of the firm

> *"The goal of financial management is to maximize the current value per share of the existing stock."*
>
> (Ross, Westerfield, and Jaffe, *Corporate Finance*)[1]

> *"Fortunately there is a natural financial objective: Maximize the current market value of shareholders' investment in the firm."*
>
> (Brealey, Myers, and Allen, *Principles of Corporate Finance*)[2]

Standard corporate finance textbooks generally agree that the goal of financial management is to maximize the value of the stock price. This is nice because it provides one simple and objective

goal. We think financial markets are good at valuing firms because the markets are good at incorporating lots of information very quickly. This information can be anything, from a company's new products to sales forecasts to personnel issues to expected litigation costs. The stock price goes up with good news and down with bad news. Economic theory and modeling can be used to clarify this process. There is one critical assumption underlying this process: that the stock price and value creation reflect all priorities and preferences of all the firm's stakeholders. While this perspective is not necessarily wrong, it is a highly simplified approach to measuring firm value. Why must "value" be only measurable in terms of stock price?

Could a pharmaceutical company measure value by lives saved? Could a food company measure value by the quality of the food or meals served? Could a computer or book company measure value by students educated? Of course, the answer to each of these questions is "yes, they can." Each of these companies will be measuring value in more subjective terms, in terms of impact or goodwill. However, in the pure economic sense, financial value is created by these intangible ideals; a firm's investments will have financial value if they increase the utility of the firm's stakeholders. "Utility" is a nebulous economic concept meant to convey betterment or happiness or value in either monetary or nonmonetary terms. There is no direct monetary value in eating or sleeping (for most people), but people are generally better off after certain amounts of eating or sleeping. If society believes that education is important, then a computer or book company providing discounted products to schools to enhance learning will be valued—in both nonfinancial and financial terms. Similar logic can be applied to any investment firms make: the decision to give raises to employees, the decision to spend millions on research and development, the decision to advertise during the Super Bowl, or anything else. Firms do what they do because they think it will add value to the firm, in whatever way they measure value.

Historically, sustainability-related investments have been excluded from finance and economics textbooks, presumably for two reasons. Perhaps (1) we don't think we know how to value or measure the subjective and abstract cash flows associated with these investments. For example, should I pay a premium to buy a hybrid or electric vehicle? It is relatively easy for me to do the math on how much I can save in fuel costs, but what is the value to me from that vehicle having

lower emissions than other vehicles? I could argue that there is no value to me since I do not directly receive any cash flows from making the environment better (or less bad). I could alternatively argue that by emitting less pollution, I am making the world a better place, which has utility to me, and I am reducing the costs that I or society may have to pay in the future to allay the environmental damage caused by a less environmentally friendly vehicle. Or, perhaps (2) economists may think that the theories in standard finance and economics textbooks do implicitly include sustainability investments because the theories and exposition apply to all investments. It does not matter whether that investment is an environmentally friendly vehicle or shoes or widgets: in terms of economics, the nature of the products or investment being analyzed does not matter. If an investment increases utility for economic agents, it has value; if it doesn't increase utility for economic agents, it does not have value.

Governance of the firm

Speaking of economic agents, for whom does the firm exist? Does it exist for the external shareholders, the employees, the customers, some other entity, or society as a whole.

For most firms, the answer is probably "all of the above."Different firms have different missions and different stakeholders. The dynamics between stakeholders determine which stakeholder preferences dominate the firm's strategies and investments. But ultimately, all stakeholders get to decide if what the firm is offering has value to them. Every time I go to work, I am implicitly telling my employer that I support the company's business or mission and that they are paying me a fair wage. Every time I purchase a product, I am telling the seller that I value the good more than the seller does (and more than I value the money needed to purchase the good). When I buy shares of a company's stock, I am telling the company that I approve of what it is doing—in terms of mission, ethics, operations, and strategy. In a market economy, these messages are heard loud and clear. Maybe my employer is really happy that I'm satisfied at work and maybe it would be willing to pay me considerably more than it currently is; or, maybe my employer sees my satisfaction (or complacency) and begins looking for ways to pay me less or provide fewer benefits or get more productivity from me. Economic agents, acting in their own rational self-interest, will continuously look for ways to increase their own utility—by taking more of something

from other economic agents or getting more out of the resources they use. Unfortunately, things get complicated because we don't know what the other parties know, and we don't know what they value.

Imperfect information prevents economic agents from being able to increase their own utility as much as they might like. If I knew my employer was willing to pay me 10 percent more than it currently is, I might demand a 10 percent raise. But I don't know what my employer's private information is, so I don't make this demand—maybe because I'm worried about being fired or about upsetting the work environment. Conflicts such as this are ubiquitous between stakeholders in a firm. Different parties have different incentives and different objectives. Economic agents are constantly looking for ways to ameliorate such conflicts and to increase their own information.

From the firm's perspective, this process of stakeholders interacting with each other is known as corporate governance. Corporate governance is the process of making sure that the stakeholders in a firm get what they are expecting from their relationship with the firm. Corporate governance is defined as the set of mechanisms that enables firms to provide a return on capital to the suppliers of capital.[3] These suppliers of capital include many different stakeholders: employees who supply effort and time, shareholders who invest financial capital, customers who make purchases and supply information about their likes and dislikes, and many others. Each of these suppliers of capital expects something in return. Employees expect fair wages, benefits, or fulfillment. Shareholders expect a financial return. Customers expect increased satisfaction and utility from the products and services they purchase. In a market economy, if any of these returns are deemed insufficient, the providers of capital can take their capital elsewhere.

Unfortunately, incomplete information persists in every stakeholder relationship. How then do stakeholders monitor whether or not the firm is acting in their best interests and providing an acceptable return? Most firms—meaning most stakeholders—employ a variety of tools designed to reduce the level of uncertainty or incomplete information between parties. Firms publish annual reports and corporate social responsibility reports. Employees may form unions or other trade groups. Customers may rely on regulators to ensure product quality. Shareholders typically establish a board of directors or other advisory board to serve as an intermediary.

In corporate governance jargon, this is known as a principal-agent problem. The principals—the shareholders—effectively own the firm and the agents—the managers—are hired to work on their behalf. The principals expect the agents to maximize the principals' return on investment, but the agents are also responsible for their own rational self-interests and are using the firm to maximize their own utility. They don't want to work overtime and weekends just to make the shareholders happy. The managers need their own incentives; they expect a return on their investment of human capital. So how can the firm make sure that the employees are acting in the owners' best interests? How can the firm make sure that all relevant stakeholders have the appropriate incentives to maximize the firm's value? The key to making sure that all suppliers of capital are satisfied with the return on their investment is to align the interests of the different parties as much as possible. It's all about incentives and about increasing one's own utility through the relationship with the firm. The incentives then must maximize the value of the firm in the short term as well as the long term.

The sustainability of economics

Fundamental economic theory is based on the interplay between consumers and suppliers, over both the short-term and the long-term. Consumers are only willing to purchase goods if they believe doing so will add to their own utility or value. These decisions are based on such nebulous ideals as preferences and needs. Suppliers or producers will only be willing to sell goods if the benefits of doing so are greater than the costs—if that sale increases their own utility or value. Every economic decision we make is based on this fundamental premise: we only choose activities where the expected economic benefits are greater than the expected economic costs. Unfortunately, measuring these costs and benefits can be quite a challenge. How do we measure benefits such as happiness or fulfillment? How do we measure costs such as pollution or dissatisfied customers? What is the cost of a product recall or a negative tweet? Ideally, all costs and benefits should be included in this cost-benefit analysis—which is a near impossible task. There is incomplete information about the cash flows associated with any economic action; the art of economic analysis is in turning this incomplete information into stories and numbers.

Competitive markets are ruthless. Capitalism ensures that the strongest firms are the ones that succeed—and the others go away.

Every day, competitors are trying to take something away from their rivals. Indirectly, they are trying to put each other out of business in every industry and every location. In order to succeed, in order to stay in business, businesses must be making decisions that maximize success both in the short term and over the long haul, taking into account the dynamics of these competitive markets. Considering both the short and the long term can be difficult. For example, which of the following two investment scenarios would you prefer?

Scenario #1: Receive $100 per year for each of five years
Scenario #2: Receive $1,000 in five years

Under most assumptions and in most situations, economic theory would tell us that scenario #2 is preferable because it is probably worth more in today's dollars. But what if your firm goes out of business in the third year because it didn't have enough interim cash flow to pay its employees or support its projects? Your firm won't be around to receive the expected cash flow in five years. Scenario #2 will then be worthless to your firm—while scenario #1 might have been just enough to keep the firm alive and enable it to seek other profitable investments in the future. Sustaining a business over the long term requires understanding your customers' preferences, your investment opportunities, and your future expected cash flows associated with the business. And that means you must understand the key value drivers of your business on which all these other factors depend.

Value drivers

The value drivers of any business or of any investment are the unique factors that generate the competitive advantages and that create value. For Nike, the value drivers may be performance and fashion. For Apple, they may be design and community. For a lawyer or accountant, they may be expertise and trust. For an individual firm, value is created by one of two things: unexpected revenue growth or higher-than-expected margins (margins are broadly measured as revenues minus expenses). That's it—higher growth and higher margins. Unique value drivers lead to higher growth or higher margins. In many ways, these factors are perfectly measurable; we can measure what Apple pays its employees for their labor and its suppliers for materials. But in many other ways, these factors may not be measurable: how do we measure the value of the Apple

community? This community may create customer loyalty, which may lead to increased sales in the future, but this expected growth is intangible today. Identifying value drivers may make economic sense before the fact, but objectively measuring them and deciding what they are worth is difficult. Will the loyalty of the Apple community create sales growth of 5 percent or 10 percent? When it comes to valuing the community's impact, the difference is not trivial. Further, creating the Apple community isn't free. Apple expends (or invests) considerable human and financial resources to make this loyalty happen. Even if it does create sales growth of 10 percent, this loyalty may not add value if the costs needed to create it outweigh the benefits. When it comes to understanding this relationship and measuring it, valuation is more an art than a science.

Measurement issues in economic decision making

Cost-benefit analysis is at the core of every economic decision ever made. Some costs and benefits are known, explicit, and easily measurable. Most, however, are not—and these costs and benefits can substantially impact a firm's value.

- What is the value of my time at work—to me and to my firm?
- What is the value of providing day care for employees' children?
- What is the value of an employee profit-sharing program?
- What is the value of polluting the environment?

Each of these issues has costs and benefits. My firm and I know what the explicit cost of my time at work is in terms of salary and tangible benefits. But my firm cannot explicitly measure how much value I add to the firm, and I cannot measure how much utility or satisfaction I gain by working for the firm. For a firm, operating in a manner that pollutes the environment could lead to significant cost-savings in the short term, but it can also have significant future costs in terms of fines, lawsuits, resource depletion, and disgruntled customers and employees. A firm may find it reasonably easy to estimate the immediate costs it avoids by polluting; it is virtually impossible for any firm to estimate the future costs it may incur by polluting. Yet, every time a company pollutes, it has implicitly decided that the expected benefits (cost savings) are greater than the expected costs of its actions. Every company is implicitly making such a decision with every investment it makes. And, when a

company decides not to make an investment, it is saying that the cash flows created by the status quo or by other investments are greater than the cash flows from the investment it did not make.

To understand the economic value created by an investment or activity, we want to identify and measure all costs and benefits related to that investment or activity. We want to identify all direct measurable costs and benefits as well as all indirect or intangible costs and benefits. We combine the explicit and implicit costs and benefits to estimate the total costs and benefits. And, because we care only about those costs and benefits that occur in the future, being accurate with these estimates requires information, prescience, and quite a bit of guesswork. Predicting the future is very difficult.

The economics of sustainability

Financial economists have largely ignored or taken a cynical view of sustainability-related investments in most valuation discussions. I don't know why this has been the case, but there are two plausible reasons. First, we may have avoided studying such investments because the cash flows seem too abstract and uncertain to fit easily into our valuation models. Or, second, we may have avoided studying such investments explicitly because we never care about the nature or character of any investment but care only about the cash flows and the valuation model we use, without worrying about the type of investment that generated those cash flows. Neither reason is entirely acceptable.

Firms make investments related to human, social, and environmental capital all the time. Such investments can create a competitive advantage in terms of greater market share or greater pricing power. Such advantages come from providing products and services that are in greater demand than those offered by competitors. Value creation achieved by identifying customers' preferences can come from technological innovation and the competitive advantage created by it. Value creation can also come from increased operational efficiency; allowing employees to telecommute, for example, can both reduce operating costs associated with providing office space and increase productivity by giving employees the flexibility (and happiness) to work where and when is best for them. Different stakeholders have different preferences, and firms can create value only if they identify these preferences and incorporate them into their strategic decisions.

Throughout this book, we will see many examples of companies recognizing the value that can be created by investing in human, social, and environment-focused projects. Nike has invested in a waterless apparel dyeing company—this is significant since apparel dyeing represents 5 percent of Nike's water usage.[4] Interface has invested in powering a factory with methane from the public landfill.[5] Through its Whole Planet Foundation, Whole Foods is funding microfinance loans to entrepreneurs in more than 50 developing nations, helping these individuals escape poverty and improve their lives.[6] Since 2007, Walmart has installed 200 solar projects at stores in the United States and more than 100 solar projects at stores in California; in 2013 alone, Walmart installed 135 solar, wind, and fuel-cell systems at its stores.[7] The United Nations has funded local investments that significantly improve water access in Nepal[8] and the fishing industry in Burundi.[9] The list of examples could go on for pages, but you get the point. None of these investments are free—and none are charity. All of these investments are made because the investors believe the future benefits will be greater than the current costs. These benefits will be determined by consumers' and stakeholders' preferences and by the changing dynamics of resource markets. When we initially make investments, we have no idea what the return on these investments will be in terms of financial return, utility, impact, or quality of life. Only time and economics will tell. When the above-mentioned corporations made these investments, they probably had detailed financial analyses justifying each investment; we will work through our own detailed financial analyses in chapter 5. Those financial analyses probably began with a story about the investment, about the possible costs and benefits of the investment, about the economic factors that would drive the value generated from each investment.

Making the business case for any investment

The financial aspects of any investment ultimately come down to whether or not the investment adds value—that is, whether or not the present value of the benefits is greater than the present value of the costs. For any investment, while we ultimately care about the numbers and the math, telling the story of the investment is a critical part of understanding what those numbers should be. This storytelling should begin by making the business case for that investment. The business case evaluates how the investment can

create value. It evaluates where the increased cash flows come from and what costs and benefits are associated with that investment. Making the business case is a process of understanding the investment better; the purpose is not to justify or defend the investment but to understand its value drivers better. And, ultimately, the goal is to determine whether or not a particular investment—whether it is a sustainability-related investment or any other type of investment—can create value. Behind this storytelling, there are several drivers that can create value with any investment:

- *Increased market access:* through better alignment of products and preferences;
- *Greater risk mitigation:* through greater control over resources;
- *Innovation:* through challenging designers and managers to create new products;
- *Greater operating efficiency:* through lowering costs with new technologies or designs;
- *Regulatory compliance:* through meeting standards or requirements that impact operations;
- *Image enhancement:* through improving the company's image both internally and externally.[10]

These value drivers are not unique to human, social, or environmental investments. They apply to any kind of investment. Because many of the costs and benefits associated with sustainability-related investments can be intangible and long term, such investments can be evaluated more thoughtfully and thoroughly by first considering the above business case drivers. By considering a deeper view of how an investment can create value, we can have a better understanding of whether or not that investment should be made.

One of our goals in financial management and analysis is to obtain as much information as possible. If we are thinking about installing solar panels on the rooftop of our headquarters, we want to understand the costs and benefits of that investment; that is, we want to understand all cash flows associated with it. In addition to the up-front cost of installing the solar panels, there will be maintenance and repair costs in the future. For most firms, the primary benefit would appear to be a lower energy bill. But simply focusing on those explicit costs and benefits is the lazy financial analyst's approach. We need to be sure to consider all possible costs and benefits associated with the investment. Are there any government incentives for installing solar panels? Are there recurring tax

benefits? Will the energy savings increase or decrease over time? Do our stakeholders care; will we lose employees or customers if we don't make this investment? What weather dynamics might influence our estimates of energy savings or repair costs? Ultimately, valuation is about numbers, but understanding the story behind the numbers is essential. Because the costs and benefits of human, social, and environmental investments might be less clear than we want, understanding how sustainability-related investments can create value might require some new, creative, and holistic thinking on the part of analysts. The business case helps us tell this story behind the numbers.

Broader consequences of decisions made on the level of the firm

In January 2013, the International Monetary Fund (IMF) released a report claiming that the United States subsidized fossil fuel production and use at approximately $500 billion per year (half a trillion dollars).[11] The US government, however, estimated that its annual fossil fuel energy subsidies were just over $4 billion per year.[12] Obviously, these are huge numbers; more significantly, there are huge differences between these huge numbers. How can two entities differ so much in their estimates of the same cost?

The differences are due to different assumptions about the costs; that is, they are due to incomplete information. The biggest difference between these two calculations is that the IMF calculation includes perceived externalities. An externality is an economic cost or benefit that is not directly paid for or received by the economic agent. An example of a positive externality might be landscaping your front yard; this may or may not increase the value of your home, depending on what you paid for that landscaping. But it probably increases the value of your neighbors' homes—because they didn't pay anything for the better-looking neighborhood. The classic example of a negative externality is pollution. My factory produces pollution that imposes costs on society, but I do not have to internalize those costs directly. One way to fix this would be to tax my factory (or to tax pollution creation). The IMF's study of externalities incorporates all the pollution that the United States' use of fossil fuels creates and considers the taxes that are not imposed to penalize or remediate that pollution as a subsidy. The IMF makes many assumptions in this calculation,

such as how much pollution is created and what the cost of carbon emissions is. Ultimately, there is no way of knowing whether or not $500 billion is a reasonable estimate of how much the US government subsidizes fossil fuel use. But the point here is that there are broader costs and consequences to our use of fossil fuels, and we may not be fully accounting for these costs in the prices we pay. There are similarly far-reaching consequences with most other economic decisions that we make, including an unhappy work environment, poor communication with investors, and tense relationships with suppliers. It is critical to identify these consequences so we can understand any costs or benefits entailed that need to be incorporated into the business case and ultimately into the financial analysis.

Firms may think they operate in isolation and that their actions have minimal impact on others. While this may be true in some cases, it is the exception rather than the rule. Even so, is it a firm's responsibility to minimize the negative societal externalities associated with its operations? I would say that it depends—it depends on whether or not the externalities affect the firm's value. The firm's mission is to maximize its value, and its stakeholders determine the value of the firm. If these stakeholders have a problem with a firm polluting or mistreating its employees or otherwise creating negative externalities, then the firm should incur the necessary costs to minimize them. We generally assume that the minimum level of a firm's responsibility is to obey the law. But even this can be based on stakeholders creating value through their preferences: if the firm is fined for breaking the law, the results are negative cash flows and a damaged reputation and other value-destroying effects. Does the firm care more about obeying the law because it's the law or because not doing so would destroy some of the firm's value? This might be a chicken-and-egg question (as many in this book are), and every firm might have a different perspective, but many firms would likely break the law if they the costs of doing so were less than the benefits gained from the law-breaking activities (see, for example, the behavior of many large financial institutions around the world during the 2000s). Each firm's stakeholders decide what they value and what they want the firm to do; markets are very efficient at valuing these preferences.

Throughout this book, we will explore Nike's journey to changing its relationship with its contract labor factories in developing countries. During the 1990s, many of these factories were breaking

local laws and mistreating employees. Because they were contract factories and not factories owned by Nike, Nike itself was not breaking the law. Initially, Nike refused to take responsibility for the actions of the factories. But after much outcry from customers, employees, and public interest groups (Nike's stakeholders), Nike decided to take a more active role in improving the working conditions and in making sure its contract factories were obeying every law. This was a very costly initiative for Nike, but the cost was deemed to be much less than the cost of lost sales and a damaged reputation that had resulted from the company's association with the contract factories. Strictly speaking, Nike was not responsible for those factories' actions, but from a stakeholder perspective those actions absolutely had value-destroying effects on Nike. During the early 1990s, perhaps Nike's cost-benefit analysis showed that these externalities were not significant enough to destroy value for Nike and that the company did not need to invest in correcting them. Maybe customers didn't care—or didn't know—about what was happening in Nike's contract factories. By the late 1990s, stakeholder preferences had changed, and therefore the cost-benefit analysis changed, too. Nike realized it needed to invest in correcting these issues.[13] The funny thing about externalities is that they don't always stay external; once their effects become internalized in the firm's cash flows and valuation, the firm needs to reconsider how it is treating these issues and whether it needs to make any investments to correct them in order to create value (or to avoid destroying value).

Assumptions underlying this story

I am an economist and this book is about economics. Just about everything in economics revolves around the idea of markets being free. Accordingly, this book assumes free markets. It assumes free markets for products, labor, capital, and all other resources a firm may have or need. However, nothing in this book requires perfect markets or perfect information among market participants. One key principle underlying free markets is that market participants have choices about what they do; in return, their actions reveal their value-based preferences. Free labor markets assume that employees choose where they work (and that employers choose whom they hire). Free capital markets assume that investors have options as to how and where they invest. Free product markets

assume that customers have choices among the products they buy and that there are substitutes among products. Of course, there are plenty of situations where uniqueness gives products and services a competitive advantage over the competition, and there may not be any true substitutes (like with this book). In fact, all firms are trying to produce goods and services that do not have substitutes. In reality, customers always have choices—you could have paid less for an inferior book, or you could have avoided buying this book altogether. This book assumes that every economic investment is a choice that did not have to be made. The choice was made only because somebody decided it was of value to him or her. That choice was made based on whatever information the economic agent had at the time; the price paid or received for that action becomes the market price because it incorporates the precise value associated with the action.

Free markets rely on information—information about preferences and pricing. Every economic action or decision produces such information. Adam Smith coined the term "invisible hand" of the market in the 1700s to refer to how our preferences and actions drive markets.[14] Our preferences are invisible, but they have very powerful effects. Today, big data is being used to make these invisible preferences and actions more visible and predictable. Big data is little more than massive aggregation of information about our preferences and actions. Many firms are using big data to better understand why we make the economic choices we make so that they can mitigate the challenge of incomplete information. Markets are formed and moved based on preferences and actions; the better our information is about those preferences and actions, the better we can understand and operate within these markets. Big data may help us better understand preferences and actions, but as long as people are the ones making economic decisions, predicting the future will continue to be as much an art as it is a science.

For companies, making investments is also an art. Managers have to know what their stakeholders value and what markets value. Investing in human, social, and environment-related projects is a choice; it is optional. Firms make such investments only if they believe their stakeholders and the markets value such choices. Individuals' preferences and values will always determine what investments get made. The value drivers of the future will probably not be the same factors that led to value creation in the past. Many

firms, such as Nike, Whole Foods Market, and Interface have recognized that. Nike and Interface changed strategies as stakeholders' preferences placed more value on human, social, and environment-related investments. Such sustainability has always been embedded in Whole Foods' mission and operations, but the company continues to look for more alignment between its strategies and its stakeholders' preferences. These firms have chosen to become more sustainability-focused because those choices create value. As populations grow, as resources become more constrained, and as individual preferences continue to evolve, the choice to invest in sustainability is likely to continue providing opportunities for firms to create value.

Overview of making sustainable financial investments

The purpose of the firm is to create and maximize value. At its core, value creation is very simple: do things and make investments where the benefits are greater than the costs. That's it. However, the technical details of how to do this are extremely complicated. The invisible hand of the market creates an invisible hand of value creation. The pursuit of value creation forces us to ask many questions that rarely have easy answers:

- What is the business case of any investment?
- How do we know what the costs and benefits of any investment are?
- What are the differences between the short-term and the long-term impacts?
- How do we determine who our stakeholders are?
- How do we determine how those stakeholders impact our operations?
- How do human, social, and environmental factors impact value creation?

Answering these questions requires a lot of effort, a lot of research, and quite a lot of guessing. Sustainable financial investments are those that create value over the long term; making sustainable financial investments is the key to any business surviving and thriving within competitive markets. But those same competitive markets mean that making such investments is not

easy. Incomplete information and the invisibility of stakeholders' preferences make it difficult to know how to create value; yet, stakeholders' preferences are the only things that do create value. Throughout this book, that concept will drive much of our economic analysis: understanding who the stakeholders are and who cares about what we do is crucial because if we can understand who cares about our economic decisions, we are one big step closer to understanding how that economic decision can lead to long-term economic value creation.

Appendix
Firms Making Sustainable Financial Investments

We will use three sample firms as primary examples of companies making sustainable financial investments: Nike, Whole Foods Market, and Interface. In this context, we will look at how these firms are incorporating human, social, and environmental issues into their operations, strategies, and investments. These companies were chosen to demonstrate the financial factors driving a firm's strategy and investment for a variety of reasons. Most of you have heard of Whole Foods, and you have a good understanding of how its business incorporates human, social, and environmental factors. Most of you have heard of Nike, but it may not be obvious to you how it is trying to achieve growth through sustainability. And many of you have never heard of Interface (it manufactures modular carpet)—but it has formed an entire business strategy around sustainability. These three companies, from three different industries, have different reasons for incorporating sustainability into their business models and strategies, and this is why they were chosen for our discussion here.

The purpose of this book is to understand how making investments creates value—with a specific focus on investments in human, social, and environmental initiatives. Studying the economic and finance theories, foundations and concepts, and then applying those concepts to three large, for-profit companies that believe their mission is tied to their ability to successfully make sustainability-related investments will help us better understand those value drivers. Of course, these three companies are not the only ones making such investments. Nor is it my position that what these companies are doing is always right and will always create value. Our purpose is to talk about these three companies, to connect what they're doing to

the economic and financial concepts, and to think about whether or not their sustainability-related investments are creating value for the firms.

Nike

Nike Inc. designs and sells athletic footwear, apparel, and accessories. Its products include shoes and clothing for virtually every sport and recreational activity., Founded by Phil Knight and Bill Bowerman in 1964 when they were selling running shoes out of Knight's Plymouth Valiant, the company was incorporated in 1968. Over the past 50 years, Nike has grown to a multinational firm with revenues of $28 billion, about half of these generated in the United States. Nike does not manufacture most of its products but rather contracts with factories for production; most of these factories are located in developing countries around the world. Nike has over 55,000 employees, not including the 1,000,000 or so employees working in Nike's contract factories. Nike creates much of its value through its marketing and branding, selling a lifestyle experience, including a connection to famous athletes.

For much of its existence, Nike did not explicitly invest in environmental, human, or social programs. Its focus was largely on minimizing short-term costs. However, in 1998, Phil Knight, who was then the chief executive officer and chairman and is still the chairman and largest stockholder, had an epiphany. The firm had been receiving substantial negative feedback about the labor practices in Nike's contract factories in Asia. Complaints about low wages, excessive overtime, and unsafe working conditions were common. Nike's initial response was to deflect the criticism, attempting to absolve itself of any responsibility since it was the independent contractors who were responsible for the working conditions, not Nike. This did not sit well with Nike's critics and customers. While Nike may not have had a legal responsibility to change the labor practices, the critics felt it did have a moral responsibility.[15]

In 1998, Nike agreed with its critics and changed its attitude. The firm invested in improving labor conditions at these factories; factories that did not meet Nike's standards lost Nike's business. Just three years later, Nike was one of the first US firms to have a standing committee of the board of directors devoted to corporate responsibility and sustainability. Nike quickly realized how important human, social, and environmental issues were to the firm's

stakeholders. In the late 1990s and early 2000s, Nike's sustainability investments were largely devoted to labor and environmental issues. In more recent years, these issues have remained important, but Nike has transitioned to establish sustainability as a driver of growth and innovation. Nike believes that it can create competitive advantages with innovative designs, uses of resources and materials, and internal and external partnerships. In Nike's 88-page *2013 Sustainable Business Performance Summary*, some variation of the word "innovation" appears more than 200 times.[16] In less than two decades, Nike's sustainability strategy has gone from a defensive position to an offensive approach that can create unique competitive advantages and can drive value. In less than two decades, Nike's sustainability strategy moved from focusing on the short term to a holistic long-term, core competency perspective.

Whole Foods Market

Whole Foods Market opened its first natural and organic grocery store in Austin, Texas, in 1980. Today, Whole Foods is the leading retailer of natural and organic foods in the United States and is the twelfth largest food retailer overall. At the end of fiscal year 2013, Whole Foods had 362 stores in the United States, Canada, and the United Kingdom. In total 97 percent of Whole Foods' $13 billion in sales are generated in the United States. Whole Foods was cofounded by John Mackey and Renee Lawson; today, Mackey is still the co-CEO (alongside Walter Robb) and is the largest individual stockholder. In 2014, Whole Foods purchased 32 percent of its goods from United Natural Foods and has a contract to continue this relationship through 2020. Beyond this, the company sources much of its produce and other products from local farms and suppliers. The industry is highly competitive, with national discount competition (like Walmart) and small local competition (including farmers' markets). Whole Foods stores average 38,000 square feet; by comparison, the average Walmart is about 150,000 square feet, and the average Safeway is about 50,000 square feet. Whole Foods has about 57,000 full-time employees (78,000 total) and is proud to be 1 of only 13 companies to have made *Fortune* magazine's "100 Best Companies to Work For in America" list in all 16 years it has been published.

Since its opening, Whole Foods' core mission has been focused on the promotion of healthy eating, organically grown foods, and

the sustainability of the entire food ecosystem. Human, social, and environmental investments are a critical part of the firm's strategies and operations. The firm wouldn't exist without its commitment to using sustainability as a key competitive advantage and differentiator. The predecessor company to Whole Foods that Mackey and Lawson founded was called SaferWay, a not-too-subtle tribute to Safeway.

The company invests in environment-focused assets through its farm relationships, its high standards in sourcing seafood, its commitment to supporting organic farming, and its use of renewable energy and green buildings. In 2006, Whole Foods became the first major retailer in the United States to offset 100 percent of its store energy with wind energy credits. The company makes social-focused investments through engagement with community partners. Whole Kids Foundation works to help families commit to a life of nutrition and wellness. Whole Cities Foundation works to bring healthy and nutritious food to underserved communities in larger cities; its initial investments were in New Orleans, South Chicago, and Jackson, Mississippi. And Whole Planet Foundation is committed to alleviating poverty in developing country communities where Whole Foods sources many products. The company invests in people in many ways, notably by being a desirable place to work. Store employees are called team members and are involved in recruiting, strategy, and operations. Store and regional teams are empowered to make decisions that work best for them, with minimal interference from headquarters in Austin. For Whole Foods, investing in human, social, and environmental initiatives is not a strategic decision; it simply defines the company.[17]

Interface

Interface is the world's leading manufacturer of modular carpet, or carpet tiles for commercial spaces. The company designs, produces, and sells the carpet. Its 2013 sales were just under $1 billion; 57 percent of these were generated in the United States, 29 percent in Europe, and 14 percent in the Asia-Pacific region. The company is based in Atlanta, Georgia, and has operating and manufacturing facilities around the world. The company was founded in 1973 by Ray Anderson with a mission to mass-market carpet tiles to provide greater flexibility in design and functionality. The company employs about 3,500 people worldwide, half in manufacturing and half in administrative positions.

Table 1A.1 Sample Firms Making Sustainable Financial Investments: Nike, Whole Foods Market, and Interface

	Nike	**Whole Foods**	**Interface**
Company Size	Large Sales = $28 billion (FY 2014) Market Value = $85 billion	Medium Sales = $13 billion (FY 2013) Market Value = $17 billion	Small–Medium Sales = $1 billion (FY 2013) Market Value = $1 billion
Role of Sustainability-Related Investments	Value-added, long-term strategic decisions. Source of growth and innovation.	Embedded in the company's existence. The company wouldn't exist without them.	Mission-based, long-term strategic decision since 1994.
Sustainability Orientation	Emergent	Embedded	Emergent to Embedded
Growth	Driven by innovation. Sustainability and growth are complementary. Value creation comes from new products and technology growth as well as from cost control.	Driven by matching products and values with consumers' and stakeholders' preferences, expanding markets, bringing customers into the store, increasing local partnerships.	Minimal revenue growth, aggressive pursuit of long-term expense control. Investments in long-term strategies that align mission with stakeholders' values.
Sample Investments	Waterless dyeing, Flyknit shoes, monitoring and audits of contract labor, climate change, empowerment of women.	Culture, empowered employees, responsible local sourcing, LEED buildings, food access, Whole Planet, Whole Cities, Whole Kids.	Methane-powered factories, empowered and incentivized employees, non-petroleum-based products, minimizing water, energy, transportation costs.

How Sustainability Became a Strategy	Journey of sustainability integration, initially in response to customer and stakeholder action, now viewed as a long-term value driver.	Founding value of the company in 1980, founding competitive advantage.	Paradigm shift as a result of founder's epiphany in 1994, 21 years after founding the company in 1973.
Competitive Advantage	Design, innovation, performance	Values, quality products, customer service, customer experience	Style, design, functionality, values
Customer Preferences	Driven by brand, performance, style. Not driven by eco-friendliness or long-term sustainable vision.	Based on matching customer preferences with long-term personal and environmental sustainability-based initiatives.	Priority is on function, style, and value. Secondary emphasis is on eco-values and sustainability-based initiatives.
Emblematic Quote	*"Sustainability and business growth are complementary."* Mark Parker, CEO, 2014	*"Just as we employ a systems approach to business, we view the world as a beautiful and complex system and as citizens of the world, hope to leave it a better place than the one we inherited."* Green Mission Report, 2012	*"The first name in commercial and institutional interiors worldwide through its commitment to people, process, product, place, and profits."* Ray Anderson, Founder, 2007
Founder's Book	None (yet)	*Conscious Capitalism* John Mackey, 2012	*Confessions of a Radical Industrialist* Ray Anderson, 2007

For its first 21 years, the company was a fairly typical carpet company, looking to compete on design, price, and quality. That all changed in 1994 when Ray Anderson had a profound change in his perspective on the firm's mission: he realized that the firm's mission needed to become as environmentally and socially sustainable as possible. From then on, sustainability would drive all strategic decisions. Today, Interface's mission embodies this spirit: Interface seeks to "become the first name in commercial and institutional interiors worldwide through its commitment to people, process, product, place, and profits."[18] Ray Anderson challenged his employees and stakeholders to climb Mount Sustainability[19]; inherent in this were Anderson's seven key tenets of sustainability:

1. Eliminate all forms of waste in every area of the business.
2. Eliminate toxic substances from products, vehicles, and facilities.
3. Operate facilities with 100 percent renewable energy.
4. Redesign processes and products to use recycled and bio-based materials.
5. Transport people and products efficiently to eliminate waste and emissions.
6. Create a culture that uses sustainability to improve the lives of all stakeholders.
7. Create a business model that demonstrates the value of sustainability-based commerce.[20]

The company has explicit, measurable standards for each of these tenets. It has not fully achieved all of these seven goals, but it is committed to working every day to pursue them. Sustainability is a process, not a destination. For a manufacturing firm, Interface's focus on environmental and eco-related projects is the most apparent, but the social and human investments are just as important to the firm. The environmental investments would not be possible without the proper culture and engagement by the firm's employees, partners, and stakeholders. While Interface was not founded with sustainability as a driving competitive advantage, Ray Anderson's strategic and moral epiphany in 1994 made sustainability the key value driver for the firm.[21]

2
The Role of the Firm's Stakeholders

Firms are successful when all parts of the firm are working together to create something bigger than any individual part. The firm's resources come from many different sources: employees, investors, suppliers, nature. Each of these sources of capital contributes to the firm's success. The value of the firm is determined by the union of capital, contributed by all of the stakeholders, not by any single stakeholder but by the combined contributions of all stakeholders.

Who owns any firm? That is, who owns the resources of any firm? The answer may not be as obvious as you might think. The standard answer is that stockholders own the firm. After all, that is what business schools teach in Business 101. Stockholders are the residual owners entitled to all cash flows or interests after all prior expenses and obligations have been fulfilled. But that same Business 101 class also teaches that the firm is a nexus of contracts, an integrated system of relationships between many disparate parties: stockholders, customers, employees, suppliers, and others. The firm would not—could not—exist without any of these parties. While the stockholders may be the ultimate legal owners of the firm's cash flows, many other parties are the owners of other specific cash flows that take priority over anything the stockholders may receive. In this sense, these other parties own the firm, too.

Firms exist because their stakeholders decide they should exist—and each firm becomes a dynamic nexus of these stakeholder relationships. Investors provide the financial capital, designers provide the product, customers provide the market, employees connect the product to the market, and society reaps the cumulative

benefits—through salaries, social welfare, products, taxes, community development, and other means. In free markets, every stakeholder gets to vote on the actions of the firm. Customers can decide not to buy the products. Employees can choose to resign. Investors can choose to take their investments elsewhere. These votes ultimately determine the value of the firm and the impact the firm makes. Each stakeholder acts in his or her own rational self-interest; successful firms are able to manage the inherent conflicts between different groups to maximize mutual benefit.

As you read the various examples and case studies in this book, assuming you actually read them, ask one simple question: Who cares? Don't ask this in a disparaging way; ask it in a curious way. Think about who cares about what a firm does. Who cares what a firm pays its employees? Who cares about the features or design of a product? Who cares what impact an investment or activity has on the environment? Who is going to contribute extra capital or resources to the firm as a result of any investment? Value is created by these stakeholders caring enough about that investment to exchange resources such that the benefits to all parties are greater than the costs to all parties.

The purpose of any business entity is to maximize value. How a firm defines value is determined by the firm's structure and mission, which are determined by the firm's stakeholders. As a result, it is critical for every firm to understand what its stakeholders value in order to decide what investments to make. And everything the firm spends its resources on is an investment; infrastructure, salaries, benefits, training, product research, development, design, operations, and distribution are all investments. Each investment decision is made because the firm believes its stakeholders will value that decision—that they will place greater value on that decision than they do on any alternative decisions the firm could have made—and that this decision will ultimately increase the value of the firm as a whole.

Among those stakeholders are the obvious ones: customers, employees, and investors (or those working to maximize the value from within the organization) but also less obviously include pirates and expropriators, or those who are looking to take advantage of the firm for their own personal benefit. Yes, even entities looking to destroy value have a place at the table. Over the past two decades, Nike has received periodic pressure from special interest groups to improve the working conditions in its contract factories and to remedy situations when the contract employers violate their laws or

fiduciary responsibilities. Nike has to decide what investments to make to satisfy its stakeholders, whether to give in to the special interest groups and make the changes they demand or whether to ignore those groups, maintain the status quo, and focus on managing expenses in the short term. Another possibility is that Nike would be better off by not using contract labor and instead establishing its own company-owned manufacturing facilities. Companies like Nike must strike a balance between throwing a relatively small amount of money at a problem to make it go away and setting a precedent of paying off any opportunistic individuals or organizations that threaten to cause a longer-term nuisance to the firm (causing a nuisance is probably the same as destroying value).

Every firm's nexus of relationships is unique, but figure 2.1 shows a hypothetical web of relationships for one business (the pirates have not been included, but they certainly could be).

In its *2012 Green Mission Report*, Whole Foods Market provides a similar stakeholder web that includes five primary stakeholders, anchored by Whole Foods in the center of the web:

- Team member happiness
- Community and environment
- Motivated investors
- Satisfied and delighted customers
- Partnerships with vendors and suppliers.[1]

This web of stakeholder interdependence shows arrows from Whole Foods to each of these five primary stakeholders, but also

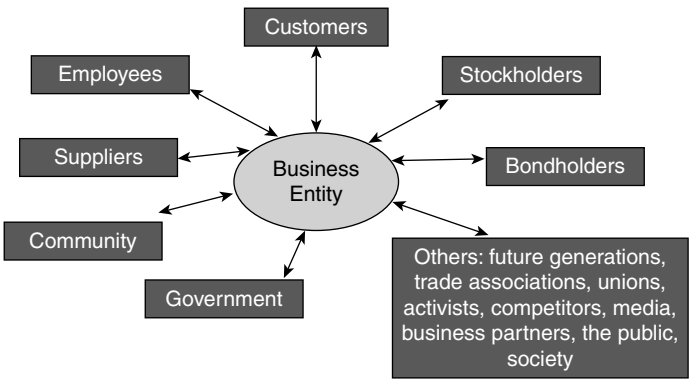

Figure 2.1 Web of Stakeholder Relationships

shows arrows between each of the stakeholders to emphasize that all parts of the web work together to pursue the firm's mission and to create value. Beyond these five key stakeholders, this web is tied together with ten philosophical ideals, including congruent values, innovation and service, profits and growth, and corporate citizenship. If these philosophical ideals weren't found in a *Green Mission Report*, there is nothing about them that would make them stand out as green—but everything about them suggests economic sustainability. For Whole Foods' stakeholders, pursuing the firm's green mission is the only way to achieve economic sustainability.

These mutual relationships do not necessarily form a hierarchy. They form a web. If all entities are acting to maximize their own value, the result should maximize social value over the long term. However, in this process, each entity may be trying to gain a competitive advantage over its competitors and to gain power over each of its relationship partners. Whole Foods doesn't want to overpay its employees or its suppliers, and it doesn't want to undercharge its customers. But it does want to make them happy enough. Balancing the competing interests of these short-term and long-term objectives is extremely difficult. In the short term, for example, firms are trying to gain as much pricing power as possible over their suppliers. At the same time, they are trying to manage their relationships with suppliers in a way that benefits the firm the most over the long term. Firms may be willing to pay a little more in the short-term to ensure access to a consistent and robust supply chain over the long term. In figure 2.1, the arrows between parties point in both directions. This is not accidental. All economic agents have a choice of whether or not they enter into a relationship; presumably, they will do so only if being in that relationship maximizes their own expected value. Economic transactions, of any sort, happen only because all parties involved think they are better off as a result of those transactions. Whole Foods' employees, customers, suppliers, and investors choose to be a part of Whole Foods' stakeholder web only because they each think they are better off as a result of the relationship.

Each relationship between stakeholders involves trade-offs. Determining which trade-offs to make is the firm's implicit analysis of economic costs and benefits, of how short-term costs can be balanced with long-term benefits. Examples of such tradeoffs and analyses include the following:

- Google is known as one of the best places to work because of its employee-friendly benefits, such as free food, day care, massages,

and other perks.[2] But these perks aren't free—to either Google or the employees. Google provides these benefits because it believes the costs of doing so are lower than the benefits that Google receives from its employees in return in the form of productivity, loyalty, and culture. If Google focused only on short-term profitability and if Google's other stakeholders (such as stockholders) focused only on short-term profitability, it might not make such investments in its employees. But by incorporating a long-term perspective into its valuation analysis, it has decided that these short-term costs are more than offset by the long-term benefits.

- Walmart is the largest retailer in the world. It has more than 11,000 stores that generated nearly $500 billion in revenue in 2013. Approximately 250 million customers shop at a Walmart store in a given week. For suppliers, having their product sold by Walmart is a dream come true. Walmart has extensive requirements and standards for its suppliers, holding them to legal, ethical, labor, environmental, and other standards. Of course, the supplier's products must be products that Walmart's customers will demand, too. Walmart can exercise this power over its suppliers because the costs of possibly losing some suppliers are less than the benefits of paying the lowest prices for the highest quality possible. But customers want products at the lowest prices. Suppliers have to decide if they want to sell their products to Walmart, possibly at lower prices than elsewhere, in order to have access to Walmart's customers.[3]
- Whole Foods proudly asserts that "our team members are at the heart of our unique culture."[4] As part of this emphasis on employee value, Whole Foods makes the salaries of all employees publicly available. The company caps executive salaries at 19 times the average team member's salary and pays out compensation and benefits worth 23–25 percent of total revenues, much higher than the industry norm. "Team member happiness" is worth paying for because the firm believes it is essential for creating a unique competitive advantage. Existing team members are involved in the recruiting and hiring process for all new hires, including panel interviews with employees in various levels of the organization. Having employees participate in the process makes them responsible for the hiring and the team, encouraging a shared value and shared fate approach. The company believes that happy team members lead to happy and satisfied customers. If the customers are happy, they will be willing to pay more for goods or to buy more goods, allowing the company to share those revenues with employees—and with other stakeholders—to create value over the long term for all stakeholders.

While standard corporate finance textbooks may claim that the ultimate goal of any firm is to maximize the value of the firm's stock, think about where stockholder value comes from. It comes from customers purchasing the firm's goods or services. It comes from employees producing those goods and services at maximum productive efficiency with the highest quality or output at the lowest cost. Lowest cost is not necessarily the same as lowest wage. It is the same as most value. A low wage may lead to high turnover, low effort, low productivity, lost customers, and other long-term costs. Stockholder value also comes from suppliers providing the inputs for the firm's goods. The firm may benefit more from high-quality, more expensive inputs than from lower quality, less expensive inputs because customers may be willing to pay more for the value added by those higher quality inputs. Saving money on employee safety or environmental compliance may save money in the short term but lead to greater costs in the long term in terms of remediation, legal, image, or other costs. Within a system of stakeholders, value is only maximized through the efforts and interests of all vested parties.

Principal-agent relationships

One of the biggest challenges with getting stakeholders to maximize value for the system is that each individual stakeholder is trying to maximize his or her own unique value. As a result, most firms face a principal-agent problem. That is, the principals who ultimately own the firm—in general, the stockholders—are not always the agents running the firm. The managers of the firm are the ones making the day-to-day strategic and operational decisions that should, in theory, be aimed at maximizing the value of the firm for all stakeholders. The various stakeholders within a firm are not merely anonymous groups; they are people who are presumably rational individual economic agents. These people each make decisions that maximize their own rational self-interest, and their primary concern is not necessarily to maximize the value of the firm.

Unfortunately, we don't always know what motivates any of the stakeholders. One of the most challenging aspects of economics—of business—is that so little of the information we need to make decisions is observable. That is, Google doesn't really know what its employees value. Do the free massages and day care really motivate the employees to work harder, or would the employees actually

be more productive without these perks and with a 10 percent pay raise? Each stakeholder places different values on different aspects of the relationship. Some want cash, some want control, some want flexibility, some want minimum risk, some want convenience, and some want a free massage. Since these different preferences are not observable—by any party in an economic relationship—it is extremely difficult to determine what each individual stakeholder wants out of any economic relationship.

In an individual firm, managers must try to determine the system of benefits that will maximize the value of the firm, recognizing that they may have to disappoint some individual stakeholders in the process. Whole Foods doesn't know what its employees value, and it doesn't really know how their preferences contribute to the firm's value and mission. Executive salaries are capped at 19 times the average team member's salary,[5] presumably to create a more equitable environment where each team member feels they receive fair and appropriate compensation. But why 19? Why not 15? Why not 30? How does Whole Foods know that capping executive salaries at 19 times the average salary is the level that maximizes value? Does the firm lose out on hiring high-quality executives who may value a higher cash salary, at, say, 22 times the average team member's salary? Would the firm be better off by hiring these executives at the higher salary and possibly alienating some team members just a little bit because of those higher salaries? Nobody really knows because things like this are not observable. But Whole Foods obviously doesn't believe so. Very few other companies place a cap on executive salaries in this manner—presumably because they believe that the costs of possibly alienating some employees are less than the benefits associated with having a flexible approach to compensating executives. But those other companies don't have Whole Foods' stakeholders.

This 19-times limit on executive pay could be accomplished in two ways: either by paying executives less or by paying the average team members more. If entry-level wages are $15 per hour rather than $10 per hour, the firm can pay those high-quality executives a higher salary and still pay the average team member what they believe is an appropriate wage. From a compensation perspective, this seems like a win for all involved: Whole Foods can attract high-quality executives with a competitive salary and entry-level employees feel motivated to be productive and appreciated within the organization. Of course, this structure is probably more expensive for the company

in terms of its compensation expense. So how would Whole Foods justify such higher expenditures? Maybe this means that customers will end up paying more at Whole Foods because they appreciate the happy and helpful store employees. Maybe this means suppliers will have to accept slightly lower per-unit pricing since Whole Foods allocates so much of its income to compensation—which may be fine with the suppliers if the volume of sales is higher. Investors are primarily concerned with financial returns, but maybe they see the sources of competitive advantage that lead to higher cash flows, profits, and value in Whole Foods' unique system of stakeholders. Firms create value through many different sources and stakeholders; what works for Whole Foods or Google may not work for Walmart or Nike. Free massages and day care lead to different benefits and cash flows at Google than they might at Walmart, for example.

None of the above is meant to suggest that what Whole Foods or Google is doing is right—or that what Walmart is doing is wrong. We can never really know exactly what the best approach—the value maximizing approach—is for any firm. And that's kind of the point here. Each firm has a unique set of stakeholders—a unique culture, business model, and value chain. Executives who want a salary that's 30 times the average employee's salary may not fit in personally or culturally at a place like Whole Foods. Employees who want an unlimited salary structure may not have the personality and ability to contribute to Whole Foods' model. It works both ways. At the same time, the salary cap may be a signal not only to the employees; it may also be a message to customers, investors, and community partners that Whole Foods' value comes from the efforts and contributions of the entire team—the entire network of stakeholders— and not just from a select few well-paid executives or from a lot of well-paid team members.

Wayne Cascio has studied the impact of driving value through employee wages at two similar companies: Costco and Sam's Club, Walmart's warehouse store.[6] He found that even two companies with seemingly similar value propositions drive value with very different strategies. In 2006, when Cascio performed his research, Costco had about 340 stores and 68,000 full-time employees; Sam's Club had about 551 stores and 110,000 full-time employees. Perhaps the biggest difference between the two companies was in their compensation policies: the average Costco employee earned $17 per hour, and the average Sam's Club employee earned $10 per hour. Costco is also more generous with benefits: company contributions

to health and retirement benefits are significantly higher at Costco than at Sam's Club. So, does Costco get what it pays for? Wayne Cascio's research suggests that it does. Employee turnover at Costco is 17 percent, compared to 44 percent at Sam's Club. After the first year of employment at Costco, turnover there is only 6 percent. Cascio estimated that Sam's Club spent close to $400 million more than Costco on replacing employees. Another cost associated with happy (or unhappy) employees is inventory shrinkage, usually due to theft: Costco's inventory shrinkage is the lowest in the industry, at 0.20 percent of sales compared to the industry average of 1.70 percent. All told, Cascio found that Costco earned almost twice as much operating-profit-per-employee as Sam's Club did: $22,000 compared to $12,000. In this case, it certainly seems as if Costco is getting what it pays for.

Because Sam's Club is not an independent, publicly traded company, we cannot compare its stock price to Costco's stock price. And using Walmart's stock price as a proxy for Sam's Club may or may not be appropriate since there is so much more to Walmart than just Sam's Club. But it's the best we can do. In his analysis of the firms from 2001 to 2005, Cascio shows that Costco's stock price increased 55 percent during that period while Walmart's stock price fell by 10 percent; that seems pretty telling. In my own analysis, the picture is a little more mixed.[7] During the 25 years from 1989 through 2013, Costco's stock price outperformed Walmart's in 16 of the 25 years, including 12 of the past 14 years. But when Walmart's stock price outperformed Costco's stock price, it did so by a lot. In the 16 years that Costco outperformed Walmart, it did so by a cumulative 280 percent; in the 9 years that Walmart outperformed Costco, it did so by a cumulative 350 percent. As a result, the cumulative compound return over that 25-year period is much higher for Walmart than it is for Costco, with Walmart's stock price increasing 16-fold and Costco's stock price increasing 11-fold. Does this mean that Walmart's strategy creates more value than Costco's, or does it suggest that the value in Costco's long-term approach is now being appreciated by investors? I don't think it necessarily has to mean either.

I think it means that there are different approaches to creating value over the long term. When value is created, it is created for all stakeholders, not just the stockholders. Costco's customers typically have higher incomes than Sam's Club's customers do and Costco sells more higher-priced, high-end items. Costco's customers

have different preferences than Sam's Club's customers. Costco's and Whole Foods' stakeholders may value the higher wages that employees receive. But maybe Sam's Club's stakeholders—including its employees—might not value paying higher wages. If higher wages would not lead to greater productivity, lower turnover, lower inventory shrinkage, or higher sales and other benefits, then it doesn't make sense for Sam's Club to offer those higher wages. And that's: each company must understand what its stakeholders value and must use that information to devise a strategy that will lead to long-term value creation for the firm.

This stakeholder discussion highlights two issues: (1) individual economic agents have a wide variety of preferences that motivate them to add value to their firm, and (2) the goal for firms is to maximize the value created from all those economic agents, recognizing that different firms have different methods for doing so. The key to managing this relationship—to managing any principal-agent relationship—is to align the incentives of all vested parties. This is true for all parties in the firm's value chain and in the nexus of relationships among stakeholders. Managing the relationships between stakeholders and understanding how firm value is maximized within this nexus of disparate parties is one of the biggest challenges businesses face, but it is also one of the biggest keys to creating value.

Aligning incentives through corporate governance

In its efforts to engage and create value through stakeholders, every firm is continuously trying to determine how best to align the interests of all the various parties in the value chain. In practice, there are a number of mechanisms firms use to try to achieve this alignment of interests. The examples above show how compensation structures can be used to create value. There are other operating approaches that can be used to align the interests of different stakeholders, such as allowing employees to telecommute, agreeing to long-term contracts with suppliers, and paying dividends to stockholders.

Corporate governance is generally defined as the set of mechanisms within a firm that works to provide all suppliers of capital with a return on that capital.[8] In general, this means that corporate governance represents those structures and systems designed to align interests across the firm so that value can be maximized. For most firms, the key corporate governance mechanism responsible

for working to maximize value through all stakeholders is the board of directors. Boards are structured to explicitly manage the principal-agent issue. Boards act as the link between internal and external stakeholders and internal managers.

In theory, boards are hired by shareholders to represent the shareholders' interests in overseeing management's actions and decisions. Without oversight by the board, management might be tempted to act in its own rational self-interest, possibly at the expense of providing returns to any other stakeholders. Day-to-day decisions are the responsibility of management, but boards advise managers on many big picture strategic and cultural issues, such as executive compensation and recruitment, acquisitions and divestitures, legal and risk management, financial reporting, and various other issues. Boards help management make decisions that will maximize the value of the firm and help it pursue the firm's mission. In practice, however, there is one big problem: boards are made up of people who have their own needs and desires—needs and desires that may not always be aligned with those of the stakeholders the board is entrusted to serve.

The world of corporate governance in the United States changed significantly in 2001.[9] In 2000, Enron was the seventh largest company in the United States by revenues—but some of that revenue did not really exist. In 2001, Enron acknowledged that its earnings had been overstated by about $600 million and that its assets had been overstated by about $2 billion. Enron's managers had fooled its board, the audit committee of the board, its independent auditors, its employees, and its investors. Enron filed for bankruptcy in December 2001. Enron's market capitalization, or the cumulative value of its stock, had declined from about $70 billion in early 2001 to $0. If the board's fiduciary responsibility was to protect the shareholders' investment and ensure a return on their capital, why did the board allow such fraud? Ultimately, we can only guess why—but 29 board members and executives did sell more than $1 billion of stock before the firm imploded. They are individuals with their own needs and desires, after all. Perhaps the board members were taking care of their own desires instead of the stockholders at large. Other stakeholders lost billions of dollars of value that they had entrusted the board and management to protect.

Regulators immediately began working to make sure a similar collapse didn't happen again. The regulatory result was the Sarbanes-Oxley Act, which was passed in mid-2002. SOX, as it is known,

focused on increasing the independence between managers, boards, and external auditors. If financial statement fraud was the problem, then putting in measures to reduce the chances of such fraud occurring should protect all stakeholders. One result of SOX was the introduction of more standardized corporate governance structures at publicly traded firms. While not quite leading to one-size-fits-all governance structures, firms were less free to create governance structures dynamically customized for their own unique culture, mission, and set of stakeholders. Boards and corporate governance structures now had to maximize firm value while operating within a new set of rules and guidelines. The cost of SOX is less freedom and less flexibility for firms to determine how they create value for stakeholders; the benefit of SOX is possibly a lower likelihood of another Enron-esque corporate collapse. SOX could not, however, prevent the financial crisis of 2008. If the purpose of SOX and other corporate governance mechanisms is to ensure a return for all suppliers of capital, the financial crisis of 2008 was certainly a governance failure as: many stakeholders did not get a return on their investments.

The purpose of this history lesson is to highlight the complexity of corporate governance and principal-agent issues. Of course, corporate fraud and bankruptcy are extreme cases. Even in good, ethical companies the situation is complex. Aligning the interests of all stakeholders in an organization or corporation is not easy. There is no formula, there is no prescription. Every firm is a nuanced set of dynamic economic relationships, and each party is taking actions to maximize its own well-being and utility. What is best for one party may not be best for another party—and frequently all parties have to make some sacrifices and agree to many trade-offs.

Evolution of corporate governance

Corporate governance functions have evolved over time, sometimes by regulatory dictate, sometimes by choice. Corporate governance is a dynamic function that must change as competitive environments change and as stakeholders' preferences change. In order to better align their efforts with those of the firm's stakeholders, many boards have recently also begun taking a more active role in their firm's sustainability initiatives. Twenty-five years ago, few firms viewed human, social, and environmental investments as distinct

value drivers for organizations. In the late 1990s, many firms began publicizing their sustainability investments to help present themselves as an integrated set of stakeholders. Investors, customers, employees, and others want to know what a firm's environmental policies and practices are, for example. Today, some boards of directors have established sustainability committees that are subsets of the overall board (in addition to the standard audit, compensation, and nominating committees).[10] One purpose of sustainability committees is to show how a firm's human, social, and environmental investments are aligned with the long-term interests of the firm and how the firm's long-term strategy is aligned with the interests of all stakeholders.

A typical board of a large public company has about ten members.[11] Of these ten members, two or three typically work for the company (usually the CEO plus one or two others); the others are not directly affiliated with the company beyond their service on the board. These ten board members also serve on any of the board's committees. There are no formal requirements about what committees a board must have, but most firms have an audit or financial reporting committee, a compensation committee, and a nominating committee. Boards and their committees typically meet four to ten times a year. Most board members do get paid for their service—possibly a cash salary of $50,000–$100,000 per year, plus fees of $5,000–$20,000 for attending committee meetings and/or chairing a committee, plus stock or option awards and perks, such as health or life insurance benefits. The annual compensation for each director, in cash, stock, and benefits, may reach $100,000–$300,000 at large public companies. Our three sample companies fit within this range. Interface's directors received just over $100,000 each; Nike's directors received $200,000–$250,000 each, and Whole Foods' directors received $220,000–$280,000 each in the most recent fiscal year.[12]

The number of firms that have established sustainability committees has been increasing over the past two decades. Based on my research, however, less than 10 percent of firms had such committees in 2013. Nike was one of the first US companies to have a corporate responsibility committee, establishing its in 2001. It is now called the Corporate Responsibility and Sustainability Committee; it is responsible for reviewing "significant strategies, activities and policies regarding sustainability (including labor practices), community impact and charitable activities."[13] Its charge formally includes innovation as a focal point. Its 2001 charge was similar but

placed more emphasis on labor and environmental initiatives. Nike is certainly unique in having a stand-alone board-level committee devoted to sustainability issues, as well as being unique in having had one for so long. Interface does not have a stand-alone committee nor does Whole Foods which states in its *Green Mission Report* that the company builds "environmental stewardship into individual jobs, teams, stores and operating regions."[14]

Given that so few firms have board-level sustainability committees, there is no empirical research on the impact of such committees. But there has been research on the relationships between sustainability investments, sustainability disclosure, and firm performance. Marc Orlitzky, Frank Schmidt, and Sara Rynes have surveyed more than 50 studies and found a positive relationship between corporate social responsibility and financial performance in most of those 50 studies.[15] Other studies have looked specifically at how sustainability-related investments can reduce a firm's unique risk by better managing both internal and external factors that can ultimately affect a firm's profitability. Hoje Jo and Haejung Na[16] and Darren Lee and Robert Faff[17] have found such reduction to be the case. Walter Blacconiere and Dennis Patten[18] and others have found that increased disclosure related to environmental and other sustainability-related issues does reduce the riskiness of the firm; as a result, firms are penalized less by investors when there are negative shocks affecting sustainability-related activities. Of course, disclosure itself isn't enough, or else everyone would disclose everything. Investors and stakeholders are smarter than that. There also must be substance behind any disclosure and this substance needs to connect to profits and cash flows over the long term. Disclosure without substance may be seen as greenwashing, and firms may be penalized for behavior that is not consistent with their words. According to my research,[19] this is the case with respect to financial institutions: institutions are rewarded for CSR substance and are penalized for greenwashing. The point is that regardless of whether or not boards create stand-alone sustainability committees, many firms have begun to appreciate the role that human, social, and environmental investments play in their quests for value maximization.

Best practices in corporate governance

As we know, corporate governance is generally defined as the set of mechanisms firms implement to ensure suppliers of capital get

a return on that capital. These suppliers can be any stakeholders—employees, investors, customers, and others. The return on capital can be just about anything, too—it can be a financial return or it can be impact, happiness or some other abstract ideal. Corporate governance is a nuanced construct that is very difficult to measure objectively. In practice, corporate governance is about culture, trust, and relationships; it is about people, their incentives, and their behavior. For example, by just about every measure that we use to study corporate governance, Enron's board was better than average; the problem is that we could not measure Enron's people, their incentives, and their behavior. Despite these issues, we can still try to identify some best practices for governance.

- Compensation for executives and directors should be in the form of stock and stock options as much as possible.[20] For executives, who also rely on the firm for their wages, the proportion of total compensation that is stock-based might be lower than for directors; there is no reason to pay directors cash for serving on committees or attending meetings. All compensation they earn for these activities should be stock-based. Tim Cook, the CEO of Apple, is on the board of Nike; he received $95,000 in cash and $20,000 in benefits for serving on Nike's board in 2013. He also received $116,000 in stock options, but perhaps his interests would have been better aligned with those of long-term investors if all his compensation had been stock-based compensation.[21] He probably didn't need the cash, after all. (Nike's directors are required to hold stock worth five times their annual cash salary, which is certainly a big step toward interest alignment.) And, for all executives and directors, most stock-based compensation should be long-term, performance-based, and restricted. Restricted means that these individuals cannot sell their stock until certain requirements are met; these requirements can be based on time, such as having to wait five years before stock-based compensation can be sold or they can be based on performance, such as the company achieving specific operational or financial milestones.

  By most standards, Exxon-Mobil pays its executives very well. In 2013, the top five executives received $76 million in total compensation; approximately $18 million of this was in cash and $56 million was stock-based (plus a couple of million in benefits).[22] Most of the stock-based compensation is restricted. The executives are not allowed to sell half of their stock-based compensation for five years, and they are not allowed to sell the other half for ten years or until retirement, whichever comes later. This could be a very long time. As

an employee, supplier, customer, or investor in Exxon-Mobil, I like these restrictions because they encourage long-term strategic actions. The executives should be more thoughtful about the investments they make and their long-term impacts since they benefit financially only if the stock price and value of the firm is high many years into the future.

- Boards should be focused—in terms of meeting attendance and not having too many other competing priorities. This naturally presents a challenge: finding experienced and insightful directors who are not too busy to focus on one firm's activities. Research has found that firms perform best when their directors regularly attend board and committee meetings and when they do not have too many other director positions.[23] Directors can add real value to any firm's operational and strategic decision making, but they have to make an effort to provide such firm-specific guidance. The best directors are professional skeptics. Those with diverse opinions, novel thoughts, and relevant ideas provide the greatest skepticism and value. Those with too many other obligations, who are not able to engage with the firm and commit to the duties of being a director, are less likely to add such value. Directors are hired to provide fresh ideas and new ways of thinking. But they have to make an effort to do so—all the more reason to provide them with appropriate compensation.
- A related issue is board independence—that is, board members who are not employees of the firm or have never had any fiduciary relationship with the firm. The research is mixed on the benefits of board independence.[24] Publicly traded firms in the United States are required to have at least 50 percent of their directors be independent, and both audit and compensation committees are required to be 100 percent independent. As a result, the research is constrained by comparing boards that are, say, 60 percent independent with boards that are 90 percent independent (few firms are 100 percent independent because the CEO serves on the board of more than 95 percent of public firms). Before 2002, board independence showed little association with firm performance or firm value. The theory behind this is that directors who were also employees provided valuable operational insight that combined well with independent directors' objective perspectives. After 2002 and SOX, research has shown a positive relationship between board independence and firm performance and firm value. The theory behind this is that independent directors mitigate the risk of a firm making substantial operational or regulatory mistakes. However, more independent boards have always been better at helping firms with big picture strategic issues. For example, firms with more independent directors are more likely to replace a

struggling CEO following poor firm performance and are less likely to make value-destroying acquisitions. The moral is that boards with more directors who are independent are more likely to be effective and to help a firm maximize its value (but be sure to pay those directors in long-term, restricted stock so their interests are aligned with those of other stakeholders). However, measuring independence is not that easy: Enron's board was technically independent, but that did little to prevent its fraud (possibly because the directors were independent on paper but not in practice).

The problem with this research is that we are trying to apply objective rules to a very nuanced and abstract construct that will be different for each firm. The above ideas are not prescriptions for success. Governance is about people and relationships, and the dynamics between stakeholders will be different at every firm. In practice, is there really any difference between what we are calling corporate governance and a firmwide culture among stakeholders? I would say not. Enron had a culture of taking risks and making its own rules; this culture began at the top and permeated the board and the entire organization. Employees were rewarded for taking risks; many were fired for being safe. Risk mitigation was not a corporate value; the employees did not practice it, and the board did not enforce it. The culture dominated and eventually led to the company's downfall. The moral to this story, if there is one, is to know your stakeholders and to understand their values and incentives.

Stakeholders and sustainability at Nike

"While it takes time to align multiple stakeholders on objectives and strategy, we believe the ultimate benefits of moving forward together will outweigh the initial efforts involved."[25] That quote is from Nike's *2013 Sustainable Business Performance Summary* and it captures what this chapter is all about. It also underscores what it means to make sustainable financial investments: creating value over the long term through the combined efforts of all stakeholders.

Nike's *Summary* identifies 15 individual experts from outside the company who advise on reporting standards and operational issues. Of these 15 individuals, at least 10 are affiliated with organizations devoted to environmental issues. Directly or indirectly, the environment is a key stakeholder for Nike. The environment provides two of Nike's key product inputs: water and cotton. Investing

in processes and technologies today that will reduce the cost of water and cotton in the future can create value today. Nike cares about the environment because events related to climate change, such as floods and droughts, can lead to disruptions in the supply chain (decreasing revenues and increasing expenses), can compromise an athlete's experience (decreasing revenues), and can negatively impact working conditions and workers' safety (increasing expenses).

Cynics might suggest that Nike cares about the environment only because appearing to do so is good public relations and is good for Nike's image. This may be true; it is ultimately impossible for us on the outside to really know how embedded Nike's sustainability investments are into the firm's operations and strategies. But even if these investments are partially about image enhancement, they can still create real value. After all, when customers, employees, and other stakeholders have a more positive perception of the firm, this may lead to greater profits and value. However, if these investments are only about image without any substance involved, then such profits and value could be very short-lived. The profits Nike loses over the long term due to supply chain disruptions, compromised experiences for the athletes, and more dangerous working conditions are likely to dwarf any value gains Nike receives from short-term image enhancement.

In its efforts to engage its different stakeholder groups in its innovation and sustainability strategies, Nike actively works to form partnerships with its stakeholders. Some of these partnerships are product-driven and focused on improving the cost-benefit ratio related to innovation (such as creating the Nike+ business accelerator and investing in a start-up that developed a waterless dyeing technology). Some partnerships are more strategic, such as with the Sustainable Apparel Coalition and the International Labor Organization. And some are marketing-based programs to engage members of the community, such as The Girl Effect, an international effort to increase young girls' involvement in educational, athletic, community, and economic activities. Yes, these partnerships are self-serving for Nike. They are also self-serving for the other partners involved. But they benefit Nike only if they also benefit other stakeholders. Working together in these ways is designed to combine Nike's strengths and resources with those of the partners to unleash ideas, opportunities, and value that would not otherwise be created.

Shared value: A new approach to thinking about the role of firms

Few thinkers have influenced modern management theory as much as Michael Porter. Every MBA student learns to love (or hate) Porter's five forces that create value and long-term success for firms. These five forces are a product having few close substitutes, strong entry barriers, weak rivalry within the firm's product market, low market power of input suppliers, and low market power of consumers.[26] Recently, Porter introduced the idea of shared value.[27] Shared value goes beyond the firm-specific five forces to suggest that firms can create value over the long term by devising strategies, products, and services that consider the needs and challenges of society and, crucially, by working with society to address those needs and challenges. For-profit firms are still the most efficient mechanisms for addressing market failures; however, they do not always have the infrastructure and incentives in place to tackle the broader needs of society. But by addressing these market failures, firms can benefit significantly. By working with the community—whether government entities, nongovernmental organizations, or other for-profit firms—individual firms can share the responsibility of responding to needs and challenges and come up with the most effective and efficient solutions. The result is the creation of more combined value to society than would have been created without the partnerships. Ultimately, it's a self-serving approach to increasing one's slice of the pie by increasing the whole size of the pie.

Times have changed; the role of firms in markets and societies has evolved. Markets are more competitive than they were when Porter introduced his five forces in 1979. In recent decades, this competition has led to an increased focus on short-term profits at the expense of long-term value-creation. But some firms are beginning to realize that a short-term focus can be very detrimental. Other participants in the market economy have changed, too. Customers' and employees' preferences have changed; today's millennial generation has very different needs and desires than did their grandparents' generation after the World War II. Firms cannot operate in isolation. Firms must consider a broader spectrum of influences on their business. And, for the most part, regulators better understand how market pressures interact. This should encourage governments and nongovernmental organizations (NGOs) to partner with corporations to address society's needs and to add value to each contributor in the process.

In Porter's shared value approach, firms can capture the most value by considering as broadly as possible all the factors that impact their business. In this approach, working with the community and other entities is the most efficient approach to creating value—for individual firms and for society as a whole. The concept of shared value is entirely consistent with Porter's five forces. Shared value is based on knowing what creates value and on a better understanding of each firm's long-term value chain and what partnerships and stakeholders contribute to that value chain. In this sense, creating shared value is about making sustainable financial investments.

Here's an example of how this new way of thinking can add value, and since this is ostensibly a finance book, it is a math problem. Sorry. You are trying to decide which health insurance plan to purchase for your small business. You have narrowed the decision down to two options:

Option #1: This is the bare-bones plan. It costs $100 a month per employee and covers the basics, but nothing else. There is minimal support, training, or education for working with employees on preventive issues. And because of this, each employee can expect to spend $1,000 a year (out of their own pocket) on health care costs for emergency room visits, counseling, physical therapy, and so forth.

Option #2: This plan includes everything the basic plan offers plus a counselor who works with employees to educate them on preventing medical issues. The plan provides small incentives to employees for taking steps to improve their health, such as quitting smoking or losing weight. This plan costs the firm $200 a month per employee; because the focus is on preventive medicine, employees would not be expected to have any out-of-pocket expenses.

Which plan would you choose? These are hypothetical numbers, and there's a lot of information missing, but it may not be an easy choice for many employers. In theory, option #1 might look better on the firm's income statement because the firm's expenses seem lower. Employees will probably prefer option #2 because of not having out-of-pocket expenses and having incentives for preventive care. But does option #1 really look better on the firm's income statement? True, health insurance expenses will be lower in the short term. But will there be other costs, such as employees missing work due to sickness, employee turnover, or lost sales during regular smoke breaks? Will healthier employees be more productive? Will employees be happier and thus more engaged and productive

knowing that their employer cares about them, their health, and their well-being? Will this happiness lead to higher revenues and lower expenses on the income statement?

From a value-creation perspective, the question is whether the additional benefits of option #2 are greater than the direct costs of option #2. The employees may not be the only stakeholders that prefer option #2; customers might be willing to pay more to a company known to take care of its employees; governments might offer subsidies or other incentives to the firm for supporting better health, and investors may even be willing to accept a lower return on their investment if they view this as a reduction of the firm's operating risk. In the spirit of shared value, the firm may partner with local weight-loss clinics and health clubs to support employees taking control of their health. Perhaps the firm partners with local organizations, such as hospitals, to increase awareness and knowledge of healthy habits. Even something as seemingly firm-specific as a health care plan can become a case of shared value by companies working with other community partners in ways that can add value to each party.

Including all direct and indirect impacts in the decision-making process is both the key and the challenge with shared value. For decades, firms have been performing very simple and direct financial analyses of investments. Firms identify the direct cash flows, both costs and benefits, and value investments based solely on those costs and benefits. That's generally what we teach in business schools. And that's very easy. However, the indirect benefits of many shared value initiatives can be difficult to identify; how can firms estimate the increased revenues from customers due to selecting option #2 as in the example above? How do firms benefit from engaging other community partners in their health care programs? For financial managers, shared value is an enlightened way of thinking about valuation and identifying all of the sources of value creation. While this has always been true for all investments, we haven't always considered how the different stakeholders contribute value to an individual firm's investments.

Shared value is about a rising tide lifting all boats (or increasing the size of the pie or whatever your favorite metaphor is). Shared value is not about philanthropy or public relations. It is about looking for opportunities to work together to create greater social value than would be created if firms and communities only focused on their own short-term interests. In other words, focusing on shared

value is taking a long-term view of individual firms' and communities' sources of value. If a rising tide lifts all boats, then each individual boat should be better off. The health care example above was just a hypothetical one to emphasize the financial effects; below are three examples of major corporations investing in their communities and stakeholders in the spirit of shared value—and also in the spirit of rational self-interest and value maximization.

- In mid-2014, Starbucks announced that it would provide full tuition reimbursement to its employees who wanted to finish college.[28] There were a couple of caveats: employees receive the reimbursement only if they complete online courses at Arizona State University and only juniors and seniors receive full tuition reimbursement (freshmen and sophomores receive partial reimbursement). Employees are not, however, required to stay with Starbucks beyond graduation. Starbucks obviously values investing in its employees and expects to see significant benefits internally. But this also provides benefits beyond the Starbucks corporation. ASU benefits through tuition revenue and possibly through an enhanced public image that will draw in other students and donations. Communities benefit by having a more educated and ambitious population. And since the employee-beneficiaries are not required to stay with Starbucks beyond graduation, their enhanced knowledge and skills can benefit other organizations in future years. This represents a shared value collaboration between Starbucks, ASU, the employee-students, society, and any other organizations that may emulate this partnership in the future. The value that accrues to each partner may become greater than it would have otherwise been without the collaboration.
- In late 2013, Whole Foods acquired My Street Grocery, a mobile grocer in Portland, Oregon.[29] My Street Grocery stocks a truck (technically, it's a trolley) with healthy and affordable groceries and then sets up mobile markets for several hours at a time in areas around Portland where people have only limited access to healthy and affordable food—"food deserts." My Street Grocery has established partnerships with hospitals and clinics that give their patients vouchers or coupons to use at My Street Grocery. Shared value is created because Whole Foods increases its sales by adding the mobile markets, the hospitals and other partners lower their costs by exchanging coupons for healthier clients over the long term, and the citizens and customers improve their health and overall quality of life. Society as a whole is better off because taxes related to health care services can be lower. People are healthier and happier. Food access and poor

health were the challenges; the efforts of a for-profit firm, the citizens, and community partners increased overall social welfare by coordinating efforts and resources.

- In 2013, Nike utilized almost 800 contract factories that employed more than 1,000,000 people.[30] Internally, Nike has established auditing standards and gold, silver, bronze, and red ratings of factories based on their employee relations; gold and silver factories get more business, red factories get less business. Nike has partnered with local NGOs in Asia and has invested in management and safety training, in implementation of lean processes and in education and community outreach programs. Nike benefits due to having better risk management and a better public image. The local communities benefit, too, by having a more professional work environment, a more connected community, and more capital that can be reinvested in the communities. Other communities benefit, too, as the nonprofits transfer this knowledge and these processes to other locations and organizations. Sharing ideas, resources, and efforts led to shared value, more value than any individual party would have been able to create on its own.

Externalities are an important theme throughout this book. For the most part, we consider negative externalities that impose costs on society. Shared value is an example of investments that create positive social externalities. All participating entities share in the costs and the benefits, but many parties outside the original relationship also get to share in the benefits. The Starbucks-ASU tuition agreement will increase the overall knowledge base of many communities, regardless of whether the graduates continue to work at Starbucks. The improved working conditions and improved reliability at Nike's contract factories will lead to greater investment in the surrounding communities, which will increase their overall competitiveness and quality of life. And as Whole Foods invests in food access in urban areas, there will be positive effects on the communities, on health care, and even on the competitors' missions. Like pebbles creating waves, small investments can have major impacts far greater than their initial spheres of influence.

Stakeholders as drivers of value

With any investment, project, or idea, one of the most important questions to ask about it is "Who cares?" "Who cares about this project" is essentially the same as "Who values this project?" These

questions help us understand what the economics of the project are. A great idea nobody cares about is not really a great idea, but a great idea many people—customers, suppliers, investors—think can change their lives or businesses can become a great investment. Value comes from stakeholders believing that an idea or project, a good or service, can result in higher future profits, cash flows, or utility for them. Employees contribute time, energy, and intellectual capital to the mission of the firm because they believe that doing so will make their own lives better—possibly in terms of financial rewards, possibly in terms of relationships, fulfillment, or some other abstract ideal. Customers contribute cash to the firm in exchange for goods or services because they want to enjoy those goods or services. Investors contribute financial capital because they see the entire value proposition of the firm and its goods and services and believe that other stakeholders will contribute their resources in ways that create value for all stakeholders—resulting in a greater financial return for investors. Value creation is a function of maximizing profits and cash flows; profits are determined by the underlying economics, and economics are driven by preferences and utility. In the next chapter we will explore these economics and look at how stakeholders' preferences lead to the creation of sustainable value.

3
The Sustainability of Economics

The sustainability of economics is about enduring, surviving and thriving in the long term. Firms that best understand their competitive environment, the resources available to them, and the ways to extract value from those resources are the firms that survive and thrive. Because of the competition for capital and resources, growth will rarely be easy; others are fighting for the same success. The key to achieving success and economic sustainability over the long term is to understand the factors that drive growth and create competitive advantage.

Think about what you did yesterday. Think about what you're going to do tomorrow. In economic terms, your actions are choices. Even if you went to work, that was a choice. You choose to go to work because you want the money, or you don't want to get fired, or you actually enjoy going to work. And if you go shopping—whether at the grocery store or an art gallery—that is a choice, too. Even within those choices, there are choices: you could spend $0.99 per pound of bananas at the discount grocery chain, or you could spend $3.00 per pound of organic, fair-trade bananas at the farmers' market (well, whether or not you could depends on where you live, but you get the idea). Maybe bananas aren't your thing; maybe you chose to stock up on candy bars, instead. When you make these choices, you reveal some very valuable economic information: you are telling the world that you prefer one item or activity over the other. You are revealing your preferences. Why do you make your choices? In economic terms, the answer is simple: because the benefits are greater than the costs. Whether we know it or not, whether we think about it consciously or not, every decision we ever make is an economic comparison of costs and benefits.

Just about every dollar every company has ever received in revenue has come from its customers. Those customers chose to exchange their money for certain goods and services; those choices have economic impacts on the customers, the companies, and society as a whole. The customers are better off because those goods and services make their lives more valuable. The firms are better off because they received payment for the goods and services and for the labor and all other resources that went into providing those goods and services. And society is better off—if only a very tiny bit—because this transaction increased social welfare or the happiness, productivity, and value of society as a whole. Social welfare increases because both the buyer and the seller are better off.

Economic agents are assumed to make decisions that increase—or maximize—their utility. Utility is an abstract and immeasurable economic construct meant to convey fulfillment, satisfaction, or happiness. The finance analog to utility is value: financial decisions are made because they are presumed to increase value. The problem with utility is that it can't really be measured. It certainly isn't universal, and it can't be compared from one individual to the next. Each individual has a unique utility function—that is, we each live with ideals and preferences that are unique to us. They aren't right or wrong, but they make us who we are. Utility is relative; it's not absolute. Some people prefer the $3.00 pound of organic, fair-trade bananas, some people prefer the $0.99 pound of genetically modified bananas, and some people prefer candy. Some people may prefer the $3.00 pound of bananas but buy the $0.99 pound because that's all they can afford. To the economist, the reason that's all they can afford is because of how they've decided to allocate their budget across their other preferences and choices. This is the crux of economic decision making: figuring out how to allocate limited resources along a spectrum of choices to provide the greatest utility, happiness, or value.

This is true whether it is an individual making the decisions or it is a corporation, a nonprofit, or a sole proprietorship. The choices, budgets, and resources are different, but the decision-making process is the same. For individuals, the decision is whether to spend $3.00 on a pound of fair-trade, organic bananas or $0.99 per pound on genetically modified bananas. For businesses, the decision is whether to spend their limited budgets on a marketing campaign, on research and development, on low-flow toilets, or on something else. For corporations, just as for individuals, everything is a

choice. Think of the three investment examples above: a marketing campaign, a research and development program, and low-flow toilets. If a firm can only afford to choose one, the choice may not be obvious. Different firms have different needs, and different firms will have different value-maximizing functions. Those functions will change over time; maybe choosing the marketing campaign is the right choice today, and the low-flow toilets may be the right choice in six months. Just as my personal utility function is unique, each firm's value-maximizing function is unique and dynamic, too.

For the firms, value is created by making investment decisions where the benefits are greater than the costs. In theory, it is a pretty simple concept; in practice, such decisions can be very difficult and complex. This process is difficult because most of the benefits occur in the future and are therefore uncertain; this process is complex because the many stakeholders involved in every decision all have vested, and competing, interests in each investment and in each value-maximizing decision. For corporations, each investment decision involves customers, employees, suppliers, investors, and others simultaneously performing their own cost-benefit analyses based on their own value-maximizing preferences. Financial value is determined by this complex network of stakeholders—yet we do not know what anyone's value-maximizing preferences are until these are revealed.

As we know, firms should constantly be asking "Who cares?" when they make investments. To ask "Who cares?" is to ask where value creation comes from. If nobody cares about an investment, that means the investment does not increase the utility of those involved. Customers may become more connected to a company's products due to the marketing campaign, making them more likely to purchase the company's products. Customers may value a research and development program that creates new and innovative products that benefit the customers in better ways. And low-flow toilets may lower the company's energy expense and may better align the company's values with those of its workforce. All stakeholders have their own individual utility functions, and the economic decisions firms make should incorporate these preferences into each investment. That's not easy.

This chapter is about the economic logic and theory that goes into decision making at both the individual level and the firm level. In chapter 4 this logic will be applied specifically to sustainability-

related investments. Chapter 5 puts this economic perspective into the context of financial valuation. That's where we will try to actually value sustainable financial investments. But first we have to understand the theoretical foundation. The sustainability of economics is about making business decisions that lead to survival and value creation over the long term. Once we understand how to make economic decisions that lead to long-term economic sustainability, we can then apply that foundation to any business and any investment. Ultimately, all that matters is whether or not those investments create value or utility.

Utility and preferences

Markets are very competitive for all economic resources: customers, products, inputs, employees, and many others. Each stakeholder gets to decide whether or not their own utility can be increased by their interaction with a particular firm. That is, we buy products because those products improve our lives. We go to work because the benefits we receive there—wages, community, respect—are worth more to us than our time or the opportunity cost of going to work. We choose to make financial investments because we believe the expected return on those investments will be greater than the return we could receive on other investments.

Competitive markets are also democratic. Every economic decision is a vote. Buying a product is a vote for that product and a vote against other products. Hiring an employee is a vote for that employee and against others. Showing up for work is a vote; leaving work early is a vote, too. Making an investment is a vote for that investment and against others. These votes reveal preferences. These voting processes are what create markets: firms or products that receive the most votes will enjoy the most long-term success. Those that do not win in the voting process may be forced to restructure or to find something else to do.

For firms, possibly the most important voter in this economic democracy is the customer. Consumers make decisions that increase their own utility, well-being, or happiness. Utility is determined by each individual's preferences. But every consumer is different. Every consumer has different wants, needs, desires, preferences, and resources. We all generally know what our preferences are but not our specific utility functions. Our actions reveal many different preferences. For firms, these individual behaviors present

opportunities—opportunities to provide a good or service we will want and exchange resources for.

There are many factors that determine what individual consumers will demand and what they will pay for any good or service. These factors begin with their own individual unique preferences, but also include other comparable goods. To some people the organic bananas and the genetically modified bananas are substitutes for each other; for others they are entirely different goods. For the consumer, maximizing utility is a continuous process of making trade-offs. Think of what you do with each paycheck you receive. You probably immediately spend or earmark a portion for rent or a mortgage, for food and for utilities. Those are all economic choices. You might like to live in a nicer home or eat at nicer restaurants, but your paycheck limits how much you can spend. As such, it does limit your utility. After paying for necessities like housing and food, maybe you have some of your paycheck left over; with this portion of your budget, you have many decisions to make about how to maximize your utility. Do you save a portion of it for a vacation or for retirement (or for that nicer house you can't yet afford)? Do you spend it all on clothes, electronics, or family and friends? These are all economic decisions that you make—usually subconsciously—about how to maximize your utility. You probably can't do or buy everything you might like to do or buy, so you have to make trade-offs. You have to decide which decisions make you better off.

The economist, as you might expect, has a term and a formula for you making decisions about these trade-offs. It's called the marginal rate of substitution, and it attempts to represent how much of one good you would exchange for another good while not increasing or decreasing your utility. The formula is a simple one, with several equivalent metrics:

$$\textit{Marginal Rate of Substitution} = MRS = -\frac{\Delta \textit{ in Quantity of Good } Y}{\Delta \textit{ in Quantity of Good } X} = -\frac{\textit{Price of } X}{\textit{Price of } Y}$$

The marginal rate of substitution calculates the trade-off we have to make in choosing between two goods. As the formula shows, the trade-off can be represented by the amount of one good we would trade for a certain amount of another good, or it can be represented by the ratio of prices between the two goods. To the economist,

these are the same thing; they have to be the same. It is also important to note that the marginal rate of substitution is not always a constant ratio when comparing two choices; it is a function of the absolute amounts of each you are considering. You might be able to achieve the same utility with two pizzas and five cheeseburgers as with one pizza and nine cheeseburgers. The ratios are different at different levels because each contributes to your utility in different ways.

What is this saying with respect to our banana-buying example? The cheap, genetically modified bananas cost $0.99 per pound; the organic, fair-trade bananas cost $3.00 per pound. These prices are determined by the market, by the democratic voting process. In deciding which bananas to buy, we are performing a complex calculation of trade-offs between our preferences, values, and budget. Now imagine that a hurricane hits and the supply of organic, fair-trade bananas plummets. The price becomes $5.00 per pound instead of $3.00 because some customers are willing to pay that much, and all suppliers want to receive the maximum price possible. But the limited supply means some customers won't be able to buy the organic, fair-trade bananas. Do they buy three pounds of cheap, genetically modified bananas, or do they not buy any bananas? It depends on their preferences. Maybe some people will never buy any genetically modified goods at any price. Maybe some buy 1 pound of cheap, genetically modified bananas and use their remaining budget on other goods. Whatever we do, we do it because it's a utility-maximizing decision.

Because utility stays constant when we make the trade-off decisions between good X and good Y, or different types of bananas, we can represent the marginal rate of substitution by measuring the utility that each choice provides. The market has determined that the prices of the two different types of bananas are $0.99 per pound and $3.00 per pound because these prices represent how much the market values each product; we value each product because of the utility it provides. Specifically, we care about the marginal or incremental utility each choice provides. When market behavior sets prices, it is telling us about consumers' preferences and how much utility each option provides. As a result, we can look at the marginal rate of substitution from a utility perspective:

$$MRS = -\frac{Price\ of\ X}{Price\ of\ Y} = \frac{Marginal\ Utility\ of\ Good\ X}{Marginal\ Utility\ of\ Good\ Y}$$

This is helpful because we cannot directly observe any consumer's actual utility function. But by inferring their utility from their revealed preferences and the prices they are willing to pay for different goods, we have a much better understanding of what they value.

Now let's assume that I'm trying to determine my utility-maximizing bundle of pizza and cheeseburgers. For most people, one pizza would provide less utility than two pizzas (even if you don't like pizza, you could always sell that second pizza for cash or something else you do like). But we cannot necessarily say this when comparing pizza to cheeseburgers because each good has different characteristics. Let's say that the utility I am currently achieving by consuming 2 pizzas and 5 cheeseburgers is 100 (whatever that 100 means). The marginal or incremental utility I lose by giving up one of my pizzas is pretty high, while the incremental utility I gain by getting one more cheeseburger is pretty small. Because neither pizzas nor cheeseburgers are free, I probably can't afford unlimited amounts of pizza and cheeseburgers. In order to maximize my utility, I want to optimize the utility per dollar spent that I receive from each purchase or economic decision. The resulting prices and quantities consumed must represent our utility—or value-maximizing bundle. Nobody ever chooses a bundle of goods that is not utility-maximizing (or, at least we assume they don't). Economists have a formula to represent this, too:

$$\textit{Utility Maximized When}:$$
$$\frac{\textit{Marginal Utility of Good X}}{\textit{Price of Good X}} = \frac{\textit{Marginal Utility of Good Y}}{\textit{Price of Good Y}}$$

Whether we know it or not, this is the trade-off we make whenever we make any economic decision. Presumably, everything we do is done in an effort to maximize utility. We are rational people, so we somehow consider the benefits and the costs of everything we do. The marginal utilities represent the benefits, and the prices of the goods represent the costs. The point is that every decision we make is designed to maximize our utility, given our individual preferences, our budget constraints, and the prices of everything. The above ratio essentially tells us the benefit per unit of cost. We can't always quantify or explain the individual economic choices we make, other than to say that our choices are designed to maximize

utility. These choices are our way of revealing our preferences and of revealing our individual utility functions.

For firms, the challenge is figuring out what quantity consumers are willing to purchase at each price. For better or worse, as firms attempt to make investments that tap into our individual utility functions, these revealed preferences may be all they have to work with. For most goods and services, consumers will buy less of a good as the price increases; you'll buy more organic bananas at $3.00 a pound than you will buy at $4.00 a pound. This is true for most goods and services (with the possible exception of some unique luxury goods). Economists call this the law of demand: as the price of a good increases, the quantity demanded decreases.

Demand and supply

The purchases people make are dictated by their individual preferences and by what gives them utility. Because an individual's utility is such a nebulous concept and is impossible to measure, we try to identify more specific reasons why people make purchases. Economists like to find objective and measurable factors that influence these choices. The law of demand asserts that consumers will buy less of something as its price increases. But price is not the only factor in consumption choices. We generally identify six other factors that influence consumer demand:

1. *Income*: For most goods, we believe that demand will increase as income increases; maybe you buy more bananas when you make $100,000 than you do when you're making $30,000. We call these normal goods. But for some goods, people buy less as their income increases and more as their income decreases. We call these inferior goods. An example of an inferior good might be the $0.99 genetically modified bananas; you might buy fewer of these bananas as your income increases from $30,000 to $100,000. Despite this, demand generally increases when income increases.
2. *Substitutes*: The availability and price of substitutes will frequently influence choices: the availability of the $0.99 pound of genetically modified bananas probably decreases the demand for the $3.00 pound of organically grown bananas (and vice versa). Demand generally increases when the price of substitutes increases.
3. *Complements*: If the price of cereal or peanut butter or whatever you enjoy with your bananas is lower, you are more likely to buy bananas in general (whether you buy the genetically modified or

organic bananas is probably a separate decision). Demand generally decreases when the price of complements increases.

4. *Expected future prices*: Because everything is relative in economics, expected future prices can also be a critical factor in consumption choices and demand. Expected future prices may not matter much for bananas or other perishable goods, but they may be very important for nonperishable goods like housing, clothing, household appliances, or technology. If you expect the price of a refrigerator to increase by 25 percent over the next year, you're more likely to purchase one today. General economy-wide inflation expectations can drive this, or item-specific factors may also drive expectations of future price increases or decreases (maybe a labor or parts shortage specific to refrigerators is expected to drive their prices up). Demand generally increases when we expect future prices to be higher. Let's keep this factor in mind when we begin talking specifically about sustainability-related investments later.
5. *Market size*: More bananas or refrigerators will be purchased if there are 1,000,000 consumers in the market than if there are only 1,000. This may not directly affect individual consumption choices, but it does have an effect on what firms do and how they market and produce goods—and will therefore impact the prices that individuals pay. Total market demand generally increases when the market size increases.
6. *Tastes and preferences*: To managers and marketers, tastes and preferences may be the most important factor as they try to identify the psychological and emotional factors that lead to purchasing decisions. They can explicitly design products and services to match tastes and preferences. As we know, their nebulous and subjective nature makes it difficult to measure tastes and preferences, but economists still try. Demand increases when a good or service matches consumers' tastes and preferences.

These six factors, along with the price of the good, drive most consumption choices. We call this the general demand function: demand is generally a function of these seven factors. You can probably think of other factors that drive some decisions—such as health or weather. The purpose of identifying these factors—and any others—is to try to forecast demand. Demand leads to consumption, which leads to purchasing, which leads to revenues for any company.

But maximizing revenues is not the same as maximizing profits. Profitability is a function of both revenues and costs, so we need to also consider producers' cost structure and their incentive to

produce. We need to look at what drives the supply of goods or what makes firms want to produce. Much as with demand, the price of the good is frequently the dominant factor. Whereas demand typically decreases as the price of the good or service increases, the desire to supply goods typically increases as the price of the good increases. More banana producers are going to want to enter the organic banana game if the market price is $4.00 per pound than if it's only $2.00 per pound. We also talk about six other factors, in addition to price, that we believe influence supply; together, these make up the general supply function:

1. *Prices of inputs*: The prices of inputs can affect suppliers' profitability and, thus, their desire to supply goods. If labor prices or other input prices increase, firms may wish to supply fewer goods. Supply decreases when the prices of inputs increase.
2. *Complements in production*: If the prices of items that are complements in production increase, firms will supply more of a good. Examples might be beef and leather or oil and natural gas. Because they are produced or sourced at the same time, if the market price of leather increases, more leather will be supplied, and more beef will be supplied as a by-product of the leather production. Supply increases when the prices of complements in production increase.
3. *Substitutes in production*: Conversely, if the prices of goods that are substitutes in production increase, firms will want to supply less of a good. Substitutes in production are mutually exclusive; only one can be produced with the available resources. Farmers may have to decide which crop to plant; if the price of corn increases, more corn will be planted and less wheat and soybeans will be supplied. Supply decreases when the prices of substitutes in production increase.
4. *Production technology*: If there are any technological advances in production—such as a new method of harvesting bananas—firms will want to produce more. This is closely related to input prices, as this will decrease the overall costs to produce and will make the firm more profitable. Supply increases when changes in production technology reduce production costs or improve production efficiency.
5. *Expected future price*: Much like with demand, expectations of prices in the future will impact firms' desire to produce—except the effect is just the opposite. If firms expect prices to rise in the future, they are more likely to want to wait and take advantage of those later, higher prices. Supply decreases today when prices are expected to increase in the future. Again, keep this in mind when we get to sustainability-related investments.

6. *Number of suppliers*: And, from a market-wide perspective, the greater the number of suppliers in the market, the greater total supply will be. More bananas will be produced if there are ten banana farms than if there are five banana farms. This may not directly impact an individual firm's decision on how much to produce, but it will influence prices—of both the good in question and of inputs and related goods—so it will influence individual supply and demand decisions through the market-wide price effects. Total supply increases when the number of suppliers increases.

We can probably think of other factors that could be considered in the supply function of most goods—like regulations or taxes—but these six factors, plus the price of the good, are generally believed to drive most production decisions. Why? Because these factors drive profitability. Prices of the good drive sales revenue, and input prices determine expenses; together, revenue and expenses will determine how profitable the firm will be.

Market equilibrium

Consumers create demand, and producers create supply. But demand and supply do not act alone. Demand and supply are interconnected. Together, they determine how much will be produced and consumed: together they determine market equilibrium. If consumers are only willing to pay $2.00 per pound of organic, fair-trade bananas, and if producers are only willing to accept $4.00 per pound of organic, fair-trade bananas, both consumers and producers will be disappointed. Transactions won't happen. Consumers need to raise their price, or producers need to lower their price. Maybe consumers need to change their preferences, or producers need to change their production processes.

In truth, because of their own, unique utility functions, each individual consumer may be willing to pay a different price for the bananas. Some may be willing to pay $5.00 for the bananas; some may not be willing to pay anything for the bananas. The same could be true of producers: some may be willing to accept a very low price for the bananas, and some may only accept a very high price. As a result, the demand and supply functions form a continuum, representing how many bananas each individual consumer will purchase at each price. While each continuum of supply and demand relationships is informative, it does not tell us about the market as a whole—only the equilibrium point where consumer and producer

prices intersect tells us about the market as a whole. In this sense, the market price represents the point at which the maximum amount of goods is exchanged in a way that satisfies both consumers and producers—this is the market-clearing price.

The market-clearing price is the price that achieves this equilibrium quantity exchanged between buyers and sellers—or consumers and producers. The market-clearing price is the price that all consumers pay and all producers receive. In the organic, fair-trade banana example, $3.00 is the market-clearing price. The consumers who are willing to pay only $2.00 per pound will be out of luck; they will not get any organic, fair-trade bananas. The consumers willing to pay $5.00 per pound are the big winners because they only have to pay $3.00; they essentially get $2.00 of free value. For producers, it's a similar story: those producers willing to sell their bananas for less than $3.00 are big winners and those who required more than $3.00 will not be able to sell any bananas. They will have to lower their price, which may lower their profitability, which may require making their operations more efficient in order to be more competitive so that they can accept a lower price.

The consumers who are willing to pay only $2.00 per pound of organic, fair-trade bananas are probably okay with the price being $3.00 per pound. Their utility functions determined that they were only willing to pay $2.00 for these bananas. With the price at $3.00, they will spend their budget on other goods that maximize their personal utility. Perhaps they will buy three pounds of the $0.99 genetically modified bananas. All else equal, they may prefer the organic bananas, but all else isn't equal. Value intersects utility in different ways for different people. The individuals who are only willing to pay $2.00 for the organic fair-trade bananas will have to maximize their utility without those bananas.

Market equilibrium, strategy, and valuation

The challenging part of all of this is that both demand and supply are dynamic and transitory. They are interactive and interdependent. It's very easy for an economist to study years of historical data on pricing, market size, and competition and use that analysis to try to predict what the future prices of bananas or refrigerators will be. But predicting the future is difficult. Firms are continuously trying to find products and technologies that are disruptive. They are trying to shock the market status quo, trying to find a product

that better matches preferences or a technology that dramatically improves production. This can be through a revolutionary product that changes demand—such as organic bananas or the iPhone—or through innovative production techniques that increase efficiency—such as lean manufacturing or wet milling of agricultural products. And because so much of this is driven by subjective factors—tastes, preferences, expectations, technological improvements—it is impossible to know exactly what the market will demand, produce, and value in the future.

This simple relationship also ignores competitive industry factors: if you find a way to be very profitable producing organic bananas or any other product, competitors are going to try to create their own disruption and take away your success. Apple's iPhone wasn't the first smartphone on the market, but it did significantly disrupt the market when it was introduced in 2007.[1] At the time, the dominant smartphone was the BlackBerry. In fiscal year 2008, BlackBerry earned approximately $1.3 billion in net income.[2] For the next few years, BlackBerry continued to be profitable, as the company kept up with innovation and rode the wave of increasing market size; by fiscal year 2011, net income had increased to $3.4 billion. But BlackBerry's inability to compete with Apple's iPhone, Samsung's Galaxy, and other products soon led to big trouble for BlackBerry. Net income for fiscal 2014 was a net loss of $5.9 billion, largely due to a 38 percent decline in revenue. BlackBerry's stock price peaked around $150 per share in mid-2008, within a year of the iPhone being introduced; by the end of 2008, the stock had lost more than 70 percent of its value, and by the end of 2011 the stock had lost more than 90 percent of its value. By late–2014, BlackBerry's stock was trading around $10 a share, representing a loss of more than 93 percent of firm value since its peak in 2008—and a nearly 85 percent loss of firm value since the iPhone was introduced in 2007. The value of the firm reached more than $75 billion in mid-2008 and closed 2014 at $5 billion.

How does a firm lose more than 90 percent of its value in just a few years? Firms are valued based on their expected cash flows or expected value creation. Investors—and other stakeholders—looked at BlackBerry's products, operations, and strategies, and they looked at the iPhone and Android competition; they looked at the markets for smartphones and other personal technology and determined that the future cash flows, risks, and value creation were not promising for BlackBerry. Those stakeholders had much different

expectations for BlackBerry's cash flows in mid-2008 than they did in late 2014. BlackBerry has experienced considerable product redesign, management turnover, and competitive challenges as it has tried to regain its financial performance and market position. That has yet to happen. Of course, the future is not over yet (hopefully, it never will be). BlackBerry is constantly working to figure out how it can improve its future—with new and disruptive products, markets, and strategies. It is trying to figure out what consumers want and how to provide it for them.

Firms spend considerable resources trying to predict demand. They employ economists to analyze historical data and study market trends to try to predict what factors will increase sales revenue. They employ marketers, psychologists, and other experts to try to get inside the minds of consumers to better understand how tastes and preferences impact consumption behavior. But predicting human behavior is extremely difficult. BlackBerry was very good at predicting human behavior and preferences during the early 2000s. It produced a product that was unique, innovative, and very much in demand. It had captive customers in governments and businesses—these customers needed constant access to information, and BlackBerry provided this. In the late 2000s, all this changed; Apple's iPhone and the Android devices began providing all the practical business functionality of a BlackBerry plus more creativity and user-friendliness. BlackBerry's economic modeling failed to predict the changing—or new—preferences of the smartphone market; BlackBerry's inability to predict what future demand would be led it to pursue products and strategies that were not valued by customers, employees, suppliers, investors, and other stakeholders. That's how a company loses more than 90 percent of its value in just a few years.

Demand creation

At this point, it's probably worth reminding you that the above section was written by a finance professor. If it had been written by a marketing or strategy professor it might have a very different tone. To the financial economist (me), individual preferences and utility are given, and firms try to create goods and services to satisfy those preferences. To many others—including innovators like Steve Jobs and Elon Musk—it is the firm's job to create demand, to create products and services that the customers didn't know they wanted

or needed. Marketing professors like to provocatively introduce the essence of marketing by claiming "if you build a better mousetrap, the world will beat a path to your door" (at least every marketing professor I've ever had has done so).[3] We think we generally prefer things that are better, so this might seem a perfectly reasonable statement. But there are many problems with it. What does better mean? Does the world know that you built a better mousetrap? What are the costs—in terms of money or effort to beat that path—of acquiring that better mousetrap? Are mice such a problem that we need a better mousetrap? And what if some people actually like mice?

In many situations, demand has to be created. Customers need to have the benefits of products explained to them, and they have to be convinced that the products have value to them. This can be true for any product—mousetraps, smartphones, organic, fair-trade bananas, or anything else. Customers do not know what their utility functions look like; we do not know our preferences as clearly as economic modeling would like to assume. Something new is only better if customers and other stakeholders place value on it. Sometimes firms work to create demand for existing products and services; other times, firms work to create demand for new products and markets. The latter, perhaps obviously, is much more difficult. We are creatures of habit—and, by "we," I mean everyone who ever makes an economic decision.

This is one of the most significant challenges facing sustainability-related investments. Many sustainability-related investments are based on new technology or unproven markets. In most cases, we already have products that work; it can be quite difficult to demonstrate that the new products improve upon those existing products in meaningful ways. The products may make financial sense to their firms or creators, but projections are not the same as reality; realizing actual demand can be far more complicated.

- Electric vehicles require less use of fossil fuels and have much cleaner emissions than vehicles powered by internal combustion engines. If owning a vehicle was only about doing minimal environmental damage, then electric vehicles would be very popular. But creating demand requires predicting consumers' needs and understanding what they value in a vehicle. What are the costs of charging the vehicle? How long does a charge last? How far can the vehicle be driven on a charge? How fast does the vehicle go? How much of a

premium will I pay to buy the electric vehicle? Each of these questions may represent a cost; in order to create the demand for electric vehicles, manufacturers must convince consumers that these costs are less than the benefits they receive from using the vehicle.

- Seventh Generation, Method, and Clorox's Green Works all offer home cleaning products that use natural ingredients that are less harmful to humans and the environment than most traditional cleaning products. But do they work? How much more are customers willing to pay for a more natural cleaning product? Creating demand for these products requires understanding what consumers value. It may also require convincing consumers of the benefits—either through education or by somehow making the products as effective as traditional cleaning products without compromising the improved health and environmental qualities of the products.
- How does Whole Foods know that it creates value by paying its workforce a higher average wage than the competition does? The related costs appear directly on the financial statements, but the motivation and productivity benefits can be very difficult to see and measure. What does this have to do with creating demand? The higher wages must ultimately be paid for by consumers increasing their purchases at Whole Foods. Therefore, Whole Foods must understand what its customers value and what they are willing to pay for. Creating demand for its products by offering helpful and friendly customer service is an investment that Whole Foods believes creates value. In time, this should show up directly on the financial statements. We will see higher revenues due to greater demand from consumers, and we will see lower relative compensation costs due to increased productivity and lower turnover and theft.

Because all firms rely on customers for their revenue, it is critical that they understand what their customers value. Most firms have a long history of customers purchasing their products, and these revealed preferences provide very valuable information. With new products or technologies—whether those products are sustainability-related or not—it can be very difficult to project what demand will be because consumers' preferences have not yet been revealed. But no investment comes without risk. The risks associated with new investments can be mitigated by understanding what customers and other stakeholders value and continuously working to meet their preferences and desires.

Aggregate market demand

So far, we've focused on consumers' preferences and demand from an individual's perspective. This is appropriate since all decisions start at the individual level; all economic decisions are made by people. But firms are not necessarily overly concerned about each individual consumer's preferences and utility. Organic, fair-trade banana producers know that not every consumer will want organic, fair-trade bananas. But the producers probably want to produce and market a product that will appeal to as many consumers as possible in their efforts to maximize profits and value. For this, they need to focus on aggregate market demand, not individual preferences. However, because market demand is simply the sum of individual demand and the result of individual preferences, they become essentially the same thing.

The law of demand stipulates that the quantity demanded decreases as the price of the good or service increases. This is one of the very few laws in economics because it is one of the very few ideals that is universal and rarely violated. Laws in science are immutable facts dictated by nature, but laws in economics revolve around decisions made by human beings, which are anything but immutable. For example, there are plenty of goods that I would never buy, regardless of the price. By focusing on aggregate market demand, firms can abstract from individual decisions and just worry about capitalizing on overall sales possibilities. I may never purchase an omelet, but plenty of other people will. Even though there is no price at which I would purchase an omelet, there is a market for them. At the market level, the law of demand will hold: more omelets will be purchased at $1 per omelet than at $10 per omelet. Some people will buy several omelets at $1 each, but might not buy any at $10 each. Different people will have different price points of what they are willing to pay for omelets and how many they will buy at each price. These individual preferences form the market, and they inform the producers.

But the producers get to decide the price at which they are willing to sell their omelets. They don't have to sell anything. When a trade happens, it happens only because both the buyer and the seller think that they are better off as a result of that trade. Both parties believe that their own utility will be greater if the transaction happens than if it doesn't. For the producers, it's about value creation rather than utility. The value that is created for the producers as a

result of selling omelets or bananas or anything else is a function of both the price the omelets sell for and of how much it costs to make each omelet. And that takes us to the economics of production.

Production

Whereas the discussion of demand largely shows where sales revenue comes from, a discussion of production will explain how a firm's expenses impact value maximization—and the decisions firms can make about their production to maximize value. Firms attempt to minimize the resources expended (or to use them most efficiently) to produce the desired demand. Firms have a lot of options about how to produce goods. Some firms can do everything by hand. Some firms can automate everything. Some can outsource production to a foreign country, and some produce everything domestically. The choice to produce everything domestically might be made because that's where it is cheapest to produce or because that's where the necessary skills and intellectual capacity are found. Or a product might be made domestically because the label "Made in the USA" provides a competitive advantage valued by the firm's customers, employees, investors, and other stakeholders (showing that the production decision is not always merely a decision about production).

Like any other decision the firm makes, production decisions are about creating as much value for the firm as possible through the efficient use of resources. To the economist, these resources fall into two simple categories: labor and capital. Capital can be defined as everything but labor, such as financial capital, intellectual capital, equipment, technology, natural resources, and anything else used in the production of goods and services. The firm's production decision comes down to how much of each resource to use. The firm should use whatever allocation of labor and capital produces the most output at the lowest cost to the firm. Balancing amounts of inputs is a challenge because there is no way to know in advance what the optimal allocation is. The static trade-off between capital and labor required to produce a certain output is called the marginal rate of technical substitution. This is a ratio of how much labor should be added if the firm reduces capital, and vice versa. Just as the marginal rate of substitution defines the trade-off between goods that consumers make in their efforts to maximize utility, the marginal rate of technical substitution identifies how businesses can

most efficiently use their resources to produce a certain amount of output.

Suppose that in order to produce 100 cars, Ford can use a variety of allocations of labor and capital. Maybe it can produce 100 cars with 10 workers and 20 machines, or maybe it can produce 100 cars with 25 workers and 5 machines. The marginal rate of technical substitution is the ratio that can help management determine what trade-offs to make in production:

$$Marginal\ Rate\ of\ Technical\ Substitution = MRTS = -\frac{\Delta\ in\ Capital}{\Delta\ in\ Labor}$$

In the above Ford example, you can imagine that each additional unit of labor has different productivity when 5 machines are used as compared to when 20 machines are used. *MRTS*, like the marginal rate of substitution earlier, is not constant; it is a function of the allocations of labor and capital already being used and of the amount of output desired. The point of all this is to think about trade-offs in production: should we use more labor or more technology? What combination produces the desired quantity at the lowest cost?

The firm may also want to use production processes to confer value to the customer that may create a competitive advantage. Think back to our genetically modified bananas and our organic, fair-trade bananas. The genetically modified bananas were created with steroid-like chemicals and fertilizers while the organic, fair-trade bananas were produced in fields that have never seen any unnatural chemical or fertilizer and each banana was individually harvested with love by an adult making $25 an hour. For the genetically modified bananas, the value may come from the technology that creates the low price: they're inexpensive bananas, but presumably they still have some of the nutrients and taste that makes consumers like bananas. For the organic, fair-trade bananas, the value comes from the fact that they may be healthier and better tasting and are produced in ways that do not exploit people or the environment. For either good, the value only exists if customers see it and are willing to pay for it. That's what makes a market.

An interesting (to me, at least) example will illustrate some other challenges involved in the production decision. Two Columbia University professors—Eric Verhoogen and Amit Khandelwal—ran an experiment on producing soccer balls.[4] They created a cutting process that resulted in producing about 10 percent less waste than

the traditional process did. The quality of the product and the labor used were the same—the only difference between the new and old technologies was in the amount of waste. That should lead to big savings. When they offered the technology to 35 firms in Pakistan producing soccer balls, only 5 adopted it—despite very clear evidence that the new technology saved money. The problem? The workers were paid wages based on piece rates, so there was no incentive for them to change. The firms would have been better off with the new technology, but the workers resisted it because it involved more effort for lower benefits.

The production decision is not always as simple as just coming up with a more efficient process. For these companies producing soccer balls, the solution was twofold: (1) firms needed to restructure compensation, moving to salaries and performance bonuses rather than piece rates; and (2) the local government became involved and began offering grants for innovative new technology that would help create jobs and allow the firms to compete better regionally and globally. Refining a production process led to shared value between the firms and their communities. The firm is a system; value is created by all stakeholders. Nothing in economics happens in isolation.

Maximizing corporate profits

This chapter is about the sustainability of economics—how economics influence whether or not a firm can be successful and sustain its business over time. The goal of this book is to show how the investments a firm chooses lead to both maximizing profits and long-term value creation. Now we need to connect our discussion of consumer demand and supplier production functions to see how those interact to enable a firm to maximize profits.

Corporate profits are calculated as sales revenues minus expenses. It's more complex than that, but thinking of profits as revenues minus expenses is good enough for now. Maximizing corporate profits is not the same as maximizing sales revenues nor is it the same as minimizing expenses. Maximizing corporate profits is part of a complex formula that nobody ever really knows—because of the continuous trade-offs between revenues and expenses. The profit formula will be different and unique for each firm, and it will change as revenues and expenses change. In order to increase sales revenues, a firm will generally have to increase expenses, but

expenses and revenues will rarely increase at the same rate. At times, expenses may increase faster than revenue—the firm may have to add another factory or other fixed expenses to increase revenue by a single dollar, decreasing marginal profits. Or expenses may increase slower than revenue; for example, the firm may be able to scale revenue with only variable costs and will be able to spread its fixed costs across a larger amount of sales revenue, increasing marginal profits.

Economists and investors are always forward-looking; they are not very good at living in the past but are constantly trying to predict what will happen in the future. They do appreciate the past, but they primarily use it to inform the future. When it comes to value creation and decision making, the future is all that matters. This is why economists think in terms of marginal benefits and marginal costs. To economists, "marginal" doesn't mean "mediocre" or "unimportant," as it does to the Merriam-Webster dictionary; to economists, "marginal" means the "next" or "incremental." Marginal benefits represent those benefits—in profits, cash flow, value, impact, utility, or whatever else we care about—that result directly from an economic choice we make. Marginal benefits are not cumulative benefits but only those additional benefits that are unique to a certain decision. Marginal costs are similar, in that they are those costs associated directly with an economic choice. If we make an investment, what specific costs and benefits are a direct result of that investment?

In general, profit is maximized when the marginal benefits of selling one more good or service are exactly equal to the marginal costs of selling one more good or service or at the last amount of sales where the marginal benefits are greater than the marginal costs of obtaining those sales. Up to this point, profits increase; beyond this point, profits decrease. Profits are not maximized when the per-unit profit margin is greatest nor when a firm's market share is greatest. For each firm, the amount of output that maximizes profit will be unique because the factors that create value for each firm are unique to that firm—low prices, high quality, customer service, innovative product design, efficient cost structure. Whole Foods and Walmart are both in the grocery business, but the value drivers for each firm are very different. Why? Because each firm has a unique set of stakeholders who have different utility functions that drive profitability for that firm. Having highly compensated and engaged employees is a key value driver for Whole Foods; the same may not incrementally

increase value at Walmart because of its different group of stakeholders. It is impossible to consider value maximization for any firm without understanding that firm's set of stakeholders who will be responsible for maximizing that value through their actions and preferences.

Profit maximization is an art, not a science. No firm knows the exact formula to follow to maximize its own profits. It can understand its key value drivers and stakeholders, its competition and markets, and key revenue and cost functions, but that doesn't mean it knows the precise formula for achieving maximum profits. No firm can know that. As a result, trying to maximize profits becomes an iterative process of trying to find that point where marginal benefits and marginal costs are equal. This involves having to make countless investment decisions that will all have marginal effects: raising prices and losing volume, paying higher salaries hoping to motivate employees better, using cheaper input materials hoping to save money, using more expensive input materials hoping to increase revenue, introducing new products, and expanding to new markets. The hardest part of any investment decision is estimating the future benefits; the future is unknown and can be a very long time. As such, maximizing profits and value requires understanding the long-term value drivers that will lead to investment decisions creating value over the long term.

Investments for maximizing long-term value

Maximizing profits in the short term is rarely the same as maximizing value over the long term. Chapter 5 details the math and finance associated with this distinction; for now, we'll focus on the philosophical aspects. There are many factors that go into these issues of investing over the long term: availability of capital, risk aversion, market uncertainty, technological uncertainty, and incentives. All long-term investment decisions are made by people. These people have to make many assumptions about the investment and about the future—its risk, the size of cash flows, the timing of cash flows. Just as profit maximization is an art, maximizing the value of any investment is an art, too; profit maximization is simply the product of all individual investments a firm makes.

Value is always measured in today's terms. But today's value is created over the long term by making investments that have positive marginal cash flows over the course of their life, that have

marginal benefits that are greater than their marginal costs over their life. For value creation, it doesn't matter much whether those cash flows occur today or in 20 years. One problem with long-term investments and value creation is that the short term is a lot more certain than the long term is. It may be tempting to make investments or strategic decisions that maximize short-term cash flows at the expense of long-term value creation. There is a long history of research showing that managers do just this. In their survey of 400 CFOs and other executives, John Graham, Campbell Harvey, and Shiva Rajgopal[5] found that more than half of their survey participants said they would not invest in a value-creating opportunity if it meant that their short-term earnings would not meet Wall Street's expectations. This is either very unfortunate or patently absurd. Managers make this choice because investors have explicit expectations about the short term but not about the long term. Investors severely punish firms when earnings do not meet short-term expectations (see Schipper[6] or Brown[7] for summaries of the expectations research).

Wall Street analysts follow many publicly traded firms, and every quarter they estimate the financial performance of the firms they follow. The analysts and their firms hope to show their clients how great they are at predicting the performance of firms and their stock prices. The analysts include all sorts of information in their valuation models, including past earnings, but they also include qualitative information about expected operations and activities. Perhaps the firms themselves shouldn't really care whether or not the Wall Street firms are very accurate with their predictions, but they do care. If they just meet or slightly beat the analysts' forecasts, they will be rewarded with a modest increase in stock price; the investor community will increase the value of the firm. If they perform worse than expected, the investor community will drive the value of the firm down, perhaps quite significantly. This miss gets included in new financial models that value the firm; this miss may have little to do with the future performance of the firm (perhaps it was due to a one-time event, such as a hurricane), but the Wall Street analysts don't have any other information. They value the firm based on what they think they know. Because of this short-term focus, managers may choose to delay significant investments, or they may choose to reduce certain discretionary expenditures, such as advertising or research and development. Over the long term, these trade-offs may destroy value.

Because estimating cash flows that may or may not occur many years in the future can be so much more difficult than estimating cash flows in the short term, having a short-term focus may be somewhat defensible. After all, we never really know whether an investment will create value over the long term. We can make many assumptions—about the expected costs of natural resources in the future or the benefits of paying higher wages, for example—but we cannot be certain what those costs and benefits will actually be. Managers know with far more certainty what short-term costs and benefits are. For the risk-averse manager, this may partially justify why he or she chooses to focus on short-term profitability rather than on long-term value creation. Incentives can play a huge role, too: many executive salary and bonus decisions are based on current or short-term earnings and stock prices and not on what the stock price will be in 10 years. As discussed in chapter 2, that is not ideal, either.

Of course, all the above is no excuse. Every cash flow matters, whether it occurs today or in 20 years. Managers are hired to create value, not to create short-term profitability. Unfortunately, managers have considerable flexibility within decision-making and accounting rules such that they can focus on short-term profitability, possibly at the expense of long-term value creation. But because long-term value is the aggregation of all current and expected corporate profits, firms should be making investment decisions that maximize both over the long term. The investment decisions that firms make today will determine the profits they will enjoy in the future, which will directly impact today's assessment of value. Today and over time, profits drive value. Maximizing corporate profits over the long term is achieved by repeatedly making sustainable financial investments; identifying those opportunities where the aggregate benefits are greater than the aggregate costs is how firms create value over the long term.

An argument could be made that focusing on the short term to appease Wall Street is very much a value-creating decision. If Wall Street is happy with the firm's performance, it may be easier for the firm to raise capital. Perhaps the firm is able to borrow at 10 percent instead of at 15 percent. This difference in capital costs has a direct effect on valuation. If the choice is to reduce advertising expenditures and obtain capital at 10 percent rather than to increase advertising expenditures and borrow at 15 percent, it may make sense to reduce advertising expenditures. However, over the long term, the decision should be based on the economics: if increasing advertising expenditures really is a value-creating investment, this added value

will result in increased profitability eventually, which will lower the borrowing costs and increase the firm's value. For better or worse, the choice may be as simple as choosing a sure thing today versus a gamble on the future. Being risk-averse, managers and investors frequently prefer the sure thing.

Competition and industry dynamics

The above brief discussion describes how individual firms pursue profit maximization: produce or sell until the marginal benefits of one more sale are no longer greater than the marginal costs associated with that sale. No firm will ever know how to calculate this precise point because there are so many moving and interrelated parts responsible for creating that one additional unit of sales. In this process of trying to maximize profit, successful firms figure out what their competitive advantages are and what value drivers lead to profitability. Nike believes that innovative design is a key value driver, and Whole Foods believes that higher quality is a key value driver. Of course, no firm acts in isolation. Every firm is continuously competing with other firms—for customers, employees, investors, value. Every firm is trying to take value away from its competition. Walmart is trying to sell organic groceries at a lower price than Whole Foods; adidas is trying to innovate better than Nike. The uniqueness of these influences means that the value drivers of any firm may change over time as competitive pressures change the market preferences. Each firm constantly has to respond to competitive forces in its industry and its markets because every firm wants to be successful and maximize its own value.

Every firm is trying to create a product, strategy, and business model that gives it a competitive advantage. This competitive advantage can come from many sources. In chapter 2, we discussed Michael Porter's five forces that create sustainable competitive advantages: products and services that have few close substitutes, strong entry barriers, weak rivalry within the product market, low market power of input suppliers, and low market power of consumers. Competitive advantages lead to profits, and profits lead to value creation. Profits also lead to competition from other firms that want the profits and value that you have created. Becoming profitable is never the end but is part of a dynamic process. Competitive advantages may be temporary and anything but sustainable (see, for example, BlackBerry or Detroit's automakers). Firms must continuously create

new competitive advantages in order to achieve profits and create value. Such competitive advantages usually come at the expense of other firms, which are also actively trying to maintain their competitive advantages and profits.

In economic theory, there are two competitive market extremes: perfectly competitive markets and monopolies. In a perfectly competitive market, it is impossible for firms to obtain profits because intense competition drives them away. Homogeneity across products and the lack of barriers to entry prevent firms from having any source of competitive advantage. As a result, over time, no firm earns a profit. In a monopoly market, there is one single firm that earns a very large profit—because it does have a unique product and barriers to entry prevent other firms from capturing its market. Because of their unique competitive advantages, monopoly firms are able to generate profits and value, whereas competition drives away potential profits. In between these two extremes, the perfectly competitive market and the monopoly market, there is the real world, the markets where nearly every real firm competes.

Firms are continuously working to create the competitive advantages that will lead to the pricing power associated with being a monopoly while trying to avoid falling into a perfectly competitive market. Firms are trying to create unique products and barriers to entry. Firms are trying to gain power over both suppliers and customers. This is a constant process for just about every firm. Even for firms with seemingly strong pricing power—Microsoft in the 1990s and early 2000s, BlackBerry in the mid-2000s, Apple in the 2000s and early 2010s—nothing is permanent. One firm's ability to create competitive advantages, profits, and value can have as much to do with understanding how its competition creates value as it does with understanding its own value drivers. That is, in addition to understanding what we should do given our own stakeholders and our own value creation function, we need to understand what our competition will do given its unique stakeholders and its unique value creation functions—because our competition is also one of our key stakeholders. When we factor in this dynamic, the analysis of value creation becomes far more complicated.

Competitive dynamics and game theory

Most of economic theory is static; we analyze one model at a time, one variable at a time, and try to understand how discrete changes

affect economic decision making. Unfortunately, life is not static; the real economic world is dynamic. We make decisions giving consideration to what other alternatives are available, to what competitors are doing, and to what competitors might do in response to anything that we might do. To incorporate the dynamic nature of decision making, we can utilize game theory or a procedural understanding of appropriate strategic behavior in situations where there is interdependence between the actions and outcomes of firms or individuals. The most famous game isn't really about business or economics (though an economist would tell you that all of life is about economics). It's called *The Prisoners' Dilemma*, and it considers how two captured (alleged) felons should behave.[8]

Imagine you and your partner in crime broke into a car dealership and stole a car. Video surveillance shows you breaking in, but not stealing the car. The police capture you; they know they can convict you for breaking in based on the video, but they need a confession to convict you for the bigger crime of grand theft auto. They separate you and your partner and offer each of you the following deals:

- If you deny stealing the car but your partner rats you out, you will go to jail for 12 years and your partner will get only a 1-year sentence because she cooperated.
- Likewise, if you rat out your partner but she denies stealing the car, she will go to jail for 12 years and you will get only a 1-year sentence because you cooperated.
- If you both deny stealing the car, the police will only be able to convict you for breaking in; you then each get a 2-year sentence.
- If you both confess to stealing the car, the police will give you a little credit for confessing, but you still stole a car: you then each get a 6-year sentence.

A few conditions need to be pointed out: you and your partner cannot communicate about your decisions, you make your decisions simultaneously, you each know what the other's options are, and you will only engage in this decision once (you should not consider what happens in jail or after your jail sentence). So, what do you do? The key to determining what you should do is to understand what your partner is likely to do—given what she thinks you will do. To solve this game, economists will compare the payoffs (or penalties) associated with each of your decisions, given what your partner is likely to do.

If you don't confess, your partner will end up either doing 2 years if she also doesn't confess or 1 year if she rats you out—so she's going to confess. If you do confess, your partner will end up either doing 12 years if she doesn't confess or 6 years if she also confesses—so she's still going to confess. Regardless of what you do, your partner's best action is to confess. You can repeat the process to consider what you will do in response to your partner's actions to see that your best response is also to confess, regardless of what your partner does. For each of you, your best response is to confess, and that is what you will end up doing—even though you could each be better off if neither of you confessed. You make your choice based on trying to optimize your situation given what you expect your partner to do—and that means you'll both confess and do more time than you would had you both kept quiet (6 years each rather than 2 years each). The police knew what they were doing and structured the game's payoffs to get this result; they're not stupid.

So what does this have to do with economics and sustainable financial investments? This same process can be applied to any business situation—new product introduction, new strategies, marketing campaigns, negotiations, and investments.

- How should adidas respond to Nike's introduction of the Flyknit technology, which reduces waste associated with certain components by 80 percent?[9]
- How should adidas and Nike address major sporting events, like the Olympics or the World Cup? What should they invest in research and development or marketing for those events? What if Nike invests heavily but adidas doesn't?
- How should Coca-Cola respond to PepsiCo's acquisition of Naked Juice, Sabra hummus, and other healthier food and beverage options? How should PepsiCo respond to Coca-Cola's large investment in Monster Beverage?
- How should Whole Foods respond to Walmart increasing its offerings of organic produce?
- How should Walmart respond to Whole Foods' practice of attempting to establish a more equitable work and pay environment by capping executive pay relative to the average worker's pay?
- How should suppliers respond to a significant customer's demands for reducing their environmental impact—such as what Walmart is asking of its suppliers?

The list could be nearly infinite; almost every economic or business decision involves dynamic interaction between stakeholders. In theory, we could construct a comparison of profits or value creation for each possible scenario and response imaginable.

In practice, firms certainly should consider the competitive dynamics between other firms for nearly every operating decision they make, including both internal-facing actions, such as compensation and culture, and external-facing actions, such as products and advertising. But this becomes extremely difficult very quickly. In practice, competitive game decisions are rarely as simple and discrete as *The Prisoners' Dilemma* (even if you get arrested for stealing a car). Real-life business decisions are rarely one-time events or simultaneously determined. There are rarely only two parties involved in the dynamic interaction. The profits and value creation are rarely known, for any of the parties involved. An enormous amount of effort and guesswork is required for estimating those payoffs, especially for the competitors (for whom your information is far more limited). And there are rarely discrete outcomes; there is almost always a continuum of possible outcomes and evaluating each would be extremely difficult.

Nevertheless, despite all of these issues with connecting theoretical game theory to real life, firms should still try to consider possible competitor (or stakeholder) responses to any strategic decision they make. Business is a game, and incorporating the incentives and strategies of the competition can be extremely helpful in determining your own strategies and investments.

Externalities

Chapter 1 introduced the idea of implicit and explicit costs. We talked about evaluating investments using all economic costs and benefits, or economic profits. We also talked about how difficult it can be to measure and internalize many implicit costs and benefits, such as the goodwill Walmart may receive from investing in more environmentally friendly facilities and supply chain operations. The majority of that discussion revolved around the costs and benefits that directly impact the firm's well-being or value. These are the cash flows that would easily be included in the preceding analysis of competitive dynamics between firms. But how do you determine whether or not a cost or benefit has an impact on firm value if that

impact is difficult to identify or quantify, if the impact has a low probability of occurring, or if the impact will only materialize over the long term? How do you determine whether or not impacts that seem beyond the firm's immediate environment will ever have a direct impact on the firm's cash flow?

Such indirect effects are called externalities, and they can really matter. We saw this in chapter 2. The clearest example of an externality is pollution caused by a factory: the pollution harms society, but the factory owner does not directly pay for the costs associated with this harm. Externalities can also be positive: if you renovate your lawn, your neighbors benefit from a nicer neighborhood, but they didn't have to spend anything to obtain that benefit. Shared value investments can also create positive externalities. Whether or not negative externalities matter to a particular firm depends on whether or not that firm will ever have to internalize the costs associated with those externalities. Governments can try to limit and discourage negative externalities through taxes or regulations. But this requires that governments know the true cost of the externality to society (and that they have the political might to impose the tax or regulations).

According to the American Petroleum Institute, as of late 2014, the federal government imposed an excise tax of 18.40 cents per gallon on each gallon of gasoline purchased.[10] Each of the 50 states then imposed its own additional taxes and fees, which range from a low of 12.40 cents per gallon in Alaska to 52.89 cents per gallon in California. Higher taxes should discourage consumption and should discourage driving and thus the emission of carbon dioxide. The taxes collected could be used to mitigate the damages caused by using the gasoline; such mitigation, in this example, is unlikely to be used to fix the ozone layer, but it could be used for education purposes or for research or investment in alternative technologies. Taxes on cigarettes play a similar role: they can both discourage smoking and fund investments in education or health care programs. According to the Centers for Disease Control, state taxes on cigarettes range from $0.17 per pack in Missouri to $4.35 in New York.[11] While it might be inappropriate to attribute all of these taxes to externality mitigation, the economic effect should be the same: relative consumption should be less in New York than in Missouri.

Nike does extensive stakeholder engagement, both in terms of encouraging participation in ongoing operations and in reporting on sustainability activities. In the *2013 Sustainable Business Performance Summary*, Nike identified 15 external stakeholders that

are actively involved in advising the company.[12] Of these 15 individuals, at least 10 have principal occupations involved in protecting the environment. Why? Nike makes athletic shoes and apparel. Do Nike's customers care about Nike's environmental policies when they're purchasing a pair of shoes? Probably not. Do the investors care about Nike's environmental policies, from a moral or ethical perspective, when they're buying or selling the stock? Maybe not. Suppliers probably just care about having Nike as a customer. Some employees may care about Nike's environmental activities, while others may not. At the company's headquarters in Beaverton, Oregon, 90 percent of Nike employees drive to work, and 78 percent of them drive alone despite mass transit buses and trains serving the headquarters campus; you can be the judge about what this says about their commitment to environmental issues.[13] Why does Nike care about climate change or water usage or landfills or recycling? Because it cares about its customers' health and experience and about the cost of its products.

Nike's customers enjoy Nike's products more when the air is clean, when parks are pleasant, when mountain trails are not littered, and when natural disasters do not interfere with their experience. If Nike's customers are not healthy, Nike's customers won't be very good customers. Granted, Nike does not have complete control over either the environment or the health of its customers, but the company recognizes that it has some influence and that a very small investment today can ensure a higher probability of much larger returns in the future. In a world of increasing resource scarcity, Nike realizes that its ability to provide products to its customers relies on its ability to have raw materials available at a reasonable cost. This resource availability can come through innovative design—such as clothing made from recycled plastic bottles—or from protecting the natural resources used in production. Nike is doing both. These are small investments the company is making today with the expectation of much greater returns—in higher revenues or lower costs—in the future.

The preceding is an economist's perspective on why investing in environmental issues makes sense to Nike. There are likely other reasons, but even those will have economic impacts. Given the preferences of Nike's stakeholders, it is likely the company generates a fair amount of positive goodwill by being associated with investing in environmental protection. Some Nike employees may be more engaged, connected, motivated, and productive if their own

individual morals and preferences are consistent with the company's actions (even employees who drive to work alone). All of these factors are economic factors and contribute to value creation if the company's stakeholders and the market care about such factors. Investments related to environmental protection can have some very clear and relevant long-term benefits for a company like Nike.

This is an example of a company internalizing an externality—because that externality may not really be as external as at first appears. In the short term, yes, slightly higher pollution, for example, may have little direct impact on Nike's stakeholders and the firm's value. In the long term, however, continued and accumulated pollution could have devastating effects on the firm's value. Internalizing these externalities is a long-term investment, and firms should internalize externalities when they see the short-term costs as lower than the long-term benefits. How do firms internalize externalities? In the way that Nike is doing, by identifying how those externalities will affect value over both the short and the long term (athletes' health, worker safety, resource availability) and making the necessary investments today to prevent any negative effects from those externalities from destroying firm value.

Investing in externalities today can mean different things to different firms. Burt's Bees has been a long-time investor in preventing colony collapse disorder because it needs healthy bees to have a product.[14] Chevron invests in various renewable energy programs—geothermal, solar, biomass—today because it wants to have options for a time when fossil fuel availability becomes so constrained that it can't rely on its traditional gasoline products for its competitive advantage.[15] In the 1990s, Toyota invested in developing hybrid technology so consumers could have options in case excessively high gasoline prices became a deterrent to driving. This possibility became a reality in the early 2000s and enabled Toyota to thrive. This investment also had the positive externality of creating the innovative technology for other firms to imitate and has resulted in a wave of new alternative-fuel vehicles being produced by the major automakers. General Motors' reluctance to invest in hybrid technology at the same time likely contributed to the company's ultimate bankruptcy in 2009. As with everything else in economics, the decision of whether or not to internalize externalities and how to invest in them becomes an analysis of the expected costs and benefits of

the investment—or the lack of investment. Everything is a choice, and doing nothing is a choice, too.

Taxes and subsidies

Society likes positive externalities and doesn't like negative externalities. We want to find ways to encourage firms and individuals to create positive externalities and we want to find ways to discourage negative externalities. That much is known and simple. The problem is knowing how externalities are created and how to encourage or discourage them.

Gasoline and cigarette taxes can be used to discourage the negative externalities associated with carbon-emitting vehicles and smoking. While there is a standard federal tax for each, every state has its own gasoline tax and cigarette tax. This may be because the damage caused by their use is different in each state; more likely, it may be because each state has a different assessment of the damage caused by their use. Furthermore, each state knows that the taxes will influence economic behavior in that state and wants to be careful to fix one problem without simultaneously creating other, bigger problems. Given that Virginia and North Carolina are two of the largest tobacco-producing states, it should be no surprise that they also have two of the lowest state cigarette taxes ($0.30 per pack in Virginia, $0.45 in North Carolina).[16] Higher taxes might lead to lower consumption, leading to lower production, leading to fewer jobs and overall economic activity in Virginia and North Carolina. On the other hand, New York can levy a $4.35 tax on each pack of cigarettes because it doesn't care about tobacco-related jobs; no tobacco is produced in New York state.[17] Kentucky, which produces more than 40 percent of the tobacco in the United States, has a state cigarette tax of just $0.60. Incentives matter, and regulators are always trying to balance incentives in an effort to maximize social welfare. Everything is an economic game.

Subsidies are negative taxes; they are payments from the government to firms to encourage activities that have positive externalities or are deemed beneficial to society. When the government subsidizes economic activity—through grants, loans, tax relief, or other assistance—it lowers the cost of production and increases value-maximizing opportunities for businesses. Perhaps paradoxically, many subsidized activities can have significant negative externalities. In the United States, the agriculture and energy industries are

the two most heavily subsidized industries. As a society, we need food and energy, and we want stable and affordable supplies of each. But subsidies also understate the true cost of eating food and using energy. As a society, we become dependent on and accustomed to cheap food and fuel. But our use of fossil fuels is a major contributor to climate change. And agricultural production and its methods can lead to both environmental and health problems. Society is going to have to pay for the problems created by these subsidies at some point; so far, we have made the decision that we are better off if we have cheap food and fuel now and pay for it later. Whether or not this is the right decision depends on major assumptions about preferences, utility functions, and the current and future costs associated with these externalities.

Firm-level economic effects and value creation

To summarize, maximizing profits is extremely complicated. Firm-level decision making and profitability is driven by the business's economics, which are driven by people: customers, employees, executives, suppliers, investors, and others. Every person has unique preferences—desires, needs, incentives—that contribute to an individual firm's profit-maximizing strategy. Unfortunately, no firm ever knows what this strategy is. Determining that strategy involves understanding your stakeholders, knowing your firm's key value drivers, and making some heroic assumptions about predicting the future.

Because of this, a firm's profit-maximizing strategy is never static. The economic environment of today is very different from the economic environment of 20 years ago. This is a result of changing preferences of stakeholders, changing industry and regulatory environments, and new information about resources and constraints. Nike has been very forthcoming about how its sustainability and innovation strategies have changed in the past three decades. During the 1990s, labor was viewed as a low-cost means to an end; today, labor is viewed as a partner in value creation. Today's approach may have higher direct expenses, but Nike is convinced that this approach is associated with higher direct benefits and lower indirect expenses over the long term. Either approach might have been right at the time because each approach was aligned with stakeholders' preferences at the time.

Ten years ago, Elon Musk's Tesla Motors didn't exist. Today, in late 2014, it is a publicly traded company worth over $30 billion.[18] In 2008, Tesla introduced the first commercially produced and federally compliant electric vehicle in the United States; since then, Tesla has sold more than 25,000 vehicles at an average price of $70,000. Ten years ago, the economic environment did not exist for Tesla to survive and thrive: customers did not value electric vehicles enough to pay $70,000 for one, charging stations were not available, investment capital might not have been willing to take a risk on a luxury electric vehicle venture, and the US government was not supporting $7,500 in tax credits for purchasing an electric vehicle[19] (electric vehicle tax credits came from of the 2008 and 2009 federal stimulus packages).

But today Tesla is a $30 billion company. That's about half the value of either Ford Motors or General Motors. And, in 2013, Ford and General Motors each sold over 6,000,000 vehicles while Tesla sold just over 20,000.[20] Ford and General Motors each sold 300 times the number of vehicles that Tesla sold, but the value of either Ford or General Motors is just twice the value of Tesla. That tells us quite a bit about the future cash flows expected from each firm. Tesla has capitalized on the confluence of economic value drivers that have established the opportunity for the company to succeed. Customers' willingness to pay $70,000 for a luxury electric vehicle, the federal government encouraging electric vehicles with large tax credits, employees' willingness and ability to innovate and design the paradigm-changing technology, investors' desire to provide financial capital for the growth and development of the company, and communities supplying charging stations have all contributed to Tesla's current success. Only time will tell if investors' expectations about value come true, but $30 billion is their best estimate of Tesla's value today.

In addition to "Who cares?" a reasonable question to ask is "Why now?" Why is this happening today, and why didn't it happen 10 years ago? All stakeholders are making significant investments in the future of Tesla. Why? What are the factors that have gone into their valuation analyses? In short, they have considered all of the economic factors that have been discussed in this chapter. They have performed complex financial analyses about the future, including demand projections, resource constraints and costs, competitive dynamics, risk modeling, and government support. Exactly how they have done this will be the subject of the next three chapters.

And as we go through those three chapters, it will be important to think about the stakeholders and investors who did not make the same investments that Tesla made. After all, not everyone is seeing the same financial analysis that Tesla and its stakeholders are seeing. What do Tesla's stakeholders know about the future? Answering that question is the key to making sustainable financial investments.

The case of Tesla—and of Nike, Whole Foods, and Interface and many other companies—illustrates how economics may be changing. The preferences of consumers, employees, and communities have changed, and they are valuing different factors than they valued just a few years ago. Passive investors—such as those investing in companies through the stock market—may or may not have changed their preferences; they are looking for the best financial returns, generally independent of how those returns are obtained. But even this has probably changed somewhat, too. The recent rise of socially responsible investing, social impact investments, and other vehicles that screen investments on social and ethical issues suggests that investors believe that such investments will lead to economic value creation for the firms and will be more likely to produce higher financial returns for investors—because of their social and ethical drivers. What matters is the simple fact that investors are seeing new ways of returns being generated. Government regulations, in some ways, are encouraging investment in sustainability-related projects, too. Consumers are more willing to pay more for a luxury electric vehicle or organic, fair-trade bananas than they were a few years ago. And companies have finally designed a luxury electric vehicle that consumers want, and organic, fair-trade bananas have been produced widely enough so that consumers can finally purchase them. Economic value drivers are constantly evolving and leading to different opportunities and business models. The key to succeeding in the long term—the key to making sustainable financial investments—is to recognize these shifts and the strategies that can best capitalize on them. That is exactly what creates value.

4
The Economics of Sustainability

Business success, sustainability, and survival are all driven by economic factors. In a world with limited natural resources and increasing population and with evolving personal preferences and priorities, our ability to find novel approaches to utilizing these resources is paramount. Human, social, and environmental investments can be significant sources of competitive advantage. Understanding the economics behind those investments is essential for maximizing value.

According to the United States' Energy Information Administration (EIA), in 2010 the US government provided financial subsidies to energy producers—of all types of energy—worth approximately $37 billion.[1] The majority of these subsidies were in the form of direct investment ($14 billion), tax benefits ($16 billion), and research & development incentives ($4 billion). About $15 billion was devoted to renewable energy incentives, up from $5 billion in 2007, mostly in wind and biofuels incentives as part of the 2009 federal stimulus programs. Another $16 billion was devoted to conservation and heating assistance for low-income consumers; $4 billion was devoted to fossil fuel sources, down from $6 billion in 2007. The EIA does not focus on the reasons for providing these subsidies, but we covered the general reason in the preceding chapter: to incentivize development of technology and production of energy that increases social welfare for the population of the United States. The $37 billion estimate does not capture some indirect subsidies that other industries also receive (such as depreciation benefits and domestic manufacturing tax deductions), so the total energy subsidy is likely higher than just $37 billion.

All types of energy are extremely costly to produce; many of these costs occur up-front in the exploration or research and development phases before producers have any idea about how much energy can realistically be produced. This uncertainty makes investment risky. Once the energy source is identified, building the infrastructure to deliver this energy to the public at scale is also extremely costly. Oil fields, hydroelectric dams, and wind farms all require enormous investments, have significant risks, and may not produce returns on the investment until many years after the project is launched. The first direct energy subsidies were provided in 1916 for crude oil exploration and production. Federal subsidies were exclusively provided to fossil fuel producers until the 1970s when hydroelectric projects began receiving subsidies. Other renewable energy sources have received significant subsidies only during the 2000s (mostly since 2007). Throughout this hundred-year period, the US government has provided subsidies to energy producers in order to encourage these large and risky investments. From 1916 to now, the US government has decided that these were sustainable financial investments; the costs of the subsidies were believed to be lower than the benefits to society.[2]

In 2013, the International Monetary Fund (IMF) released its own report analyzing energy subsidies around the world during 2011.[3] It followed a slightly different approach than the EIA did, but it was still trying to quantify the same economic factors that led the EIA to estimate energy subsidies in 2010 at $37 billion. The IMF report estimated that the energy subsidies provided by the US government were not $37 billion but were $502 billion—13 times the amount the U.S government reported for 2010. That is obviously a huge difference. We can ignore the difference in years of the estimates as there was no identifiable change in subsidy policy between 2010 and 2011. And we can probably dismiss any notion of a government cover-up or partisan spin, as the EIA is legally an independent body that does not represent any federal entities or branches of government; this view may be naïve, but it is unlikely to account for the 93 percent differential between the two estimates. So what is the difference? Why does the IMF think US government's energy subsidies are over $500 billion when the government itself estimates them to be less than $40 billion?

The difference is due to externalities: the IMF report includes them, while the EIA report does not. The IMF report includes all direct and indirect subsidies, while the EIA report only includes the

direct subsidies. The IMF report essentially uses full-cost accounting to capture all of the costs to society of producing and consuming energy. Because of the negative externalities that result from using fossil fuels, the cost to society is much greater than simply the direct cost we pay for our energy. The IMF made estimates for corrective taxes that would be necessary to mitigate the effects energy consumption has on global warming; the IMF report assumes a damage estimate of $25 per ton of CO_2 emissions. Nobody has any idea if this is the right amount of damage; it could be too low, it could be too high. Regardless, society's use of fossil fuels for energy obviously has major effects on the natural environment and its resources. This is a cost—but who should pay for it?

The IMF report suggests that the users of energy should pay for it today and that governments would be the most efficient mechanisms for taxing our energy use. The purpose of a tax would not be to directly fix damage done by climate change (the way we can fix roads and bridges). But with a tax to account for the full damage done by our use of fossil fuels, energy use would cost us much more. The result, thanks to the law of demand, would be less consumption of such fossil fuels. We would then have to either use less energy or find alternative energy sources that are less expensive. With populations increasing and lifestyles slow to change, finding alternative energy sources seems to be the more likely outcome: wind and solar energy development is growing, electric cars are becoming more prevalent, and other sources of renewable energy are gaining momentum as alternatives to fossil fuel–based sources. Why? Because the economics make sense. Because we are seeing that these alternative energy sources can become better investments than carbon-based sources. The valuation of Tesla discussed in the previous chapter suggests that economic value can be created in new ways.

If the IMF report is accurate and the consumption of fossil fuel–based energy in the United States is the primary reason why our energy use creates nearly half a trillion dollars in negative externalities related to climate change each year, then why is the US government subsidizing fossil fuel production at all? Why are US taxpayers paying to destroy the environment? We did give $4 billion in subsidies to fossil fuel producers in 2010 and we have been subsidizing fossil fuel production for 100 years, after all.

The main reason we do this is very simple: these subsidies make energy cheaper for me. I like that. And since externalities are external, the negative effects of my gasoline use do not seem to impact

me directly. But that's the problem with externalities: even though we don't have to internalize the costs directly, there are still costs. And they do impact society and each of us individually. We will be affected by the costs eventually. There is no doubt about that; the issue is then how much we will be affected, when to pay for these costs and how much to pay for them. Maybe the taxes we have in place already are adequately covering the costs of these externalities. The IMF and its climate scientists don't think they are, however. If the IMF estimates are correct, then apparently the United States has decided to focus on short-term benefits; the subsidies certainly help the economy in the short term. We will presumably worry about any long-term consequences some time in the future, if we have to (and if we can). This is an economic decision; this is an investment decision.

Models of sustainability

In order to determine whether or not these are good investment decisions, we need to fully understand the economic effects of each decision. There are countless models of sustainability produced by academics and think tanks that try to provide a structure for thinking about sustainability-related investments. And there are just as many sustainability strategies in use by corporations. These models differ in approach and terminology, but for the most part, they are similar in purpose.

Triple Bottom Line

People, planet, profit: according to the Triple Bottom Line model, corporations achieve success through balancing the performance of each of these three components. Introduced in 1994 by John Elkington, the founder of a British consulting firm, the Triple Bottom Line approach suggests that companies should prepare three separate performance reports, one for each of these three components.[4] The profit report would be the traditional financial statements showing revenue, expenses, profit, and financial equity. The people account would measure the internal human capital of the firm representing the direct and indirect human capital. And the planet account would illustrate the company's environmental record, showing long-term costs and disclosing all other environment-related direct and indirect effects (such as externalities caused by fossil fuel use). By preparing and presenting all three performance reports, firms

and their stakeholders will obtain a more complete understanding of how value is created and will have a richer accounting of the costs of the firm's operations, not just of the direct financial costs. No component is more important than the others; firms cannot achieve profit-success without appropriately using their people and the planet's resources.

The purpose of the Triple Bottom Line is for the firm to realize that value is created—and destroyed—through many functions and stakeholders. It also forces companies to have a long-term perspective. Whereas profitability can be measured on a quarterly or annual basis, and management can take a short-term perspective, investments in people and the planet are long-term in nature. Fair labor practices, health care plans, and employee engagement initiatives are unlikely to show financial results in the short term; they take time to become internalized and for their objectives to become realized. Likewise, investments in responsible sourcing of materials, safety programs and environmental risk mitigation are unlikely to be fully appreciated on a quarter-to-quarter basis. By focusing on the different sources of capital and the interdependence of people, planet, and profits, a firm and its stakeholders can obtain a more complete and holistic view of how the business can maximize value over the long term.

The Five Capitals

The Five Capitals model identifies five sources of value: natural capital, human capital, social capital, manufactured capital, and financial capital.[5] Possibly with the exception of some service businesses, all firms begin with natural capital; in one way or another, all goods come from natural sources (and many goods ultimately return to nature). The natural capital is then transformed with the knowledge and skills provided by human capital and by society's infrastructure and community institutions. Manufactured capital, consisting of machinery and technology, transforms these combined sources of capital into a new product or service. And financial capital, which is involved throughout this process, enables each of the other forms of capital to flourish and become valuable. Financial capital, unlike the other sources of capital, has no unique value by itself; it only has value in concert with the other parts of the process.

The purpose is for firms to appreciate the different sources of costs and benefits along its entire value chain, from nature to market, from cradle to grave. Value can be created at every point, and value

can be destroyed at every point. Investors must realize that value does not just come from the financial capital but originates with natural capital and is developed throughout the process. Through this perspective, firms appreciate that value creation is a long-term, integrated process, dependent on many sources of influence.

Triple-E Framework

The Triple-E Framework focuses on an individual firm and encourages it to think about where it is—and where it wants to be—along a continuum of sustainability orientations. Along this continuum, there are three benchmark levels of sustainability: extraneous, emergent, and embedded.[6]

- *Extraneous:* Firms with an extraneous sustainability orientation have not internalized human, social, and environmental strategies into their operations. Any sustainability-related investments are primarily for greenwashing or public relations purposes. The firm does not have any products or services that have internalized sustainability, and the focus is solely on the financial bottom line—as if it is independent of human, social, and environmental sources of value.
- *Emergent:* Firms with an emergent sustainability orientation have embraced value creation through sustainability in certain areas or products. The firm has developed some competencies and competitive advantages related to investments in sustainability, but it has not done so throughout its entire value chain. While the firm as a whole may still be focusing on the financial bottom line, it does appreciate that human, social, and environmental investments can impact the firm's value. As a result, there are mixed messages and identity conflicts within the firm.
- *Embedded:* Firms with an embedded sustainability orientation would not exist without sustainability-related investments. Sustainability represents the identity of the firm and drives the firms operations, systems, and decision making. Sustainability is in the firm's DNA and is the source of the firm's competitive advantages. The firm fully internalizes the long-term perspective encouraged by a Triple Bottom Line reporting: value is created by the interdependence of human, social, environmental, and financial value drivers.

The Triple-E framework does not say that having an embedded orientation is necessary for value maximization; it allows for different firms to identify what orientation is most appropriate for them and their stakeholders. However, when viewing these orientations

along with the Five Capitals and Triple Bottom Line perspectives, it is hard to imagine that firms can maximize value with an extraneous orientation in today's economic climate. Value is created by each source, and by treating the human, social, and environmental sources of capital as extraneous, the firm cannot create unique value from these sources. Using human, social, and environmental sources of capital is not optional, but maximizing the value created by these sources of capital is. Firms can maximize that value only by having an embedded appreciation for the costs and benefits derived from sustainability-related investments. Whole Foods certainly has an embedded orientation; Nike's and Interface's orientations are more nuanced, since neither firm was founded due to sustainability-based drivers. However, both Nike and Interface have been making significant investments to get sustainability more embedded in their strategies and operations, and both continue to do so.

Global Reporting Initiative

Management professor and guru Peter Drucker is famous for reminding us that "what gets measured gets done" (he's famous for many other reasons, too).[7] For public companies in the United States since at least the 1930s, what has been measured is financial performance—through quarterly and annual filings with the Securities and Exchange Commission and through quarterly earnings reports to the investment community. As a result, what has gotten done is firms have focused on financial performance on a quarterly basis. Financial reports created with generally accepted accounting principles (GAAP) drive the firm's strategies and decision making.

In 1999, the Global Reporting Initiative (GRI) created an integrated reporting framework to encourage firms to go beyond just reporting GAAP-based financial performance and to also include objective and measurable sustainability reporting.[8] The GRI framework requires firms to report performance in three categories: economic, environmental, and social performance. In order to report on performance in each of these categories, firms are required to define objectives and standards, set goals, measure performance, connect strategies to outcomes, and integrate a sustainability strategy into their core operational and strategic planning. As a result, the categories become integrated. Investments in social and environmental performance may come at the expense of economic performance in the short term, but they will optimize economic performance in the long term—if they are the right investments. Firms have mastered

financial reporting for decades; by reporting their environmental and social performance, firms will pursue strategies that incentivize them to maximize their performance in these nonfinancial areas, and this will, in turn, drive value maximization in financial terms, too.

There are many other models of sustainability, but this short list captures the spirit of the models well enough. The key takeaway is that firm value is an integrated, holistic, and dynamic ideal. We can use different terminology and frameworks, but the result is the same: firms can maximize their value only if they pay attention to all sources of value creation and recognize how value is created over the long term, not just how profits are measured in the short term.

The business case for sustainability

A 2012 study by the consultancy Deloitte showed that chief financial officers (CFOs) are becoming more involved in their firms' sustainability strategies and decision making.[9] In the study, more than half of the 1,000 CFOs from around the world said that their involvement in their firm's sustainability strategy had increased during the prior two years and more than 60 percent expected their involvement to increase over the next two years. CFOs are likely to be the new champions of sustainability. Why? There are at least two possible reasons.

First, CFOs have the financial responsibility to hedge or manage purchasing decisions related to resource procurement. Southwest Airlines in the 2000s is a good example. Southwest Airlines used purchases of jet fuel futures contracts to mitigate the potential risk of rising costs, effectively locking in a price for 6 or 12 months into the future and paying much less for fuel than the market price, as market prices increased dramatically during the mid-2000s. This is one reason that Southwest enjoyed significant value creation during a time when many other major airlines were in severe financial difficulty. Obtaining resources at the best price will always be a critical part of any CFO's job.

Second, CFOs are responsible for overseeing all of the firm's investments. While chief executive officers (CEOs) and other executives may be responsible for the firm's operating and sustainability strategies, CFOs are responsible for doing the math, calculating value creation, and ultimately determining the financial impact of any investment and whether or not it is a good use of the firm's

financial resources. If CFOs can show that sustainability-related investments—or investments of any nature—create value, then those investments are likely to get made. Therefore, it's important to understand the criteria that CFOs use to evaluate sustainability-related investments. The ultimate criterion is whether or not the investment adds value; to determine whether an investment adds value, we need to understand the business case for any investment and the value drivers that will determine the success or failure of that investment.

In chapter 1, we mentioned six primary factors that can be used in making the business case for any investment: increased market access, greater risk mitigation, innovation, greater operating efficiency, regulatory compliance, and image enhancement. In practice, there can be considerable overlap among the factors, as a single investment may generate cash flows and value from more than one at the same time, such as innovation and efficiency or market access and image enhancement. Ultimately, of course, it doesn't really matter which factor creates the cash flows, only that the investment creates value.

Increased market access, through better alignment between products and preferences

In 2013, Whole Foods acquired My Street Grocery, a mobile food access company based in Portland, Oregon.[10] At the time, My Street Grocery had one employee-founder, a truck, and a mission to get healthy and affordable food into areas of Portland where access to healthy and affordable food was limited. The founder, Amelia Pape, identified a number of food deserts (the areas with limited access) and other locations where the business could have a significant impact: senior living facilities and low-income areas overrun with convenience stores and fast food restaurants. My Street Grocery also established partnerships with hospitals and recovery centers to promote healthier food as a complement and driving force behind healthier living and recovery. My Street Grocery ran markets at different locations, with loyal and enthusiastic customers. But these were My Street Grocery's customers, not Whole Foods' customers. In downtown Portland, a well-off uptown neighborhood is adjacent to a lower-income area with limited access to healthy food (Old Town); there is a Whole Foods in the uptown neighborhood, and there are lots of convenience stores in Old Town. My Street Grocery held once-a-week markets in Old Town

where customers loved stocking up on fresh fruit, vegetables, milk, cheese, and other groceries. The customers were buying the same items they could be getting anytime just five blocks west at Whole Foods—but they wouldn't go to the Whole Foods store. The My Street Grocery customers did not identify as Whole Foods' customers and did not shop there because it wasn't their place.

In late 2013, after two years of operations, My Street Grocery joined forces with Whole Foods to increase the impact, to broaden its scope and scale, and to connect customers and markets. With one employee and one truck, the economics for an independent My Street Grocery might have been pretty challenging, but with the resources of Whole Foods, which can supply a greater product mix at better prices and can afford to invest in multiple trucks and employees, the economics of food access begin to look much more promising. Upon launching the Whole Foods-My Street Grocery markets in 2014, Whole Foods Markets acknowledged that it was going to run the My Street Grocery markets on a break-even basis—meaning that it was not looking for any direct profits from its mobile food markets. If the direct revenues could cover the expenses, that would be fine. And it would be fine because the real profits and value—for a firm like Whole Foods, with $13 billion in annual sales—would be unlikely to accrue from small margins on produce and groceries sold off a truck, at a dozen or two markets a week, in one city. The real gains would come from opening new markets and from opportunities associated with food access.

The Whole Foods-My Street Grocery program began operations in early 2014 with one truck (technically it's a trolley) in Portland, Oregon. What if the program has three trucks in 2015 and is able to serve three times as many areas around Portland with limited food access? What if the program expands to Seattle and San Francisco in 2016 and then to Detroit, Chicago, Cleveland, New York, and Atlanta in 2017? And maybe My Street Grocery's loyal and adoring customers who visit the market in Old Town once a week will begin to identify themselves as Whole Foods customers and will feel comfortable walking those five blocks west to the Whole Foods store that is always there and doing the bulk of their shopping there? This is food access for the customers—and it's market access for Whole Foods.

What are the cash flow effects?

Whole Foods probably had to write a check to acquire My Street Grocery's business, it has to pay Pape a salary, and it had to buy

the trolley for the markets. Those are significant cash outflows. And if it is currently operating the program on a break-even basis, the operating expenses and revenues should offset each other. So where is the value? The value comes from the potential cash inflows from opening new markets (that may not be run on a break-even basis), from the mobile market customers doing more of their shopping at Whole Foods stores, and potentially from partnerships with hospitals or other agencies that support access to healthier food for their clientele. Those are the direct cash inflows; the indirect cash inflows could be much greater. Whole Foods is no longer just for the uptown crowd (not that it ever really was), but it's for the Old Town crowd, too. Whole Foods is investing in and connecting with the entire community and sharing value throughout its neighborhoods. Whole Foods has built much of its value and mission on doing well by doing good, and this investment is no different. If certain members of its community are unable to get to its stores to buy healthy food, then Whole Foods will take the healthy food to them. Much of the value to Whole Foods is likely to come from its traditional uptown customers who place high value on initiatives such as this (or from helping others and connecting with community). That will likely generate more loyal customers, which means more revenues and higher margins. Accessing new markets can generate new opportunities and cash flows, it can also be a way to enhance or improve value from existing programs and markets.

Greater risk mitigation, through greater control over resources

In 2013, Nike's value chain—from planning to production to sales to reuse—used 217 billion gallons of water.[11] Most of this, 83 percent, was used in the design and materials stage; 63 percent of Nike's total water use, or more than 135 billion gallons, was used in growing cotton. As Nike grows and as populations increase in areas close to Nike's production facilities, access to clean water will become more and more constrained. Further, Nike's use of scarce water in rural or developing areas can have long-term negative impacts on people and communities. Nike uses sophisticated data-collection techniques to better understand water—including verifying geospatial coordinates to assess the water used in its suppliers' and subcontractors' processes. With this data, it can determine where improvements can be made and where the water supply risks are greatest.

Understanding where the water use is greatest and most vulnerable is only half the battle; the other half is in the company changing its actions to reduce the negative impacts. Nike could refuse to buy the cotton from suppliers not meeting its water use standards. And Nike can affect water use in the design of its products. In 2013 Nike launched its ColorDry technology that eliminates water use in the dyeing process (it eliminates certain chemicals in the dyeing process, too). The innovative ColorDry process uses recycled carbon dioxide, eliminating the need for water; considering traditional dyeing procedures require 30 liters of water to dye a single shirt, the water benefits of this technology can be enormous.

In 2011, Nike set the goal of improving water efficiency by 15 percent per unit in footwear manufacturing and apparel finishing by 2015. By 2013, the company had already increased water efficiency in footwear by 23 percent and in apparel by 10 percent. The company used over 800 million fewer gallons of water in footwear manufacturing in 2013 compared to 2011. This may seem like a drop in the bucket compared to the total of 217 billion gallons, but every drop matters. In 2013, almost 800 suppliers and vendors were participating in the Nike Water Program, where participants self-report the water they're using; this number of participating factories is up by more than 50 percent since 2011. What gets measured gets managed. Nike and its suppliers recognize the value of water and are investing today to make sure it is available in the future. This may be even more critical for small vendors in developing nations than it is for Nike itself, as the vendors' business survival and relationship with Nike may be largely dependent on their ability to have clean water in the future. Mitigating the risk of not having that water available is an investment Nike believes will pay big dividends in the future.

What are the cash flow effects?

Investing in risk mitigation may not have many short-term benefits, but it can lead to significant benefits over the long term. With Nike's investment in water, if it invests enough today in reducing water use, it may be able to avoid, or at least lessen, any future consequences. That's the whole point. Risk mitigation, like Nike's efforts to reduce water usage, is costly today. Organizing suppliers, setting standards, and monitoring all take work (and resources). Those are cash outflows. These outflows may continue indefinitely into the future; ideally, as the risks become smaller, the outflows

would become less. The benefits associated with these investments, in this case, will be an abundant availability of clean and affordable water for Nike and its suppliers to use in the future. A further benefit is the avoidance, now or in the future, of drought, which would have devastating effects on Nike's ability to produce footwear and apparel. In the most extreme scenario, without water Nike may not be able to generate any revenues. Nike wants to make the necessary investments today to ensure that never becomes a possibility.

Innovation, by challenging firms to create new products and processes

In 2003, Interface partnered with the local landfill in LaGrange, Georgia, where Interface has a factory, to use methane that was coming out of the landfill to power the factory.[12] The city paid for getting the methane from the landfill to the factory, and the company changed its boilers and systems. In exchange, Interface pays the city for its methane energy use. Interface believes that there will be several decades of methane available from the landfill, during which both Interface and the city can reap the rewards of their investments. These rewards are numerous: cheaper energy for Interface, cleaner energy for Interface, improved image for Interface, a revenue stream for the city of LaGrange, a longer life for the landfill since the mass decreases as the methane is extracted, and a more pleasant living environment for the residents living near the landfill.

What are the cash flow effects?

Both Interface and the city of LaGrange had to invest in the capital equipment necessary to get the methane to the factory and to convert the methane into energy. Those are the initial outflows. But for as long as the methane exists, Interface will have lower annual energy costs than it did before when the factory was powered with natural gas. Any renewable energy credits earned as a result of this project may ward off regulatory fees or expenses in the future. And since Interface has received considerable recognition for this factory, including receiving an Energy Partner of the Year award from the US Environmental Protection Agency in 2005, it is likely Interface earned a boost in revenues due to the improved image. The city of LaGrange receives consistent revenue from Interface for its methane, which is much better than the $0 it was receiving for letting the methane rot in the dump, and it can defer investing in a new

landfill since this one will last longer. Finally, the improved quality of life in the area likely results in increased economic activity, increased home values, and more effective use of tax dollars. This is a case of innovation benefiting multiple stakeholders, creating both individual and shared value.

Greater operating efficiency, lowering costs through different resources and technologies

Interface converting methane into energy at its LaGrange factory is an example of innovation leading to greater operating efficiency. Interface has also achieved significant savings from operating efficiencies in less revolutionary ways. Taking simple steps, such as monitoring energy usage with real-time displays, puts the issue directly on employees' minds and encourages them to think about what they could be doing to reduce energy use. Installing skylights and solar tubes in factories takes advantage of solar warmth; installing more efficient heating, ventilation and air conditioning units, and lighting systems are straightforward eco-efficiency investments. Across Interface's global business, energy use per square yard of product decreased by 39 percent from 1996 to 2013—from a total of 14,000 BTUs to 8,400 BTUs (as revenue has been basically flat).[13] Many of these improvements in operating efficiency have come from initiatives led by employees; in 1995 Interface employees launched *Quality Utilizing Employee Suggestions and Teamwork* (QUEST), a cross-disciplinary, employee-led program to identify ways to reduce waste at the factories and to identify efficiency opportunities. *QUEST* has spawned many success stories over the years, including an employee redesigning a century-old process for feeding yarn into production via moveable rather than stationary systems. The result is an estimated 54 percent savings in scrap yarn.

What are the cash flow effects?

Many of the direct efficiency gains have come from straightforward eco-efficiency investments: spend a little money today on a new HVAC system or on a skylight and accumulate the energy savings over the long term. These savings can result in direct and long-term cash savings (54 percent less scrap yarn is 54 percent savings in scrap yarn costs). There are also substantial indirect effects: employee empowerment and engagement, mission alignment across the organization, freedom to innovate and take risks, and

increased productivity—all resulting in higher revenues or lower operating expenses; perhaps Interface can pay lower relative salaries when employees feel passionate about their work and their connection to the company's mission.

Regulatory compliance, by meeting standards or requirements that enhance operations

Regulatory compliance can be legal compliance imposed by governments, or it can be a voluntary compliance with industry or association standards. Whole Foods has a history of selling only seafood that meets such standards.[14] The Marine Stewardship Council (MSC) is a London-based nonprofit, established in 1997, devoted to setting the standards for sustainable fishing practices. Such practices include avoiding overfishing and having minimal impact on the ecosystem and fishery waters. MSC works with partners, from nonprofits to corporations, to establish these standards, with the ultimate goal of ensuring the long-term sustainability of the world's fishing stock. Informed customers recognize the blue MSC-certified label, and they know what it means. Whole Foods has been partnering with MSC since 1999, when it became the first retailer in the United States to offer MSC-certified seafood. Whole Foods is not alone in understanding the value of MSC-certification: both McDonald's and Walmart also sell MSC-certified wild-caught seafood.

But not all seafood is MSC-certified. As a result, Whole Foods has to decide whether it should sell only MSC-certified seafood, or whether it should sell both MSC-certified seafood and seafood that has not been certified by MSC. As with any economic decision, there are costs and benefits to either option. Whole Foods has opted to sell both certified and non-certified seafood, with a small catch: it has worked to be transparent about the source of the non-certified seafood so that customers can make informed decisions. There are also many seafood products that Whole Foods will not sell because of their irresponsible sourcing, such as sharks, bluefin tuna, and Chilean sea bass. Whole Foods does want to give its customers the ability to vote with their wallets, but it also has to maintain overall high standards for any product it sells. Since 2010, Whole Foods has partnered with Blue Ocean Institute and Monterey Bay Aquarium to provide sustainability ratings on all wild-caught seafood it sells that is not MSC-certified. All seafood is labeled as green (from well-managed fisheries with little harm to ecosystems), yellow (from fisheries

with some concerns about their practices), or red (from fisheries that are poorly managed, overfished, or cause harm to the ecosystem). Whole Foods does not sell any red-labeled seafood, and clearly labels the green and yellow seafood. While these standards are not legal requirements, they are extremely important as they clearly signal the quality of the product and the company's values.

Is this example of Whole Foods' seafood certification an example of regulatory compliance, or is it more appropriate to consider it image enhancement or risk mitigation? Or could the creation of standard and indices be considered innovation? It doesn't matter; it's okay for there to be practical overlap between these six business case drivers.

What are the cash flow effects?

Whole Foods has to invest time and money in setting up the relationships with MSC, Blue Ocean Institute, and Monterey Bay Aquarium. It has to label the products and train its employees to know the differences between ratings and to be able to communicate this to customers. Whole Foods might be losing some sales from the red-labeled seafood or other prohibited items, as some customers would still purchase them. The inflows come from increased sales from customers who value the higher-quality fish, sustainability, and transparency. Customers are likely to become more loyal to Whole Foods because of this transparency and because Whole Foods won't sell certain qualities of seafood. Further, from the perspective of risk mitigation, if there ever are legal regulatory standards established for retail seafood quality, which may not be an unreasonable assumption if the quality of global seafood stocks becomes compromised, Whole Foods will be ahead of the competition by having both internal and external compliance standards already established. If that happens, Whole Foods can likely continue doing what it's been doing, rather than having to stop selling certain products or having to completely structure new compliance systems. There is considerable value in that compliance risk being minimized.

Image enhancement, both internally and externally

In 1998, Nike cofounder Phil Knight gave a speech at the National Press Club recognizing both internal and external concerns with Nike's contract labor practices. "The Nike name has become synonymous with slave wages, forced overtime and arbitrary abuse," he

acknowledged.[15] Nike had long been a target of critics who attacked labor practices at its contract factories. Throughout the 1990s, Nike responded defensively, claiming the company had no responsibility to control the actions or standards of the factories in developing countries. Many Nike customers disagreed, and they protested in many ways, including with their wallet. By the mid-1990s, the company was trying to figure out how to quell student protests on many college campuses. In 1987, Jill Ker Conway joined the board of directors. Conway was the former president of Smith College as well as the first female member of Nike's board. She was critical in helping the board understand women's issues and students' perspectives. Her expertise was invaluable during the mid-1990s as the company developed a strategy to address its reputation as a lousy corporate citizen. Conway personally visited many contract factories to learn what conditions and attitudes were really like. She talked with the workers, mostly young women, to appreciate what their relationship was like with their employer.

This research led to at least two significant outcomes. First, in January 1998, several months before Phil Knight's speech at the National Press Club, Nike hired its first vice president of corporate responsibility, Maria Eitel. And second, Nike began publishing the results of the factory conditions research and being transparent about what it was doing in response to these challenges. To implement changes, Nike began partnering with nongovernmental organizations (NGOs), holding training sessions in the factories, and engaging the broader board of directors in the strategic decisions related to corporate social responsibility.

In the late 1990s, Nike's corporate responsibility efforts involved more environmental concerns, looking at many of the issues it is focused on today: recycling and reuse of materials, water usage and toxic chemicals in the production process. In 2001, Nike became one of the first US companies to have a board-level corporate responsibility committee. By 2004, the corporate responsibility department at Nike headquarters had 150 employees and it was taking a fully-integrated stakeholder view on its sustainability issues, incorporating labor, social, community, and environmental perspectives. Nike began looking for innovative ways to address sustainability in its operations. Rather than try to monitor the safety aspects of every factory all of the time, Nike looked at ways to make its operations safer so there would be less that needed monitoring (such as using less toxic glues and chemicals). In the course of 10 years, corporate

responsibility at Nike had gone from defensive (and probably ineffective) public relations to a source of growth and innovation. It had gone from an extraneous sustainability orientation to an embedded orientation—maybe not embedded in all aspects, but in certain ways and functions.

Nike's image had been significantly transformed in the course of a decade. The change came from the top, when Phil Knight acknowledged the issues and became personally involved in making changes (he attended every meeting of the corporate responsibility committee in its early years). The change continued when the company made significant investments in improving its culture and actions throughout the organization: on the board, at headquarters in Oregon, and in operations around the world. It wasn't mere greenwashing; much of the work Nike was doing was internal and was never seen by the public or the company's critics. Nike recognized that its image in the mid-1990s was destroying value, and it invested to transform its image; genuine integrated transformation was the only way to create value in the long term. Nike may never have the sustainability or image of a Patagonia or a Stella McCartney, but the company has come a long way since the mid-1990s. These six business case drivers are not mutually exclusive; we could have used this same Nike story to illuminate market access (new customers), innovation (new systems), operating efficiency (long-term cost control), risk mitigation (lower risk in revenues and costs), or regulatory compliance (lower costs). Each of the other business case drivers impacts image, and image impacts each of them.

What are the cash flow effects?

Nike's image revitalization has clearly identifiable cash outflows but abstract and indirect cash inflows. As it began addressing its issues in the late 1990s, Nike invested in researching factory conditions, auditing factories, paying higher wages in factories, hiring a vice president of corporate responsibility, establishing a 150-person corporate responsibility department, devoting board time to sustainability issues, integrating sustainability and innovation into operations, and subsequently expanding this commitment over the course of two decades. The cash inflows primarily come from increased sales revenue (or from decreased lost sales revenue). As the strategic and operational initiatives that were behind the image enhancement become more embedded into the firm's decisions, cash inflows will come from increased innovation in products and systems (higher

Table 4.1 Summary of Business Case Value Drivers

Business Case Driver	**Typical Cash Flows Resulting From Business Case Driver**
Increased Market Access	Increased revenues as a result of new markets, customers, and products
Greater Risk Mitigation	Cash outflows in the short term, reduced expenses or increased revenues over the long term
Innovation	Increased revenues if the innovation is due to product, reduced expenses if the innovation is largely due to people and processes
Greater Operating Efficiency	Reduced expenses over both the short and the long term
Regulatory Compliance	Reduced expenses over the long term, possibly in the form of avoided legal and restructuring expenses
Image Enhancement	Increased revenues over both the short and the long term

revenues, lower operating costs), greater employee engagement and productivity (both at the factories and at headquarters), lower risk, and many other sources.

Small short-term cash outflows and large long-term cash inflows are the common theme across all of these sustainable financial investments. That's the common theme across many types of financial investment—if they are good investments. The other common theme across these business case drivers is that they are integrated and not mutually exclusive. Value creation comes from many sources, both directly and indirectly. Trying to characterize it or associate it with one particular driver is a useful exercise as we try to understand the potential cash flow effects of any investment, but it need not be performed too literally or prescriptively. The goal is not to characterize the nature of the value driver; the goal is to determine what effects any potential investment has on cash flow. The business case analysis is the means to an end, not the end itself (see table 4.1).

The relationship between sustainability and firm performance

Spoiler alert: our next chapter, chapter 5, is all about measuring the value of any investment in direct and objective ways. Measuring the

impact of investments in sustainability—or any investment—is a challenging process because it's about predicting the future. Before the fact, we can create the story or business case to support just about any investment. But at some point we do want to see what our investments are doing and whether or not they are having the impact, financial or otherwise, we anticipated. You might think that measuring the impact of sustainability-related investments after they've been made would be easy; unfortunately, you would be wrong.

If you buy 100 shares of Microsoft stock for $40 and then sell them for $46 a year later, it's simple to determine the return on your investment: ($46 – $40) / $40 = 15 percent return on investment. Unfortunately, there are few other investments for which it is this simple to calculate the return on investment. In order to calculate a return on any investment we need to identify and measure the specific cash flows that were created as a result of the initial investment as well as exactly when each cash flow occurred. With corporate investments—in product design, R&D, employees, factories—it is not that easy. This is especially true with investments in human, social, and environment-focused projects because of the indirect nature of many of the cash flows.

Think about you and your job. You are an investment for your company. It's reasonably easy to identify the cash flows that flow from the company to you; if you have a complicated compensation arrangement including bonuses or stock and option awards, even this easy part of the calculation can become difficult to quantify. But what are the cash flows back to the company in return for its investment in you? Those cash flows probably occur in the form of increased revenues, decreased sourcing costs, new product designs, more efficient and less costly operations, or something else. But what are these cash flows? And when do they occur? Those questions are nearly impossible to answer.

To see the practical difficulties in measuring the performance of any investment in a sustainability-related project, consider Interface's waste program. Interface has a goal of zero waste for all of its production, retail, and office facilities. From a business case perspective, this goal probably hits two or three of the value drivers, but the cash flow gains from efficiency are the primary factors that will create value. In order to understand how to get to zero waste, it is important for the company to know where it stands and what the sources of waste are. To this end, Interface developed a simple yet

structured approach to measuring waste and working toward zero waste.[16] This approach could be modified for other sustainability-related investments to encourage a culture of continuous improvement and working toward the end goal. The Interface approach includes five steps:

1. Manage on a macro basis but measure on a micro basis.
2. Make the waste measurement number relative to output—don't focus on an absolute number.
3. Index relative waste costs and amounts to a historical baseline.
4. Measure consistently and fairly from one business or facility to the next, but only compare each business or facility with itself.
5. Post the progress and results for all to see.

Everything is relative, and transparency is critical. With this approach, Interface is confident it can continue working toward, and get to, zero waste across the company. This approach can help the company identify what waste it is producing, and by analyzing the waste production over time, the company can identify what the waste costs are and what the savings are from this program. This approach, however, does not address whether or not the result will be worth the investment. Should Interface be working toward zero waste? What are the costs associated with this goal? Where is the value in this program? Who cares? How much do stakeholders value this program?

For any company, determining whether or not increased investment in sustainability-related projects leads to competitive advantages, improved performance, and increased value is extremely difficult. We can analyze what sustainability-related investments the firm has made during any period of time; that part is easy. And we can analyze how profits or firms value have changed; that part is easy, too. But determining whether or not these sustainability-related investments directly led to any changes in the firm's value is extremely difficult. We can also perform case studies on specific firms and their investments—such as we've been doing with Nike, Whole Foods, Interface, and others—to see what specific strategies are being employed. Researchers spend their careers trying to design testing methods that will establish such causality; yet even the most sophisticated methods struggle to purely isolate direct causality. We identify associations, and we can control for all sorts of internal and external factors—such as firm size, past performance, industry performance, and economic environment. We perform statistics-based

studies on large samples of firms (say, hundreds or thousands of firms) over a long period of time (say, 5 to 20 years) to understand general relationships. The findings in these studies may or may not apply to any particular firm and they certainly may not apply to future investments and performance.

In these studies, researchers will typically look at abnormal profits or abnormal value creation; that is, they will try to isolate the profits or value the firm generated over and above some benchmark, such as an industry or market standard. If the overall market has an average stock return of 10 percent, we would not be surprised to see that a particular firm also enjoyed a return of 10 percent. We might just attribute the firm's entire return to market-driven factors. But if a company enjoys a return of 15 percent, then some of this return might be due to firm-specific factors and investments, beyond what the average firm returned. All returns—profits, value creation, or impact—are relative, and we want to distinguish what part of any return is expected and what part is unexpected or abnormal. This research can inform our general understanding of these relationships across a broad swath of firms, industries, and time periods. A sampling of research shows some consistent—but certainly not unanimous—findings that sustainability-related investments do lead to increased firm value.

Joshua Margolis, Hillary Anger Elfenbein, and James Walsh[17] perform a meta-analysis of dozens of academic studies looking at the relationship between corporate social responsibility (CSR) and firm performance and other firm characteristics. In looking at 35 years of such studies, their general finding is something of a buzzkill: there is, at best, a weak association between CSR and firm performance. Importantly, however, they find that there is no risk or penalty associated with making CSR investments. Overall, in analyzing dozens of studies across several decades, they find that, at worst, there is no benefit from investing in CSR. But at its best, investing in CSR can add significant value to the firm. With this in mind, let's consider several unique perspectives on the relationship between CSR and firm performance.

Alex Edmans[18] studies how the companies in *Fortune* magazine's annual list of "100 Best Companies to Work For in America" performed between 1984 and 2009 relative to all other firms. He finds that these companies outperform the overall market by 3.5 percent per year, and they outperform their industry peers by 2.1 percent per year. That is, firms that take care of their employees end up

taking very good care of their investors; firms that invest in their employees are very good investments for stockholders. This result epitomizes the stakeholder model of firm ownership: in order to create value for any stakeholder, firms must understand the priorities and preferences of all stakeholders.

My own work[19] studying corporate social responsibility at financial institutions shows a positive relationship between CSR and firm performance—but only for certain CSR investments. I break down the CSR investments into seven types of investments: community relations, diversity programs, employee relations, corporate governance, environmental issues, human rights, and product responsibility. I find that those banks with the highest overall CSR performance across these seven categories have the best operating performance and the highest stock valuation when compared with the market as a whole and with other financial institutions. However, there is a negative relationship between investments that are seen as greenwashing—such as community relations or superficial diversity programs. This, again, shows that profits and value are created through investments in all parts of the firm, and that firms can outperform by making long-term investments in sustainability-related projects.

Caroline Flammer[20] studies shareholder proposals related to CSR investments. These are CSR-related projects the management or board is considering and that require shareholders' approval. She finds several important results. First, adopting CSR-related proposals leads to superior financial performance. Second, this effect is smaller for firms that already have better CSR, suggesting that firms with weak CSR can benefit more by making CSR-related investments. Finally, this effect is stronger for firms in industries that have high CSR standards or norms. These results hold across all different types of CSR investments, showing that shareholders understand the long-term value that they can realize as a result of the firm making such investments.

Finally, Robert Eccles, Ioannis Ioannou, and George Serafeim[21] compare corporate cultures of sustainability across 180 firms, including firms that voluntarily made social and environment-related investments many years ago and firms that have made virtually no such investments. They find that firms that made such investments are more likely to have structured stakeholder engagement processes, to have engaged boards of directors, and to be more long-term focused. They also find that these sustainability-oriented firms enjoy superior financial performance relative to firms that did not

make such investments, in terms of both accounting performance and stock market performance. Interestingly, this outperformance is strongest at firms and in sectors where the customers are individuals rather than companies—which tells us something about the revealed preferences of different stakeholders.

This literature review could go on for pages, and a similar literature review could highlight studies that fail to find the relationships identified above. But the preponderance of evidence does show that investing in sustainability-related projects does not destroy value and can create value in many situations. The above studies are just a few examples of how such value creation has been found. The takeaway from this brief review is that firms should continue to search for any investments that create value, and when looking at the firm as a complete nexus of different stakeholders, value can absolutely be created through human, social, and environment-related investments.

Social impact and social entrepreneurship

To economists, value is created when social welfare increases. Social welfare increases when market participants' utility increases as a result of economic choices. One of the primary reasons that we have governments is to provide goods and services that cannot efficiently be provided through normal market actions: schools, roads, public safety, defense, security, health care. Markets do not provide these services because it is inefficient or impractical to do so (how would I even go about building my own roads?). To economists, this is the government's way of correcting some market failure—providing a social good that otherwise would not have been provided by normal market activity. But governments are not always complete or successful in their efforts to correct these market failures. Enter the social entrepreneur. Social entrepreneurs are business people, driven by two desires: (1) the desire to address a social problem, and (2) the desire to earn a profit. Social innovation, social impact, and social entrepreneurs are all synonyms for this ideology. Social entrepreneurs see social problems as opportunities to make an impact, a change, and, hopefully, a profit.

Think about My Street Grocery. Food deserts force many residents to get their groceries from convenience stores and fast food restaurants. My Street Grocery drives around to these different food deserts and sets up a market for a morning or an afternoon. Or think

about Husk Power Systems, an Indian company working to generate affordable renewable energy in rural areas—by using discarded rice husks.[22] Through late 2014, the program has directly impacted 200,000 lives and saved over 9.2 million liters of kerosene. Or think about EcoZoom, which has created a clean burning and highly efficient cookstove, powered by wood, charcoal, or solid biomass.[23] The stoves use 60 percent less energy and produce 70 percent lower emissions than traditional stoves. EcoZoom is looking to change lives and environments in developing countries; it is partnering with NGOs and hopes to distribute 600,000 stoves in Rwanda by the end of 2015. Each of these social entrepreneurs share two common goals: fix a social problem and create value.

Entrepreneurship and social innovation are not solely the domain of independent start-ups. Mars Corporation—the maker of Snickers, M&Ms, and other delicious treats—is getting in on the act, too. Mars is partnering with local governments and NGOs in the Ivory Coast, where much of the cocoa for its chocolate is sourced, to improve the farming practices and work conditions of its farmers.[24] Mars believes that these investments can triple the cocoa yields, improving the reliability of the firm's raw materials source and improving the lives and welfare of 500,000 cocoa farmers in the Ivory Coast alone.

These are just a few examples of social innovation and social impact investments. In many ways, these investments are no different than any other investment a firm or individual can make: the value of an investment is completely determined by the future cash flows it creates. The key to adding value with these investments is to analyze the business case and to understand how value can be created through the various stakeholders. As with many such investments, the tricky part is identifying and quantifying those cash flows. You can imagine that many of these related cash flows are abstract, indirect, and very long-term. Nevertheless, these examples show how some committed entrepreneurs are investing in creating value by solving social problems; these are examples of social entrepreneurship and shared value—value being created for individual firms and for broader communities.

I should warn you that if you're a passionate and committed believer in the value of social impact and social innovation, in the need for firms and entrepreneurs to address social needs beyond mere financial profit, you might want to be careful about sharing this passion with a classical, rational economist. Classical, rational economists believe in markets, possibly too much. Market failures

do not really exist to rational economists; markets provide everything we need and want, in the right amounts and at the right prices. If something is not provided, it's because market participants do not value it. There may be a need for government intervention where rational markets do not have the incentives or scale to efficiently provide certain goods and services (such as education), but the reason that some businesses do not succeed is because society does not value them.

To economists, few businesses have a greater social impact and create more social welfare than Walmart. Customers love Walmart: it generates more revenue than any other company in the United States. Walmart employs approximately 1.4 million people in the United States (2.2 million people worldwide); despite what some critics may allege, these employees also value the company.[25] Every day that they show up for work and accept a paycheck, they are casting a vote for Walmart and acknowledging the social value that Walmart creates—and the value that Walmart provides them. Suppliers love Walmart, too, as established firms and aspiring entrepreneurs are constantly competing for Walmart to stock their products. And investors love Walmart, too. As of mid-2104, Walmart's stock is worth a cumulative $250 billion, and 4 of the 10 richest Americans are descendants of Sam Walton, who founded Walmart in 1962.[26] Non-Walton investors have also benefited from Walmart's profitability and value creation over the years. In the 30 years since 1985, Walmart's stock price has increased by a factor of 85 (+8,500 percent); the average US company's stock price has increased about elevenfold over the same period (+1,100 percent).[27] In the 10 years since 2005, Walmart's stock has increased about 73 percent compared to 65 percent for the average US company. From any stakeholder's perspective, this is the epitome of value creation. This is the epitome of social value—Walmart has created and still creates enormous value for its stakeholders and for society.

In truth, even the most ardent, classical, rational economists would probably allow that markets are not always perfect and complete. Market failures do exist. That's where entrepreneurs, innovation, and competition add to social welfare. That creates opportunities, too. These entrepreneurs are not always independent individuals starting their own businesses, as the Mars Corporation example shows. Entrepreneurship is a mentality, not a job description. It is possible to be working within a larger corporation and still be entrepreneurial. To some, these people are intrapreneurs; to classical, rational

economists, these are employees. The semantics are irrelevant; it's all about the investment and its impact. Whether it's a start-up providing more efficient stoves in Rwanda or Walmart working to provide the lowest possible prices on everything, value creation comes from the same economic drivers: are there stakeholders who care about this mission and who are willing to partner to create value? For any firm, success is determined by economic factors; but, for all firms, it is the mission that drives those economic factors.

Transparency and communication: Corporate social responsibility reporting

Each publicly traded firm in the United States prepares an annual financial report because the Securities and Exchange Commission requires them to do so. The financial statement information in these reports is largely standardized and prepared in accordance with generally accepted accounting principles (GAAP). While specific GAAP rules and procedures do change to adapt to changing economic circumstances, the basic structure and information in these reports has been largely the same for decades. Investors and other users of financial statements know what to expect from them and how to read them. We know how to interpret the revenue and net income numbers on the income statement. We know the balance sheet data is a snapshot of financial condition at a specific point in time, like looking at our own periodic bank statements. Sophisticated readers know that the cash flow statement is way too much of an accounting creation to be interpreted literally, and they know that some of the most important information in the entire document is in the footnotes to the financial statements (really, that's where the good stuff is). Really bored readers may spend their weekends reading through the management discussion and analysis sections to see why the company thinks certain accounts have increased or decreased over recent years. We can also look at other required filings, such as the proxy statement that has considerable information about the firm's corporate governance and compensation policies, or the Form 4 that discloses when company managers and directors buy or sell any of the firm's stock or other securities (these can be kind of fun). All of these financial reports are required, standardized, regulated, and prepared through a joint effort by the company, its accountants, its lawyers, and other vested parties.

Corporate social responsibility reports are none of the above: they are not required, not standardized, not regulated, and not always prepared by a team of vested parties. We don't even have a standardized name for what these things are. Nike calls its report a *Sustainability Business Performance Summary*. Whole Foods calls its report a *Green Mission Report*. Interface doesn't prepare one (it posts information on its corporate website, but does not prepare a report).

What is the purpose of these reports? Think of the business case for each company and why these companies would want to publish a CSR report; these reports are sustainability-related investments themselves. In general, these reports are designed to communicate information about a firm's human, social, environmental, and other corporate social responsibility-related activities. For many firms, the business case probably revolves around market access, risk mitigation, and image enhancement (regulatory mandate may become a reason at some point, but it isn't, yet). When you read a firm's annual financial report, you are likely to see some bad news because the firms do not have total control over what information is included. You aren't likely to see a whole lot of bad news in most CSR reports; everything that goes into them is selected by the firm and is for the firm's benefit. You might see some discussion of goals that haven't been met, of challenges that lie ahead, or of mistakes made and lessons learned. But the general tone is usually positive and optimistic. CSR reports are more informative and transparent than mere marketing spin but less so than regulated annual reports.

Nike issued its first *Corporate Responsibility* report in 2001, and that report did contain a fair bit of bad news—or honesty. It included a 14-page section on labor issues, with candid discussions about child labor and wages (including a short debate on whether or not Nike should provide a living wage). From reading Nike's first *Corporate Responsibility* report, it is clear that transparency was a primary objective. Communicating the firm's practices, mistakes, positions, and challenges to its stakeholders was very important to Nike at the time; because annual financial reports are so standardized and regulated, issuing its first *Corporate Responsibility* report in 2001 was an opportunity for Nike to share its position on controversial issues and to engage a larger group of stakeholders. From the business case perspective, it seems clear that image enhancement was Nike's primary goal with this first investment in a CSR report.

Since that first report was published in 2001, Nike has continued to publish a report regularly every other year. And, not surprisingly,

the 2013 report reads very different from the 2001 report. In the wake of the labor issues of the 1990s, the 2001 report needed to convince certain stakeholders that Nike's practices were legal, moral, and appropriate. The 2013 report shows what Nike's strategic opportunities are and how these will create value for the firm. It is designed to engage and connect all stakeholders—employees, investors, critics. And, it is designed to provide a blueprint for what Nike will be doing in the future. The 2013 report used a variant of the word innovate more than 200 times, while it appeared only 11 times in the 2001 report. Nike is trying to show how sustainability-related investments lead to innovation, innovation leads to growth, and growth leads to value creation.

Whole Foods didn't issue its first *Green Mission Report* until 2012. If what we've been talking about in this book is accurate, Whole Foods waited so long to publish a CSR report because doing so earlier would not have created value. In 2001, Nike presumably had a lot of sustainability-related reputation to gain; Whole Foods didn't. There never has been much question about Whole Foods' commitment to the environment or to human and social-related values. Investing in these values has always been what defined Whole Foods; its sustainability orientation has always been embedded, and the company didn't believe that telling its stakeholders that it was already doing what they knew it was doing was a worthwhile investment. Today, as more and more companies have begun publishing their reports, perhaps Whole Foods decided it was finally time to tell the world what it was doing so the world wouldn't wonder whether the company was hiding anything. Or perhaps Whole Foods felt it was important to remind the world what it was doing to emphasize how the company was different and how it had always been different by living values dedicated to its green mission. Walmart can sell organic produce, but Walmart will never be the same as Whole Foods. Whatever the driving reason was, Whole Foods finally decided that this was an investment that would create value. And to date, Interface has not published a CSR report. Whatever the reasons, Interface has decided that publishing a CSR report would not be a sustainable financial investment; Nike and Whole Foods have decided that publishing such reports does create value.

Globalization and sustainable investments

For every investment any firm makes, there is a trade-off between short-term and long-term effects. Sustainability-related investments

require a long-term perspective. As a result, they are uncertain and risky. A company like Nike may be able to invest with a long-term perspective because it has patient stakeholders with whom it can clearly communicate the strategies and benefits associated with these investments (consistently publishing *Corporate Responsibility* reports since 2001 helps with this communication). Making such investments is probably even easier for Interface, a company that is much smaller than Nike and has a more embedded sustainability orientation: long-term sustainability is now the reason many stakeholders engage with Interface. These companies benefit from having clearly identified strategies and having objectives that are clearly aligned with their stakeholders' objectives. This doesn't mean the investments will easily create value, but it does mean that the companies will be given a chance to be patient with those investments and to allow all of the long-term benefits to materialize.

The same may not be true for a developing nation like Malaysia or Brazil. In theory, it should be the same—but in practice it may not be. It should be the same because creating value has the same underlying economic drivers, whether for a country or a company. Countries want to make investments in education, commerce, health care, infrastructure, and other assets that both provide a high quality of life for their citizens and give the country a comparative economic advantage over other countries. But for many developing nations, the costs they have to endure in the short-term—in terms of providing health care or basic subsistence needs—may be so extreme that focusing on the long term is not a viable option. For a company, the long term might be a business cycle that lasts a couple of years; for a country, the long term could be a generation or more.

When we add into this mix the dynamics associated with political elections, natural resource constraints, culture, and other factors that are unique to a given country, investing for the long term becomes even more difficult. Voters may not be willing to wait a generation or more. But that doesn't mean these countries shouldn't try.

Over the past 25 years, foreign direct investment from multinational companies has been good business for Malaysia's economy; Malaysia's gross domestic product, a measure of total output of the economy, has increased from $35 billion in 1988 to more than $300 billion in 2013.[28] This represents a 785 percent increase, or annual growth of more than 9 percent (whereas developed economies have grown around 2.5 percent during the same period).

This macroeconomic growth has led to other improvements in life in Malaysia: a lower death rate, higher wages, more women in the workforce, more men and women attending school.

All of this seems to be very good news for a developing country. But this growth hasn't come without challenges for both the country and for the companies investing in the country. Nike chooses to use contract labor because it is cost effective; wages in Malaysia and other developing countries are much lower than they are in the United States and other developed countries. Even after factoring in shipping and other logistics costs, using labor in developing countries makes a lot of economic sense for companies like Nike. Initially, perhaps, Nike also liked using the contract factories because Nike did not have any direct liability or oversight of the factories. Labor, safety, and other legal issues were the factories' responsibilities, not Nike's. The challenges with this relationship arise when the host country does not have the legal and other systems in place to appropriately manage the foreign investment.

We know what sparked Phil Knight's sustainability epiphany in 1998. Similar problems have continued to persist, despite Nike's best efforts. In 2008, Nike uncovered serious problems at its Hytex factory in Malaysia; this factory employed 1,200 people and had been making apparel for Nike for 14 years.[29] An investigation found problems that bordered on human trafficking of migrant workers from nearby countries: overcrowded dormitories, unsanitary kitchen and bathroom spaces, garnished wages, withheld passports, and improper labor contracts—all in violation of Malaysian law. Hytex was violating the laws, not Nike, but that doesn't matter much. Upon finding out about the problems, Nike made sure that Hytex corrected them.

A bigger issue relates to the Malaysian government's role. Clearly, the Malaysian authorities were not enforcing their laws, either because they didn't have the resources or the incentives to do so. The Malaysian authorities made the investment decision not to invest in enforcing their laws. Sure, it's costly to establish a system of contract law and enforcement, but there are also significant benefits to having companies like Nike want to use Malaysia's factories. If Malaysia cannot provide the systems necessary to give Nike the value it expects, then Nike can find factories in other countries to manufacture its products. In the end, Malaysian officials seem to have realized that the benefits of protecting Nike's image and business were greater than the costs of establishing and enforcing their

laws. In the short term, Nike worked with the factory to correct all of the labor issues; in the long term, Nike worked with local and national Malaysian officials to inform them of what standards global businesses expect to be met and enforced.

Malaysia's extraordinary growth over the past 25 years came from providing incentives and working conditions that appealed to Nike and other global companies. As stakeholder preferences have evolved over those years—cheap is no longer the sole criterion—the country's standards have changed, too. Countries need to adapt to how value is created at different times. The blueprint for Malaysia's growth over the next 25 years probably involves different value drivers than it did over the past 25 years, and the country will need to continuously make the investments necessary to create new opportunities and value.

Creating value through sustainability-related investments

What is the value to a firm of installing photovoltaic solar energy panels on the roof of its headquarters? What is the value to a firm of paying a wage that is the highest in its industry? What is the value to a firm of providing free day care and free gym memberships for all of its employees? What is the value to a coffee shop using fair-trade beans or a grocery store selling locally grown organic produce or a clothing store selling upcycled items? What is the value to a delivery firm of converting all of its gas-powered trucks to electric-powered trucks (or getting rid of trucks altogether and using bicycles)?

Economic value is creationism created by the difference between costs and benefits. The costs and benefits the firm experiences are determined by the firm's stakeholders. Firms stay in business, in part, because their customers purchase their goods and services. If the goods and services are not valued by customers, then they are worthless—regardless of how sustainable or great for society they appear to be. For example, consider a delivery firm that chooses to use gas-powered trucks instead of using bikes or electric-powered trucks. The delivery firm exists to make deliveries; if a bike or electric-powered truck cannot make deliveries as effectively as the gas-powered trucks can, then the firm may lose customers. Of course, the delivery firm may lose some eco-minded customers by using gas-powered trucks. Everything is about trade-offs. If the economics don't exist for a firm to create value—from customers, employees, suppliers, or other stakeholders—then its mission needs to be

changed or abandoned. But some sustainability-related investments may add value independent of how they relate to the business purpose of the firm. Day care, gym memberships, and solar energy are unlikely to compromise any business's goods and services. Investments that lead to increased employee efficiency, lower turnover, increased innovation, reduced inventory shrinkage, improved morale and image, or other benefits are creating value despite not being directly related to the firm's products and services. If the stakeholders care, those investments should be made; if stakeholders don't value them, they shouldn't be made. But such investments are not free; they require using valuable resources that otherwise could be devoted to R&D, marketing, distribution, salaries, or other investments that may more directly impact stakeholders' utility.

Every investment is a choice between alternative investments. When the delivery firm decided to use gas-powered delivery trucks, it decided that the value associated with using gas-powered delivery trucks was greater than the value associated with using electric-powered trucks or bikes. Maybe it made the investment in the gas-powered trucks because that was the only technology available at the time. Or maybe the company chose the gas-powered trucks over electric-powered trucks as the result of a thorough cost-benefit and valuation analysis.

- What is the cost differential between the gas- and electric-powered trucks?
- What are the energy cost savings associated with using electric-powered trucks?
- Gas stations are everywhere: what is the availability of electric charging stations? Would the firm incur any additional costs in recharging, in terms of driving farther, labor hours, or missed deliveries?
- Would the firm's stakeholders place any value on the firm using electric-powered trucks? Would customers pay more for deliveries? Would employees work harder or accept lower compensation? Would investors require a lower return on their investment? Are lawsuits, fines, or other cash flow penalties less likely with the electric-powered trucks? Are there any government subsidies associated with the electric-powered truck investment?

These questions get to the business case of the investment and are directly associated with the cash flow costs and benefits that will create or destroy value for the delivery firm. That is, the only reason

any firm should make an investment in gas-powered trucks is if it believes that doing so creates more value than any other investment. Investments are investments, and deciding to make an investment in gas-powered trucks requires the same analysis as making an investment in electric-powered trucks or bikes does.

Predicting the future is so difficult because, in economic terms, we have incomplete information about the future. We do not know what is going to happen. We do not know what our stakeholders are going to value. Right or wrong, when we make predictions about the future, and when businesses make investment decisions, we frequently assume that our stakeholders will value the same investments in the future as they did in the past. This is not always the case. Preferences change. Technologies change. Conditions change. Alternatives change. Just as firms are trying to innovate their products and services, investors should be trying to update their analyses of identifying and measuring value. Every investment decision, ultimately, is about the business case that is used to support that investment decision and the cash flows and value that that investment can create.

5
Valuation of Sustainable Financial Investments

> *We invest resources today with the expectation of some kind of return in the future. This return can be a financial return, or it can be something more abstract, such as quality of life or social welfare. The decisions a firm makes today are motivated by the firm's mission to maximize value; to do this, the firm needs to understand what will drive the economics in the future. Investments are long-term predictions about the future. Value is created when our predictions about the future are right.*

Less than five years after selling its first electric vehicle, Tesla Motors has grown into a company worth $30 billion. That's about half the value of either General Motors or Ford—despite each of those companies selling 300 times as many vehicles as Tesla and being more than 100 years old.[1] Why is Tesla worth $30 billion? Where does such a valuation come from?

In valuing investments, the three most important questions are:

1. What are the cash flows?
2. When do the cash flows occur?
3. What are the cash flows worth today?

Finance is all about figuring out what the future is worth today. Saying that Tesla is worth $30 billion is akin to saying you'd give up $30 billion today for the rights to all future cash flows and operations that Tesla produces in the future (assuming you had $30 billion). Valuing such an investment is a lot about economics and a lot about psychology. The economics part relates to projecting demand and profit margins and growth opportunities and competitor responses

and the like. The psychology part is about getting inside the mind of consumers, employees, regulators, investors, and others to guess how they will impact Tesla's future. Will consumers value a luxury electric vehicle more or less in the future? Will employees be able to innovate enough to excite customers in a cost-efficient manner? Will regulators and taxpayers continue to support subsidies? Will investors see Tesla as more or less risky in the future than they do today? The psychology informs the economics, and the economics inform the psychology.

Let's see if we can figure out why investors think Tesla is worth $30 billion. In 2013, Tesla had revenues of just over $2 billion—up from $413 million in 2012.[2] That's a 400 percent increase in just one year. From that $2 billion in revenue, Tesla had a net income of -$74 million—a net loss of $74 million. Tesla's expenses were greater than its revenues. In theory, that's not good news. But that loss in 2013 is much better than Tesla's 2012 performance: on its $413 million in revenues in 2012, Tesla had a net loss of about $400 million. In terms of both revenues and profitability, 2013 was much better than 2012. We could go back a few more years and find similar information: very high growth in sales revenue and high expenses leading to net losses, but those losses are getting smaller over time. What are we to make of this? Is this good news or bad news? And does this information justify a $30 billion valuation?

Investors certainly view these improvements as good news—Tesla's valuation has increased tenfold since the end of 2011, from about $3 billion to $30 billion. But Tesla is still losing money, so it's hard to see what justifies a $30 billion valuation. The current valuation is based on the cash flows that investors think Tesla will produce in the future. If we use net income as a proxy for cash flows, we would have to say that Tesla has yet to produce positive cash flows. Nobody would pay $30 billion for a company that never produces cash flows, so investors must be expecting cash flows to change. Will revenues continue to grow 400 percent per year—or more? No, of course not, at least not indefinitely. If Tesla's revenues—driven by consumer preferences for luxury electric vehicles—grow 400 percent per year for the next five years, Tesla's 2018 revenues will be over $6 trillion. Let's assume that Tesla's revenues merely double in each of the next five years. The economy of the United States averages growth of about 2.5 percent per year, so an annual growth rate of 100 percent is still very impressive. With 100 percent annual growth, Tesla's 2018 sales revenue will be about $65 billion. How

reasonable is this? General Motors' 2013 sales revenue was $155 billion, and Ford Motors' 2013 sales revenue was $146 billion; I'll leave it to you to decide if you think Tesla having 2018 revenues of $65 billion is reasonable. But for the purposes of this example, we will assume that this is reasonable.

Revenues are just half the math, however; we also need to project expenses. For the past five years, Tesla's expenses have been greater than its revenues. Investors must be expecting Tesla's expenses to decrease or, more accurately, to decrease as a proportion of sales revenue. In 2013, expenses were 200 percent of revenues. Expenses are likely to continue to be more than 100 percent of revenue into the near future as the company makes the investments necessary to grow its revenue. Many high-growth companies spend years investing in themselves before becoming profitable; Amazon.com was founded in 1994 and didn't have its first profitable year until 2002.[3] When will Tesla's revenues become greater than its expenses? How much higher will revenues be than expenses? And will those cash flows justify a $30 billion valuation?

Since we are not really trying to value Tesla here, we won't take the time to project out Tesla's expenses for the next decade or two. That's more math than we need to worry about. But the point of this introduction to Tesla was to illustrate how quickly the science of valuation becomes the art of predicting the future. I have no idea what Tesla's revenues and expenses will be in the future. Neither do you. Nobody does. We can understand the business case and the economic value drivers and the industry, but ultimately we are still making educated guesses about the future. The more information we have, the more educated those guesses can be, and therefore we want to put a lot of effort into incorporating as much relevant information as possible.

The uncertainty of sustainability-related investments

The future is not easy to predict for any investment, but some investments are more unpredictable than others. In finance and valuation, this means that some investments are riskier than others. When you deposit your paycheck in the bank, you don't really view this as a risky investment; you expect to get all of your money back, probably with interest. But when you buy a house or play the stock market, you do (or should) view these as risky investments; there is a chance that you won't get back the money that you expect to get

back. The same could be true of many corporate investments, too. When you hire a new employee and pay that person $50,000 a year, do you know that you're getting $50,000 of value back in return? When you launch a marketing campaign or decide to buy a new facility or spend millions on research and development for a new product, you never really know what cash flows you're going to get back. This is investment risk—it plays a critical role in the valuation of any investment. It is an especially important part of the valuation of sustainability-related investments (like Tesla).

Many sustainability-related investments involve novel products, innovative technologies, and unknown markets. We frequently have to make many bold assumptions in estimating the future cash flows. Nike has been designing, manufacturing, and selling athletic footwear for more than 40 years. Nike knows footwear. Nike has millions of bits of data detailing the history of returns on investments in shoes. From research and development, to new designs, materials and markets, revolutionary advertising campaigns, and novel sales channels, Nike has a really good idea about the riskiness of any investment it makes in footwear. Nike started with just running shoes and transitioned to shoes of all types (including a period with Cole Haan dress shoes); Nike started selling shoes out of a car and transitioned to retail and its own stores and online; Nike started with basic materials and transitioned to revolutionary materials such that every component of a shoe can be recycled and repurposed. Each of these transitions—each of these investments—had risk. And, certainly, Nike didn't know nearly as much about each of these investments in the 1970s as it does in the 2010s. Each time Nike made an investment into a new product or technology, it didn't know what the return on that investment would be—or if there would be any return at all. Today, introducing new footwear and apparel products, entering new markets, and launching new advertising campaigns seem much less risky investments than they did in the 1970s because the company has so much experience in making similar investments. Nike knows what assumptions to make, what estimates are reasonable, and what factors will influence the cash flows that the company ultimately receives on these investments. These are low-risk investments to Nike.

Sustainability-related investments, however, may be very high-risk investments to Nike. While Nike has been making many sustainability-related investments for years (such as with labor conditions and materials sourcing), many sustainability-related investments

are brand new and involve value drivers that nobody really knows how to project. Take climate change. The following passage appears in Nike's *2013 Sustainable Business Performance Summary*:

> We also use scenario planning to sharpen our understanding of the potential impact of sustainability issues on our business and to inform decision making. Through scenario planning, we can assess the potential impacts that external issues such as climate change or resource scarcity might have on NIKE. We can model the rippling effect that a percentage change in our use of a more sustainable material might have across the value chain, or the impact of changes to our sourcing base as we fully implement our sustainability indices. We can also analyze how initiatives, such as those that improve energy or water efficiency, or decrease waste, could impact the company's competitiveness.[4]

Scenario planning is all about trying to understand the risk of any investment. Scenario planning, or scenario analysis as we will call it later, involves calculating the value of an investment under many different scenarios. What if oil costs $30 a barrel? What if oil costs $400 a barrel? What if the cost of water doubles? What if labor costs in Asia double? Nike is making investments today—spending a lot of stakeholder money—to limit or mitigate the effects of climate change on the company's business and cash flows. These investments range from finding new locations to manufacturing products to using new, innovative materials and creating new systems that use less water, energy, and other resources. For some of these investments, Nike can reasonably measure the return on investment—there is enough information available to determine what the incremental cash flows are. But because climate change is such a large-scale phenomenon developing slowly and over the long term, it may be a very long time before Nike really knows what the return on such investments will be. This makes these investments very risky—far more risky than introducing a new shoe.

Competitive interaction and valuation

The last phrase of the above quote from Nike highlights one of the more interesting and challenging factors associated with making sustainability-related investments: the competition. Nike operates in what economists call an oligopoly—a market where a small number of companies comprise most of the market. Nike and adidas control a

very large share of the worldwide athletic footwear and apparel market; Coke and Pepsi control a very large share of the worldwide beverage and snack food market; Boeing and Airbus control a very large share of the worldwide commercial aircraft market. What makes oligopolies unique is the competitive interaction: everything that one firm does is influenced by what the other firm does. Any value-maximizing strategy of one firm is highly dependent on the value-maximizing strategy of the other firms. The economics of any decision Nike makes are dependent on what adidas is already doing and on what adidas will do in response to Nike's decision. Oligopolies can have more than two firms, and Nike should certainly consider Under Armour and others as competitors. Think of *The Prisoners' Dilemma* example of game theory in chapter 3: each prisoner made decisions that were in his or her own best interest given what was in the best interest of the other prisoner. This is exactly how game theory works in business: each firm's cash flows are highly dependent on the cash flows and strategies of its competition.

What if adidas invests in designing shoes that are more recyclable and environmentally friendly than any other shoes available?

Let's assume that these new shoes cost 15 percent more than similar, less eco-friendly shoes. In such a case, adidas has all sorts of complex financial models showing that this investment will pay off if global warming drastically increases the costs of materials within the next 10 years. What should Nike do? In those complex financial models that adidas produced, what was adidas expecting Nike to do? Are customers going to pay the additional 15 percent for the new, more eco-friendly shoes? Certainly some will, but others may not, especially if they have other, functionally comparable options. So, should Nike abandon its traditionally made shoes and only produce similarly eco-friendly shoes? Or should Nike lower the prices on all of its less eco-friendly shoes to capture more customers in the short term and take business away from adidas?

Of course, Nike understands the game as well as adidas does, so it also has plenty of complex financial models estimating the profits and value that it can earn from different strategies. In the short term, lowering prices and capturing a greater share of the market may be very profitable for Nike. And in the longer term it may also be very profitable. It's possible that by lowering prices Nike could capture enough of the market that these customers would stay loyal

to Nike, even if climate change drives the costs of all resources much higher in the future. It's possible that Nike could use the excess cash flows it gains in the short term to aggressively advertise or otherwise capture as many customers as possible. It's also possible that the decision to not invest in eco-friendly technology could be devastating for Nike's value: it all depends on whether or not each company's assumptions about consumers' behavior and environmental conditions in the future are as predicted. What if the consequences of climate change drastically increase the costs of materials in five years instead of ten? In this example, this would be a big win for adidas—unless Nike also invested big in eco-friendly technology for its shoes.

What if Coke invests a significant amount in healthy beverages and snacks that do less environmental damage than its traditional products and are less likely to lead to obesity-related health effects and costs?

For decades, both Coca-Cola and PepsiCo have generated billions of dollars in profits by selling sugary beverages and salty snacks. Consumers crave these products. In their efforts to become more profitable both companies have found ways to produce their products in less costly ways. These less costly ways can also be less healthy ways, as many of the healthy nutrients are replaced with chemicals and empty calories. These chemicals can further destroy the agricultural areas where the corn and soy products used by Coke and Pepsi are produced. The sugary and salty products have probably played a role in the obesity problems facing the United States and the rest of the world over the last few decades. And, based on their public statements and product campaigns, both companies seem to realize that their products may have some negative consequences. But these firms have been very profitable. And many of us are addicted to their products and aren't at all concerned about any environmental damage and aren't very concerned about obesity. So, what, if anything, should either company do about the potential societal costs associated with their products?

- If Pepsi decides to abandon the wet-milling process that takes many of the nutrients out of its products with the intent to provide a healthier product that does less damage to the agricultural environments where it is produced, would you be willing to pay 20 percent more for a can of Pepsi than for a can of Coke?

- If Coke decides to invest heavily in healthier product lines, so that 75 percent of its revenues come from new, healthier products, would this be a profitable investment? Are there enough consumers in these healthier product categories to drive value for Coke? Would the profit margins be high enough to justify continued investment?
- Is regulation enough of a threat to be concerned about? At what point does either company begin making investments to address potential regulatory impacts—such as taxes, size limits, calorie limits, education, or anything else? Is the soda industry at risk of becoming like the cigarette industry, with significant lawsuits and taxes and strict regulatory requirements?

It's all about the cash flows: what are the cash flows associated with each question? The cash flows are determined by the economics and the stakeholders. And since this is a market that is dominated by such a small number of companies, the cash flows for Coke are largely dependent on the strategies employed by Pepsi.

What if Boeing introduces a new commercial airplane that uses 15 percent less energy than comparable aircraft produced by Airbus?

The key issues here are the market and the cost. There are probably very few travelers who care about the energy efficiency of the plane they're traveling on—except as it may increase or decrease the cost of their airfare. The market is airlines, companies that will buy the aircraft. For the airlines, the decision of whether or not to buy the new energy-efficient Boeing airplanes is probably a pretty simple one: it's mostly about the cost. It can be a simple matter of projecting the price of jet fuel over the estimated life of the new airplane, estimating the fuel the plane will use flying over its life, and comparing these costs to what the costs would be with the less energy-efficient models. This is the total incremental cost; if this is less than the additional cost of the new energy-efficient airplanes, then buying these new planes is a value-creating investment. Of course, estimating the cost of fuel over the 20–30 years of a commercial jet's life is not easy. An investment in this energy-efficient aircraft is also an investment in climate change. For Boeing to introduce this new plane, Boeing must believe that its potential customers believe that the savings will be justified by higher fuel costs driven by climate change or other external factors.

What should Airbus do? It depends on what Airbus thinks its customers, fuel markets, and regulators will do. There is no way to know exactly what factors will drive or destroy value in any investment, but we have to predict the future when we make investments. What makes competitive situations so unique is the interdependence of profits and strategies. As in the previous example with Nike and adidas, Airbus could decide to stick with its older, less eco-friendly aircraft, lower the prices, and hope that the lower prices induce enough potential customers to become actual customers today. This could be a short-term win for Airbus—or it could be devastating. We won't know until we see markets play out over the long term. Every valuation analysis requires making many assumptions about the future. Some of these assumptions are about factors that firms can control—such as their own research and development—but many others are about factors they can do little to directly control—climate change, regulation, competition. The better we understand all of the economic drivers behind these external factors, the more accurate our valuation estimates are likely to be.

The vagaries of public company valuation

At the close of trading on Tuesday, May 6, 2014, a share of Whole Foods' stock was worth $47.95. This put the company's valuation at $17.6 billion.[5] That afternoon, Whole Foods released its sales and earnings results for the second quarter of 2014.[6] Despite $142 million in net income from record high quarterly sales of $3.3 billion, the guidance that the company provided about future growth and operations disappointed investors. Prior to the earnings release, investors had been fine-tuning their financial models valuing Whole Foods' stock, updating their assumptions, studying the competition, and predicting future cash flows. Upon seeing the earnings release, many investors realized that their expectations and spreadsheets were way off and needed to be modified. Future growth rates were reduced, decreasing sales and net income expectations and thus significantly lowering expected future cash flows to investors. At the opening of trading on Wednesday, May 7, 2014, a share of Whole Foods' stock was worth $39.28—a full 18 percent less than it had been at the end of the previous day. The market value of the company went from $17.6 billion to less than $14.5 billion in a matter of stock market moments. Why?

What are the cash flows, when do they occur and what are they worth today: those are the questions that Whole Foods investors were asking and answering with their wallets on both of those trading days. The 18 percent drop in value from May 6 to May 7 happened simply because the answers to these questions changed; the assumptions in the valuation model changed. Maybe investors lowered the growth rate of revenues they expected over the next 5–10 years because they expected that customers' preferences would move away from Whole Foods' products or because they saw customers had more options for buying healthy groceries. Maybe the profit margins decreased, a result of lower relative prices or higher relative costs, caused by increased competition and supplier strength due to scarce resources (the California drought of 2014 did devastate the avocado crop, after all[7]). Or maybe the company's strategies weren't working as well as they had in the past (maybe the higher wages weren't buying the productivity they used to). There are many factors that can affect the value of any firm, but the most significant drivers will impact revenue growth rates and profit margins. Determining what we think is going to happen to growth rates and margins is the quickest way to answer the above three most important questions in finance. On May 7, investors answered these questions by expecting growth rates to slow down and margins to decrease. On May 7, investors expected Whole Foods' future cash flows to be smaller and/or occur later relative to what they had expected on May 6. Given this information about what the cash flows are and when we expect them to occur, answering the third question becomes mechanical: those cash flows were worth 18 percent less on May 7 than they were worth on May 6.

Of course, the markets can revise their projections to the upside, too. Whole Foods' stockholders did just that six months later when Whole Foods released its earnings report for the fourth quarter of 2014 in November 2014.[8] This time, Whole Foods' news was better than the markets had been expecting. While six months earlier investors had been concerned about revenue growth rates and margins decreasing, those concerns evaporated with the new earnings report. Just as investors revised their spreadsheets and expected cash flows downward in May 2014, this time they revised their expectations upward as they saw improved growth rates and margins. Before the fourth-quarter earnings report, Whole Foods' stock price was less than $40 a share; immediately following the report, each share was trading at more than $48 a share—that's a 20 percent gain in a matter

of days, back to where it was before the disappointing earnings report in May 2014. Valuation will always be an educated guessing game, but neither predicting the future nor creating value is easy.

The textbook approach to valuation

Now let's revisit the investment scenario presented in chapter 1 and actually value something. Recall that investment presented us with two options. Which would you prefer?

Scenario #1: Receive $100 per year for each of 5 years
Scenario #2: Receive $1,000 in 5 years

Rather than asking "Which would you prefer," perhaps a better question is "How much would you pay for each scenario?" Standard finance theory tells us that we should find the present value of each scenario. To do this we need to know the riskiness of these cash flows, which we generally capture with an opportunity cost or interest rate. That is, if you are going to invest, or lock up, your money in either of these two investment scenarios, what kind of return do you require on that investment? For now, let's assume that this return, opportunity cost, or interest rate is 10 percent. With the cash flows above and a required return of 10 percent, we need a formula to help us figure out how much we would be willing to pay for either scenario today. That formula, probably the most important formula in finance, is the present value formula:

$$Present\,Value = PV = \frac{Future\,Cash\,Flow}{(1 + Interest\,Rates)^{Number\,of\,Periods\,Until\,Cash\,Flows\,Occurs}}$$
$$= \frac{FV}{(1+r)^n}$$

This equation can be simply applied to scenario #2 above. When we have multiple future cash flows, as with scenario #1, we can use the same formula with just a slight modification: instead of just having one future cash flow, we need to add up the present value of all future cash flows.

$$Present\,Value = PV = \sum \frac{FV}{(1+r)^n}$$

Table 5.1 Comparison of Investment Scenarios: Five Years

Year	Future Cash Flow	Interest Rate	Present Value Formula	PV of Cash Flow
Scenario #1				
1	$100	10%	$100 / (1 + 10%)^1	$90.91
2	$100	10%	$100 / (1 + 10%)^2	$82.64
3	$100	10%	$100 / (1 + 10%)^3	$75.13
4	$100	10%	$100 / (1 + 10%)^4	$68.30
5	$100	10%	$100 / (1 + 10%)^5	$62.09
Scenario #1: Sum of Present Value of Cash Flows				**$379.08**
Scenario #2				
1	$0	10%	$0 / (1 + 10%)^1	$0.00
2	$0	10%	$0 / (1 + 10%)^2	$0.00
3	$0	10%	$0 / (1 + 10%)^3	$0.00
4	$0	10%	$0 / (1 + 10%)^4	$0.00
5	$1,000	10%	$1,000 / (1 + 10%)^5	$620.92
Scenario #2: Sum of Present Value of Cash Flows				**$620.92**

This is the same equation as above, but we sum up all of the individual present value calculations to get the cumulative present value. With these two formulas, we have all the tools and information we need to figure out whether we prefer scenario #1 or #2. Table 5.1 summarizes these two scenarios.

As we can see from this comparison, scenario #2 has a higher present value than scenario #1. Most traditional finance textbooks will tell us that we should prefer scenario #2 for this reason. The interest rate we choose to use plays a critical role in this calculation. The higher the interest rate, the lower the present value is. But the timing and number of cash flows are also critical. In scenario #1, we get several annual cash flows before the final year. With each of these cash flows, we can do something: we can spend the money, save it, or invest it. Ultimately, all of our key variables determine the value of any investment: the size of the cash flows, the timing of the cash flows, and the riskiness of those cash flows.

As shown above, with an interest rate of 10 percent, scenario #2 is more valuable by $242 than scenario #1: $621 vs. $379. If we increase the interest rate to 20 percent, the present values of both scenarios will decrease; the present value of scenario #2 will decrease more because of the compounding effect of five years of interest on

all cash flows whereas in scenario #1 cash flows are not as affected by the compounding effect. With a 20 percent interest rate, scenario #1 is worth $299, and scenario #2 is worth $402. With a 36 percent interest rate, scenario #1 is worth $218, and scenario #2 is worth $215; now, at this higher interest rate, scenario #1 has a higher present value than scenario #2.

The point of considering different interest rates is to highlight a fundamental aspect of all financial analysis: risk. Since all of the cash flows in this analysis are future expected cash flows, there is some risk that we will not receive them. And we just saw how this risk is operationalized through the interest rate in the present value calculation. We will return again and again to the concept of incorporating risk into valuation because it is one of the most important assumptions with any type of investment.

Valuing investments: Net present value

When we are trying to decide whether or not to make an investment, the primary criteria should be whether or not that investment adds value: are we better off as a result of making that investment? The above examples show how to calculate the present value of future cash flows. What's missing from these examples is what it cost us to obtain those cash flows: the investment. It's a simple extension to subtract any investment from the above cash flows to determine whether or not the entire investment—both outflows and inflows—add value. This is called net present value, and it is one of the most important tools in investment evaluation.

$$Net\ Present\ Value = -\sum \frac{Cash\ Outflows}{(1+r)^n} + \sum \frac{Cash\ Inflows}{(1+r)^n}$$

We add up the present values of all of the cash outflows over the life of the project—including the initial investment, any necessary additional investments over the life of the project, and any necessary termination costs at the end of the investment—and we subtract this from the present value of all of the cash inflows over the life of the project. With this, our decision rule is extremely simple: if the net present value, or NPV, of the project is greater than $0, we want to make the investment because it creates value. If the NPV is less than $0, we do not want to make the investment because it destroys value.

To put some numbers to this, let's assume you are given the following investment opportunity: if you pay me $400 today, I will pay you $100 at the end of each of the next five years. Would you make this investment? To answer this question, we simply add up the present value of all cash inflows and outflows to determine if the present value of the inflows is greater than the present value of the outflows. Note that the cash flows that you will be receiving in this investment are the same cash flows from scenario #1 above. If we assume the same 10 percent interest rate, we already know that those cash flows are worth $379 today.

$$NPV = -\sum \frac{Cash\ Outflows}{(1+r)^n} + \sum \frac{Cash\ Inflows}{(1+r)^n} = -\$400 + \$379 = -\$21$$

In this case, since the NPV is less than $0, you do not want to make this investment. We only make investments where the expected NPV is greater than $0. But what if you decide to lower your required return from 10 percent down to 7.5 percent? In this case, the present value of receiving $100 at the end of each of the next 5 years increases from $379 to $405. Because the present value of the cash inflows is now greater than the present value of the cash outflows, the NPV is positive: -$400 + $405 = $5 of value creation. You want to make this investment.

You may hear of several different approaches to evaluating investments—net present value, internal rate of return, payback period. NPV is the one to master because it is the only one that tells us the dollar amount of value created by an investment. Knowing rates of return and how long it takes us to get our investment back is nice, but neither tells us a dollar amount of value creation. Knowing the NPV does. If we find an investment that has an expected NPV that is greater than $0, then we are a long way to deciding that we should make that investment. To finance purists, that's all we need to know about any potential investment.

Net present value and assumptions

Net present value is an extremely important tool, and the math is relatively simple. What is not simple is determining what assumptions to include in the calculation. When we make investments, the only number that we generally know for sure is the amount of the initial investment (the cash outflow at the beginning of

the project). From there, we have to estimate all other future cash inflows and outflows. And this is where our understanding of the economics of the investment is essential. This is where valuation becomes much more art than science. Many times, our NPV calculations may include some assumptions that seem unlikely. We don't include possibly unrealistic assumptions because we're idiots; we do so because they might happen. As of today, we don't necessarily know how unrealistic they are; we do the best we can with the information we have. Nevertheless, understanding the assumptions we are making and the effect they can have on value and any decision criteria is essential to making any investment.

- We assume that the cash flows are fixed and do not change over the life of the investment. The reason for this is that we assume we are passive investors, rather than active participants in any investment. Neither of these assumptions has to be true. For investments in real projects involving people or equipment, the firm making the investment will likely stay involved throughout the duration of the project, constantly working to find ways to make the project better.
- We estimate the life of any project; sometimes, we will assume that an investment persists forever (when you buy any shares of a company's stock, you are usually assuming that the company exists forever). But most projects do not last forever, so we need to estimate the life of the investment as best we can. This assumption is likely to be wrong, too.
- We generally assume that the interest rate is constant for the life of the investment. But we don't have to. We may know much more about what the cash flows will be in the next 1–5 years than we do about what the cash flows will be in 15–20 years. As such, it may make sense to use a higher interest rate for long-term future cash flows than for the near-term future cash flows. You could also make an argument that the risk is highest in the short term, as there may be considerable uncertainty about whether or not a market will develop or a product will be viable. Either case would require using different interest rates for different cash flows; this is easy enough to operationalize in the financial model. Regardless of how we decide to structure the model, it is critical to get the assumptions and analysis right for the early years because they will have the greatest impact on the outcome of the analysis.

Risk and interest rates

In finance, risk is considered the pricing mechanism. In our world, risk is akin to uncertainty. Despite our best efforts and predictions,

nobody knows what will happen in the future. Some predictions about the future are easier to make than others. A corporate bond contract explicitly states when and how we will get our investment returned. However, it does not (it cannot) guarantee that the corporation will not be bankrupt before it is supposed to return our investment. Despite the contract, there is still some risk associated with this investment. Investing in a wind turbine, for example, is far less predictable. There is no contract guaranteeing future cash flows, and we have no idea how much wind will blow or how the technology will perform. In the math of finance, we usually account for this uncertainty with the interest rates we use—the *r* in the present value formula above. We interchangeably call this *r* many things: interest rate, required return, expected return, discount rate, or cost of capital. While these terms have slightly different meanings to finance folks, they all function exactly the same way in the present value formula and in the spreadsheets. We call it the cost of capital because it represents the cost of using other people's money.

In finance, everything is relative—especially risk. We generally assume that the least risky investment we can make is an investment in the United States' government—purchasing a Treasury bill, note, or bond. The only real risk associated with this is that the US government will go bankrupt and decide not to pay us back. We assume that won't happen, at least not anytime soon, so we call this a risk-free or riskless investment. All other investments are riskier than investing in the US government. The pricing of risk between securities is relative. This means that we require (or expect) a higher return for relatively more risky investments than we do for relatively less risky investments. And, when it comes to valuing these investments, all else being equal, we would pay less for the more risky investments than we would for the less risky investments. We saw this in action with the previous present value calculations, when we increased the interest rate from 10 percent to 20 percent and when we decreased it from 10 percent to 7.5 percent. That's how risk is our pricing mechanism.

When we used that 10 percent interest rate, where did it come from? Why did investors require a 10 percent return on this investment rather than, say, an 8 percent return or a 12 percent return? The short answer is that 10 percent is the return because they could earn that on other investments with similar risk. The longer answer is that 10 percent is the result of some elaborate pricing model that determined 10 percent is the exact right number—not 9.9 percent,

not 10.1 percent. This elaborate pricing model may include many factors that imply a 10 percent return on this specific investment. These other factors—that are explicitly chosen to capture the relative risk of this investment—may include returns on other assets, returns on the market, firm-specific characteristics (such as size or industry), general economic conditions, or other factors. While the factors to consider can include just about anything, one thing is sure and constant: the required return is relative—investments with higher risk require higher returns than investments with lower risk.

There are many ways we can quantify risk; one common approach is to use standard deviation. Standard deviation is a statistical measure of how much dispersion or range the returns have or how much returns have deviated from average returns. It's a measure of variability or volatility. Returns ranging from 0 percent to 40 percent have a higher standard deviation than returns ranging from 5 percent to 10 percent. To give some perspective on the historical relationship between return and risk, table 5.2 shows how several different securities' returns compare over the past 88 years.[9]

This is a finance and economics book about sustainability; it's not a statistics book, so I'll try to keep this discussion of the numbers short and simple. The average return on the common stock of large companies, as shown in the table 5.2, has been 10.1 percent over the past 88 years. This means that, based on historical returns, we would expect next year's return on large companies' common stock to be 10.1 percent. We aren't stupid, and we know that next year's actual return probably won't be exactly 10.1 percent—we know it could be higher or lower. Based on the past 88 years, the highest return in any given year has been +52.9 percent (in 1933) and the lowest return in any given year has been –43.9 percent (in 1931). These numbers aren't in table 5.2, but they went into determining these numbers (trust

Table 5.2 Security Investment Return Data: 1926–2013

	Average Annual Return	**Standard Deviation (Risk or Volatility)**
Treasury Bills	3.5%	3.1%
Corporate Bonds	6.0%	8.4%
Common Stock: Large Companies	10.1%	20.2%
Common Stock: Small Companies	12.3%	32.3%

me). Of course, next year's return could be beyond these extremes—though it's hard to expect that based on history.

We can use these historical averages and standard deviations to predict what the range of future returns might be. Over the past 88 years, the average return for large companies' common stock has been 10.1 percent, and the standard deviation has been 20.2 percent. Of the securities listed above, small company stocks have the highest average return at 12.3 percent and the highest standard deviation at 32.3 percent. Securities with highly predictable returns—such as treasury bills and corporate bonds—have low expected returns and low volatility. Securities with much less predictable returns—such as common stocks that receive cash flows only after all other company obligations have been met—have higher expected returns and higher volatility. This is exactly what we would expect: high volatility must be rewarded with high expected returns.

Why did I just waste three minutes of your life discussing the statistics of securities' returns? Because it is essential to understand the relationship between risk and return when we are making investments—for all kinds of investments, including sustainability-related investments. Understanding expected returns is as important as understanding the economic cash flows and value drivers of any investment. It may be important to use the above returns and distributions as benchmarks for your specific investments; ask yourself how the riskiness of any investment you might be considering compares to any other investment's risk. Risk is relative; if your project is more risky than the average small company stock investment might be, you know you should be expecting a return of at least 12.3 percent. This means you should be using an interest rate or required return of at least 12.3 percent in your present value or NPV calculations. Of course, the more project-specific information you have about risk, the more you can determine a precise expected return for that specific project. Using historical data and statistics will never be perfect, but it can be a good place to start.

Investment valuation: Internal rate of return

In a seminal study performed in the late 1990s, John Graham and Campbell Harvey surveyed several hundred chief financial officers (CFOs) about how they use financial information.[10] The CFOs were asked how they determine their cost of capital, how they determine how much to borrow, and how they determine whether or not to

make an investment. The finance purists would suggest that using the NPV approach is preferred for deciding whether or not to make an investment—it tells us the dollar amount of value an investment is expected to create. In their study, Graham and Harvey found that 75 percent of the CFOs would always or almost always use the NPV approach in making investment decisions. However, this was only the second most popular method; 76 percent of the CFOs would always or almost always use the internal rate of return approach. So what is the internal rate of return?

Internal rate of return, or IRR, is very similar to NPV. It uses the same information and the same setup, but instead of solving for the present value of all future cash flows based on some required return, IRR determines the required return that is necessary in order to obtain an NPV of exactly $0. With the NPV method, the decision rule is to accept the project if the NPV is greater than $0. With the IRR method, we are solving for the interest rate that makes the NPV equal to $0.

So, if we find a project that has an IRR of 12 percent, should we make this investment? It depends. If our required return is less than 12 percent, then we should make this investment; if we only need an 8 percent return, for example, and this investment provides 12 percent, then that's great. If our required return is greater than 12 percent, then we should not make this investment; if we need a 15 percent return on our investments, but this one only provides 12 percent, then we don't make the investment because we would be destroying value (getting 12 percent while paying 15 percent). If the IRR is 12 percent and our required return is 8 percent, this means that this investment has a positive NPV; if the IRR is 12 percent and our required return in 15 percent, this means that this investment has a negative NPV. We will reach the same investment decisions with either NPV or IRR.

But there are several problems with using IRR. Perhaps the biggest issue is this: how do we know what benchmark return to use? That is, if we find that an investment creates an IRR of 15 percent, how do we know if that is good or not? We have to compare it to something—and that something will typically be the investment's cost of capital. This benchmark cost of capital will probably be the same one that would be used in an NPV calculation—so why not use the NPV method to determine actual value creation since we have all the necessary information?

Before we see the IRR rule in action, let's think back to the NPV formula. Recall that the decision rule is that if the NPV is greater

than $0, we make the investment, but if the NPV is less than $0 we do not make the investment. The IRR method also uses an NPV of $0 as a baseline, but solves for the interest rate—the *r* in the right-hand side denominators—that will create this NPV of $0.

$$NPV = \$0 = -\sum \frac{Cash\ Outflows}{(1+IRR)^n} + \sum \frac{Cash\ Inflows}{(1+IRR)^n}$$

Another small problem with the IRR method is that it becomes mathematically complex pretty quickly. Financial calculators and spreadsheets do have IRR functions that make the computations simple, but the calculation is not as intuitive as the NPV calculation is. Let's look at a simple example to illustrate the IRR method in action. Imagine that you make a $100 investment today and expect to receive $132.25 back in 2 years (but nothing back in 1 year). What is the IRR on this investment?

$$\$0 = -\$100 + \frac{\$132.25}{(1+IRR)^2}$$

We can do the algebra, rearrange terms, do some division, and determine that the IRR is exactly 15 percent. In this simple example, we can easily check that algebra with a future value calculation:

$$Future Value = FV = PV \times (1+IRR)^n = \$100 \times (1.15)^2 = \$132.25$$

Should we make this investment with a 15 percent IRR? It depends on what our required return or cost of capital is—if it's less than 15 percent, then, yes, we should make this investment. For more realistic and complex cash flow streams, the IRR math gets pretty difficult pretty quickly. We will use the IRR method in the applied example in the appendix to this chapter, but we won't go through the math as explicitly as we did above (you're welcome).

At this point, you may be considering a very reasonable question: if the finance purists and academics prefer the NPV approach to the IRR approach, then why do only 75 percent of the CFOs surveyed use the NPV approach when 76 percent of those CFOs used the IRR approach? Good question. We don't really know the answer, but one guess is that they do so because the IRR approach provides a result—the expected return—that is intuitive, easy to

understand, and easy to communicate to investors and others who may be evaluating the investment. The two approaches use the exact same cash flows and assumptions, so they will always produce the same ultimate decision. But financial managers and CFOs usually know their cost of capital or required return as well as they know their own names. Thus, when they calculate the IRR of a potential investment, they can easily compare it to the cost of capital—and they can communicate this comparison to others. If a project has an expected return of 15 percent when the firm's required return is 12 percent, it's easy to understand that this is a good investment. Perhaps it's not as clear to some people what an NPV of $125,000 means. Plus, CFOs might use IRR to compare investment opportunities; a project that returns 15 percent seems better than a project that returns only 12 percent. But this could be wrong; whether or not it really is better depends on the size of the investment, the total value created by the investment, and the other investment options available. Most CFOs do use both the NPV and IRR approaches, which is smart: more information is always valuable.

Sensitivity and scenario analysis

In general, we account for the riskiness of any investment in the interest rate we use: high-risk cash flows require higher interest rates and low-risk cash flows require lower interest rates. Perhaps a more concrete approach to accounting for uncertainty in investments is to change the cash flow assumptions and see how changing one assumption at a time, or all assumptions at once, changes the outcome of any investment decision. When we change just one assumption at a time, we call it a sensitivity analysis: how sensitive is the valuation to altering one assumption at a time? When we change all (or many) of the assumptions at once, we call it a scenario analysis: what happens to the valuation when we consider an entirely new scenario?

Sensitivity analysis allows us to identify which assumptions affect the valuation decision the most. If we can identify which variables are most influential, then we can focus our research and estimating efforts on trying to get those assumptions as accurate as possible. Or we can work with our colleagues responsible for those value drivers to see how to get as much impact as possible. Similarly, if we can

identify which variables affect the valuation the least, then we can devote less energy to those resources.

Scenario analysis allows us to consider distinctly different situations. A typical approach is to consider three to five different scenarios, such as *expected scenario, best-case scenario,* and *worst-case scenario* (possibly a few more between the extremes). For example, the best-case scenario can include game-changing events, such as major partnership or beneficial regulation. The worst-case scenario might account for a recession or a delay in product development. These different scenarios can then be used to identify extremes, and that may help make the investment decision. If the worst-case scenario has a positive NPV, then your decision is very easy: make the investment. If the best-case scenario requires some heroic assumptions and does not add significant value, then this may not be the right investment. A common approach to using scenario analysis is to weight the different scenarios—based on an assessment of the likelihood of each occurring—and basing the overall investment decision on the weighted average NPV. Table 5.3 provides an example of this approach.

There are literally countless scenarios that we can create with most investments. And we don't want to utilize all of our resources playing around with valuation models (despite what the financial analysts might say). The challenge then is to identify a few possible or reasonable scenarios and work with them. If each scenario is well-researched and economically feasible, we can learn quite a bit from a small sampling of situations. The purpose of scenario analysis is to generate information, and finance folks love information.

Taxes

Please allow me to indulge in a small digression for a minute; I promise it is relevant to our discussion of NPV assumptions, sensitivity analysis,

Table 5.3 Scenario Analysis: Weighted Average Net Present Value

	Worst-Case Scenario	**Expected Scenario**	**Best-Case Scenario**
(1) Net Present Value	($500,000)	$1,250,000	$3,500,000
(2) Weight or Probability	20%	55%	25%
(1) x (2)	($100,000)	$687,500	$875,000
Weighted or Expected Net Present Value *(sum of the three (1) x (2) numbers above)*			**$1,462,500**

and scenario analysis. Prior to entering academia, I had a short stint as a financial consultant. Among other services, we valued companies—specifically, we valued companies that were being acquired. A team of highly paid finance and accounting consultants would spend days or weeks learning everything we could about a specific company to identify the company's key value drivers. We created complicated valuation models, and we projected everything we could about the company and the economic environment. Most models included hundreds of variables and dozens of scenarios. Our final product would include an assessment of what we thought the company was worth. We thought we were pretty great. Toward the end of most engagements, we would bring in the tax experts. They would spend about 15 minutes reviewing the companies and their tax situations, and within minutes, they would tell us whether or not the deal made sense and whether or not our valuation was reasonable. All of our hard work was undermined in a matter of minutes: taxes would frequently make or break the valuation. We suddenly felt a little less great.

The point is that taxes are usually a huge driver of value. Acquiring whole companies is not the same as investing in a wind turbine or employee incentive plan, but there are likely to be tax implications with any investment. Those implications are frequently very significant. The purpose of this book is obviously not to make you a tax expert or to even inform you of many of the tax issues that need to be considered when making different investments; that book would be a couple of thousand pages long and would be far more painful and boring than this book is. However, as you consider both the examples in this book and your own investment opportunities, you need to incorporate tax considerations into the analysis. We will see just how significant taxes can be in the example in the appendix to this chapter. Sometimes taxes will make the investment look better, sometimes taxes will make the investment look worse. But they almost always matter. Ignore them at your own risk.

Interest rates and valuation

Interest rates, costs of capital, opportunity costs, discount rates, expected returns—whatever you want to call them, they're essentially the same thing. They are measures of risk. We know that investments that come with high risk, such as venture capital investments in emerging markets, require a high interest rate. Investments that have only low risk, such as government securities in developed

markets, require a low interest rate. How do we decide what interest rate to use on each investment?

Pricing securities is the holy grail in investing and finance. Everyone is trying to determine the right interest rate to use to value an investment. Unfortunately, there is no exact right way to know what interest rate to use on each investment. It's an art, not a science. Finance professors will teach some general models that are reasonable starting points, but they know full well that none of those models are perfect. (Finance professors do this to emphasize the theory and framework, not to provide a blueprint—I promise.) Investors and portfolio managers spend much of their careers trying to determine the right level of risk inherent in each investment, and those who identify reasonably accurate and consistent models will never share their models because then they would lose their competitive advantage.

Perhaps some of the riskiest investments are those made by venture capitalists. Venture capital firms make large investments in young companies—some so young that they are just an idea, without revenues or even a fully developed product. There is uncertainty about everything: the product, the management team, the market, the costs, and certainly any future cash flows. But how risky are they? Research suggests that venture capital investors typically make investments with expected returns of between 25 percent and 75 percent, depending on the stage and the type of firm.[11] Remember that virtually riskless investments in US Treasury securities have historically averaged returns of 3.5 percent (and are much closer to 0 percent in late 2014). Venture capitalists make investments expecting (hoping for) such high returns because they realize that many of their investments will fail, and they will receive nothing back in return. That's the risk that venture capitalists take, and that's what it means to make risk-adjusted investments.

So what does this have to do with investing in sustainability-related projects? They can be extremely risky, too. They involve new and unproven products, technologies, markets, and expectations. Investors—or corporate managers—do not know what the future holds for these investments. They can believe the business cases and strategies and financial models, but they cannot know the future. To see how different interest rates affect valuation, think about this: what would you pay today for an investment that you think will pay you back $100 in 1 year? The answer depends on what interest rate—or risk—should be applied to that investment.

$$Present\,Value = \frac{FV}{(1+r)^n} = \frac{\$100}{(1+10\%)^1} = \$90.91$$

$$Present\,Value = \frac{FV}{(1+r)^n} = \frac{\$100}{(1+15\%)^1} = \$86.96$$

$$Present\,Value = \frac{FV}{(1+r)^n} = \frac{\$100}{(1+20\%)^1} = \$83.33$$

The only difference across these 3 calculations is that the interest rate is different—and that single assumption is what causes the differences in present values between the 3 calculations. Determining which interest rate to use to value any investment is both very important and very difficult. This basic framework is the science: find a low-risk benchmark rate and then adjust up to compensate for the specific risk in a specific investment. But getting the right rate for any investment is absolutely an art.

Standard eco-efficiency investments with proven technology may require a small premium; other more ambitious investments in unproven technology or markets may require a much higher risk premium. Think back to the investments we talked about in the previous chapter that Interface and Whole Foods made. Interface's investment in converting its factory to methane might require a low-to-medium risk premium; the technology is unproven, but the benefits are quantifiable and significant. Whole Foods' investment in My Street Grocery might require a medium-to-high risk premium; the platform is novel and the ultimate benefits are uncertain. Whether or not these firms used the right interest rates in their investment analyses will play a big part in determining whether or not these investments add value for these companies.

Risk and valuation of sustainability-related projects

Since nearly every investment will have unique cash flows, characteristics, and futures, each investment should have its own unique required return. In large corporations that make countless investments, utilizing a unique discount rate for each investment can be complicated and impractical. As a result, many firms default to using a single corporate cost of capital for all investments—one required return that represents the approximate cost to use investors' money.

While simple and easy to implement, this is usually inappropriate. Investments should be valued based on their own unique characteristics, based on their own expected cash flows and risks.

In the short term, this could be bad news for investments in sustainability-related projects. More often than not, they are new, unproven, and unpredictable. If investors apply project-specific discount rates to sustainability-related projects, they are likely to use much higher discount rates on these projects than on other, more predictable projects—which means, as seen in the formulas above, that the present value of the future cash flows will be less for those with the higher discount rates. While rates may not necessarily be in the 25–75 percent range as shown earlier for venture capital investments, they may be in the 20–30 percent range. When comparing these investments to other investments that may have a required return in the 8–12 percent range, those investments in innovative projects will be at a severe disadvantage.

What will it take for sustainability-related projects to be valued with lower discount rates? Time and data or time and predictability of cash flows. The predictability of cash flows will be the result of the economics of each investment: the market demand, the market size, the competition, any government incentives, and the overall competitive advantage of the project. And it will take confident and prescient investors who understand these unproven technologies. Elon Musk, founder of Tesla Motors, wasn't focused on a worryingly high required return when he invested his energy and resources into creating Tesla; he was focused on the economics of the investment and the value drivers that would create the future cash flows. Risky doesn't mean bad; risky means uncertain. Regardless of how high any relevant discount rate on Tesla may be, it's the economics and value drivers that have turned Tesla into a company worth $30 billion as of late 2014. Now that we know more about the valuation process, let's think again about what may be driving Tesla's valuation:

- Investors expect the growth in sales to continue, driven by consumer preferences switching from fossil-fuel-powered vehicles to luxury electric vehicles.
  - Consumers may switch as they expect the cost of fossil fuels to increase.
  - Consumers may switch as more charging stations are available and the indirect costs of using an electric vehicle decrease.
  - Consumers may switch as the direct cost of a luxury electric vehicle decreases, possibly driven by competition from other electric

vehicle producers or by decreases in the costs of manufacturing electric vehicles.
- Investors expect government subsidies to continue, making the direct cost of acquiring or owning an electric vehicle less.
- Investors do not see a direct competitor to Tesla that can take profits and/or market share away from it.
- The required return has decreased as the riskiness associated with the future cash flows has diminished.

These factors, along with many others, when put in to a model for valuing Tesla's cash flows, would increase the expected cash inflows and decrease the expected cash outflows. Ultimately, we don't know exactly why Tesla is valued at $30 billion. We also don't know if it is overvalued or undervalued—we just know what its current value is. And we know that this value is based on economics and expectations about future cash flows because that's what every valuation is based on.

Applied sustainability-related investing: Solyndra

Unlike Tesla, Solyndra Inc. is not worth $30 billion. It probably never was. Solyndra was founded in May 2005 by Dr. Christian Gronet.[12] His PhD is in semiconductor processing from Stanford University, and he had prior experience at Applied Materials and other corporations related to semiconductor and solar power technologies. By 2009, he personally held over 20 patents related to photovoltaic solar technology. Solyndra's unique advantage was in its thin film photovoltaic (PV) panels for flat, commercial rooftops. The Solyndra PV panels were unlike any others; they were cylindrical rather than flat, which enabled the panels to absorb solar energy from any angle, thus being more efficient than flat panels. At the time, most other PV panels were made with crystalline silicon technologies, more costly to install, 10 times the size, and dependent on silicon prices. In 2005, the price of crude oil increased by more than 40 percent, from $43 a barrel to $61 a barrel; the price of crude oil reached $145 a barrel in July 2008, suggesting that the time was ripe for a renewable energy source to be in demand.[13]

However, as the financial crisis unfolded during the second half of 2008, the price of crude oil fell from $145 a barrel in July to $45 at the end of the year—basically back to where it was when Solyndra was founded in 2005. And the financial crisis put a credit squeeze

on lending and investing; because the future was so uncertain and because banks had been burned so badly by investing in subprime mortgages, they became reluctant to lend. Most investors were certainly not looking to invest in risky ventures in new technologies.

But some investors were. Solyndra received nearly $1 billion of equity investments from various venture capital and private equity firms. Solyndra also received a $535 million loan commitment from the US Department of Energy. Remember our subsidy discussions? This loan was a result of the 2009 federal stimulus package, which provided investments, tax relief, and loans to different forms of renewable energy. The federal government, presumably, saw this loan as an investment in a more sustainable energy policy, one that wouldn't place consumers and producers at the mercy of volatile crude oil prices and one that wouldn't contribute to climate change as directly. Support for the burgeoning wind and solar power industries would also lead to increased employment in those industries and to a wave of innovation that could drive technological advancement in many related and tangential markets.

Solyndra registered for an initial public offering of stock in late 2009. An initial public offering would have provided Solyndra with more capital to invest in developing new products, expanding into new markets, and, specifically, building a second manufacturing facility. But that initial public offering never happened. Solyndra filed for bankruptcy in August 2011 and effectively ceased operations. Ultimately, only Solyndra really knows what happened, but we can piece together some of the economics that led to this eventuality. Table 5.4 presents some of the details of Solyndra's financial performance from its initial public offering filing.

Obviously, this financial performance is not great and might lead to any company declaring bankruptcy—although we know that Tesla is losing money, and it's valued at $30 billion. There are plenty of other economic stories about Solyndra in its 2009 initial public offering filing. In that filing, Solyndra identifies 38 unique risk

Table 5.4 Solyndra Inc.: Financial Results, 2007–2009

	2007	**2008**	**2009**
Total Revenue	$0	$6,005,000	$100,465,000
Total Expenses	114,128,000	238,070,000	272,960,000
Net Income (Loss)	**($114,128,000)**	**($232,065,000)**	**($172,495,000)**

factors concerning its business that investors should consider before possibly investing in Solyndra (38 risk factors is not necessarily a lot; Facebook had 39 in its 2012 IPO filing[14]); in Solyndra's own words, a few of these risk factors get straight at its economic drivers:

- A drop in the retail price of electricity, or our inability to deliver photovoltaic systems that compete with the price of retail electricity on a nonsubsidized basis, may harm our business, financial condition, and results of operations.
- The reduction, elimination, or expiration of government subsidies and economic incentives for on-grid solar electricity applications could reduce demand for photovoltaic (PV) systems and harm our business.
- As PV system manufacturers have expanded their operations and the supply of silicon has increased, the corresponding increase in the global supply of solar PV products has caused substantial downward pressure on the prices of PV systems.
- If potential purchasers of our PV systems are unable to secure financing on acceptable terms, we could experience a reduction in the demand for our PV systems.
- We are exposed to the credit risk of some of our customers, as well as credit exposures in weakened markets, which could adversely impact our financial condition and operating results. [15]

These risk factors are pretty standard—although they are customized for Solyndra's unique business. Most other firms are not in the solar PV systems market, and no other solar PV systems firm had the same unique technology that Solyndra had. For other solar PV systems firms, a reduction in the price of silicon is a very good thing; this is not the case for Solyndra as its thin-film technology does not rely on silicon in the same manner as others firms' technologies do.

Ultimately, the realization of each of these risks—and plenty of others—is what likely led to Solyndra's downfall. Polysilicon, a critical input for Solyndra's competition, reached $450 per kilogram in August 2008 but fell to less than $100 per kilogram by the end of 2009 (as of late 2014, it is close to $20 per kilogram).[16] As its competitors' input prices fell dramatically, one of Solyndra's key competitive advantages became less valuable. Sure, Solyndra still had its innovative cylindrical technology, but that became much less important to potential solar systems customers when the (possibly inferior) competitors' products became much more

affordable. Further, the price of crude oil fell around the same time—making energy based on traditional fossil fuels more competitive; innovative technologies for solar or renewable energy may look like a great idea at a competitive price, but they may be far less attractive when other forms of energy are much more affordable. Everything is relative. Finally, Solyndra was trying to ramp up its business just as the financial crisis hit. Solyndra's potential customers became cautious about making large capital expenditures in energy efficiency; in 2009 and 2010, they were more concerned about surviving in the short term than about thriving in the long term. And those customers that may have been willing to make the investment had trouble getting the financing because banks and other investors had become extremely risk-averse.

You could say it was the perfect storm, or you could say it was just business and market participants acting in their own rational self-interest. It was about preferences, utility, value, and limited budgets. Everything is a trade-off. In this case, Solyndra—despite how revolutionary and innovative its products may have been—lost the economic battle. Its bankruptcy (probably) wasn't the result of corruption or horrible management; it was just customers and other stakeholders making decisions that were in their best interests and apparently not in Solyndra's. In this case, Solyndra built a better mousetrap but the markets didn't care. This is the economic game that is played out constantly, with all kinds of investments.

Long-term vs. short-term nature of investments

If you want to be in business for a long time and be rewarded for that success, you need to survive everyday along the way. This entails that you thrive and survive in both the short term and in the long term. If you go out of business in year 2, all of the great investments you had planned for year 3 become meaningless. Making successful financial investments frequently requires making certain trade-offs between short-term and long-term benefits. Firms may have to forsake potentially larger long-term investments in lieu of smaller short-term investments because those short-term investments may be more predictable and may be necessary to help the company stay in business. To illustrate this point, recall the present value examples from the previous section that involved receiving cash flows

over five years. What if these investments ended after only three years rather than five? Would scenario #2 still be preferred to scenario #1 (see table 5.5)?

Obviously, now scenario #1 would be preferred to scenario #2. In theory, it is possible that the firm would have been able to sell the claims on the forgone potential year 4 and 5 cash flows to an investor, and scenario #2 would still be preferred to scenario #1. But it is also possible that the value of these investments was uniquely tied to the firm, due to some proprietary technology, product, or human capital, such that if the firm goes away, so does any investment opportunity. In this case, risk-averse firms and investors may be more likely to take advantage of the less risky, short-term cash flows associated with scenario #1. From a pure finance perspective, this may be seen as nonsense as it adds less value to the firm. To the manager, it may make perfect sense because it prioritizes staying in business over the short term—it's impossible to maximize value over the long term if you don't stay in business in the short term.

This may help to explain why CFOs do not only consider NPV when evaluating and choosing investments. And it may help to explain investors' reactions to Whole Foods' 2014 earnings reports. The timing of the cash flows matters; cash flows that are in the distant future may be far too uncertain. For many start-up companies, their investors may require that the firm achieve certain cash flow benchmarks within a certain time period before receiving additional

Table 5.5 Comparison of Investment Scenarios: Three Years

Year	Future Cash Flow	Interest Rate	PV Formula	PV of Cash Flow
Scenario #1				
1	$100	10%	$100 / (1 + 10%)^1	$90.91
2	$100	10%	$100 / (1 + 10%)^2	$82.64
3	$100	10%	$100 / (1 + 10%)^3	$75.13
Scenario #1: Sum of Present Value of Cash Flows				**$248.69**
Scenario #2				
1	$0	10%	$0 / (1 + 10%)^1	$0.00
2	$0	10%	$0 / (1 + 10%)^2	$0.00
3	$0	10%	$0 / (1 + 10%)^3	$0.00
Scenario #2: Sum of Present Value of Cash Flows				**$0.00**

funding. To these firms, NPV decisions that are driven by cash flows in the distant future make little sense. They need short-term certainty, and they need short-term cash flow.

Valuing investments: Payback period

Ultimately, if our goal is to maximize the value of the firm or investment, the NPV approach is the only method that tells us how much value is expected to be added from any investment decision. And it most appropriately captures the risk of these expected future cash flows through the interest rate. There is obviously a difference in timing of the cash flows, as shown in scenarios #1 and #2 above. This difference in the timing could have operational issues for the firm considering these investments. From a liquidity perspective, the timing of the scenario #1 cash flows provides greater flexibility than that of scenario #2 cash flows. But this flexibility is not captured with the NPV rule.

In their survey of several hundred CFOs at major corporations in the United States, Graham and Harvey found that 75 percent of these managers used the NPV rule for investment decision making. They also found that 57 percent of these managers used the payback rule. So what is the payback rule?

The payback rule doesn't care about risk or opportunity cost. It only cares about the timing and amount of cash flows. It calculates the number of years until we recoup our investment. What if we had to invest $200 to get either the scenario #1 or scenario #2 cash flows above? With scenario #1, we recoup our $200 investment in exactly two years, after receiving $100 in the first year and $100 in the second year. With scenario #2, we recoup our $200 investment in five years, after receiving our first and only cash flow of $1,000. Thus, despite having a lower NPV, scenario #1 has a shorter and better payback period. For many investments this is desirable. Many CFOs use the NPV or IRR rules to determine how much to pay for an investment, and they also calculate the payback period to determine when they get their initial investment back to understand how much flexibility is incorporated in the investment. The moral, however, is the same—the payback rule might provide a useful piece of information in some situations, but it should never be used in isolation; it should only be used in conjunction with the NPV rule or the IRR rule, for any firm in any situation.

Valuation of sustainability-related investments

One significant challenge with investments in human, social, and environmental projects is that their cash flows can be indirect and long-term. It is much more difficult to measure indirect and long-term cash flows than it is to measure direct and short-term cash flows. This just means we may have to work harder to figure out what cash flows to include; it does not mean we do not include them.

Let's look at a decision that many firms have to make: how to source raw materials or other inputs. Imagine you are considering two options: a low cost source and a responsible source. Responsible can mean whatever we want it to mean, whether that's fair trade or environmentally certified or whatever. The key difference is that the responsible source is more expensive, in the short term. However, at some point the responsible source becomes less expensive, possibly because of excess volatility in market prices (such as oil) or because of potential remediation expenses or fees (e.g., BP in 2010) or because of indirect costs related to labor conditions (e.g., Nike in the 1990s). The drivers of the shift in the cost of raw materials could be just about anything. The basic decision is whether or not it's better to spend a little now and a lot later or to spend more now and less later.

Once we settle on the assumptions involved in this investment story, it becomes a simple math problem. Imagine you will be sourcing these materials for the next ten years. In the first year, the responsibly sourced materials are 20 percent more than the low-cost source. By the fifth year, the two sources have the same price. By the tenth year, the responsibly sourced materials are 25 percent less than the low-cost source. In both cases, we will assume a 10 percent cost of capital. These numbers are obviously hypothetical and are probably smoother than we would likely see in reality, but the comparison is probably reasonable enough. Which source should you use? The comparison is in table 5.6.

Based on the assumptions in this example, if you plan on sourcing these materials for the entire ten years, then you are better off by going with the responsible sourcing: your costs would be $1,096 vs. $1,128. Of course that's going to be the answer—you're reading a book titled *Sustainable Financial Investments*. But perhaps you enter into a five-year contract rather than a ten-year contract. In that case, you would be better off with the low-cost materials. Perhaps the

Table 5.6 Long-Term vs. Short-Term Sourcing Valuation

	Cheap Sourcing		Responsible Sourcing	
Interest Rate or Opportunity Cost of Capital = 10%	**Actual Cost**	**Present Value of Actual Cost**	**Actual Cost**	**Present Value of Actual Cost**
Year 1	$100.00	$90.91	$120.00	$109.09
Year 2	$100.00	$82.64	$125.00	$103.31
Year 3	$120.00	$90.16	$135.00	$101.43
Year 4	$140.00	$95.62	$150.00	$102.45
Year 5	$170.00	$105.56	$170.00	$105.56
Year 6	$200.00	$112.89	$190.00	$107.25
Year 7	$240.00	$123.16	$215.00	$110.33
Year 8	$280.00	$130.62	$245.00	$114.29
Year 9	$335.00	$142.07	$280.00	$118.75
Year 10	$400.00	$154.22	$320.00	$123.37
Total Cost:				
Over first 5 years	$630	**$465**	$700	$522
Over all 10 years	$2,085	$1,128	$1,950	**$1,096**

cheap market prices increase slower than predicted. Perhaps the responsibly sourced materials increase more than predicted. Or perhaps the opportunity cost of capital isn't 10 percent but is closer to 15 percent. By spending $20 more on the responsible sourcing in year 1, you're effectively giving up an opportunity to earn an additional 5 percent on that $20 in some other investments—that's costly. The point is that any investment decision is only as good as the assumptions that go into the analysis. And you never really know what your cash flows are going to be in the future.

The above analysis is essentially just what Interface did in 1994 when it decided to make modular carpet tiles in the most environmentally sustainable way possible. It was no longer looking for the cheapest materials for its carpeting—these likely would have been petroleum-based. Instead, the company looked for innovative alternatives that might have a higher short-term cost but a lower long-term cost, directly and indirectly. That was more than 20 years ago and operating with this mindset is still what drives the firm.[17] The above analysis is also essentially what Nike has been doing since the early 2000s. Nike realized that approximately 60 percent of the environmental impact of a pair of shoes came from the materials that were used to make the

shoes—which would create a vicious and costly cycle, as that environmental impact would inevitably drive the costs of those materials up over time.[18] For Nike and for Interface, the result was an investment in innovation: it may be more costly in the short term but they believe it will create more value in the long term.

Indirect cash flows and the business case for sustainability

One of the problems with valuing any investment is that it requires us to use numbers. We have to come up with a number for every story. Valuation requires us to convert a business plan or marketing strategy into numbers. It requires us to objectively measure many abstract ideals, such as air quality, customer satisfaction, employee engagement, or image enhancement, and then to convert these objective measurements into cash flows. Much of the ability to make this conversion comes from experience and from data. Interface, Nike, Whole Foods, and many other firms invest in sustainability-related projects because their numbers show that the cash flows associated with such projects are significant and value creating.

- Interface: In 1994, Interface made a bet on energy and materials costs increasing. It also bet on stakeholders' preferences moving in favor of eco-friendly carpeting. If the first bet was accurate, Interface would benefit from lower cost of materials and greater risk mitigation. If the second bet was accurate, Interface would benefit over the long term with its reputation and image enhancement. Increased cash flows would be the result of new markets of customers who preferred eco-friendly carpeting. The mission also changed the mind-set of the firm and probably led to greater innovation; the methane-powered factory in LaGrange, Georgia, is an example.
- Nike: Nike's epiphany occurred in 1998, largely because it was concerned about the direct effects of its labor and business practices. The biggest business case driver was in repairing Nike's image with customers and other stakeholders. Improving its labor practices also led to greater risk mitigation in terms of potential fines, legal costs, and safety issues. As Nike's sustainability program has transitioned from labor issues in the 1990s to environmental issues in the 2000s, one of the biggest expected drivers of value is innovation. The company is using sustainability-related issues to motivate employees to find better ways of doing business.

- Whole Foods: Whole Foods' business model revolves around an embedded focus on human, social, and environmental issues. Those values define the company and are its competitive advantage. Investments in sustainability-related initiatives are not optional. Or are they? In light of the May 6 earnings report and the subsequent 18 percent drop in stock price, can Whole Foods create value by sacrificing any of its values and investments and focusing on driving value by paying less for its produce or by paying lower wages? Maybe—but I doubt it. Its stakeholders won't let it. Everything Whole Foods does works to create value through its embedded sustainability investments. As such, there may be a few direct benefits, but there might be significant costs associated with not making new investments that are directly connected to the company's mission and social purpose. These costs would probably start with damage to its image and extend into worse operating efficiency, less innovation, and lower revenues as employees and customers become disengaged with the firm's mission and strategies.
- Walmart: Walmart's mission is slightly different from Whole Foods' mission. Walmart's mission is about its customers and providing them with low prices. The CEO's introductory remarks in Walmart's *2013 Global Responsibility Report* support this: "Walmart must do our part to give our customers better options and better lives."[19] But the CEO's remarks go on to highlight some of Walmart's social and environmental accomplishments, such as getting 21 percent of its energy from renewable sources and increasing job opportunities for women. Why is Walmart making these investments? What are the intangible benefits of doing so? Much as Nike did in the 1990s, Walmart has many critics who do not approve of the company's labor and other business practices; therefore, every dollar it invests in human, social and environmental programs is an investment in Walmart's image. The fact that Walmart sells organic produce creates much more value than the mere profit margin it earns on each sale. Walmart also pushes many of its sustainability-related initiatives down to its suppliers, requiring them to meet certain standards. This drives innovation in human, social, and environmental technology—not necessarily for Walmart directly, but throughout its value chain and across industries. In this case, value is created across multiple dimensions: for Walmart from its image enhancement, for the suppliers from the their operating efficiency, market access, innovation, and image enhancement gains, and for society as a whole from its innovation gains.
- BP: In 2000, BP (formerly British Petroleum) launched a branding campaign called "Beyond Petroleum," hoping to emphasize that

BP was an integrative energy company rather than just an oil and gas producer.[20] The company touted its investments in wind, solar, biomass, and other renewable energy sources. This served to drive value through image enhancement, market access, and innovation. At least that was the plan. Everything changed in the summer of 2010 when BP's Deepwater Horizon well in the Gulf of Mexico exploded; 11 workers died and millions of barrels of oil spilled into the Gulf. Whatever goodwill BP had built up from its Beyond Petroleum branding was gone. To some, BP's image was now associated with antienvironment, antihuman, and antisocial values. The direct costs of making the well safer initially, working harder to stop the spill, and investing in cleaning up the spill could be calculated, but there is no way BP could estimate the costs of its damaged reputation. As an exclamation point on the innovation lost as a result of BP's response to the accident, BP subsequently ended its investments in solar and wind power, choosing to refocus on oil and gas assets—the company chose to invest in low-risk, predictable short-term initiatives rather than make innovative and long-term investments.

- Patagonia: Similar to Whole Foods, Patagonia has an embedded sustainability orientation, where it is difficult to distinguish discrete sustainability investments. One specific strategy does take a unique approach to creating value: the purpose of Patagonia's *Common Threads Partnership* is to get its consumers to buy less of its products.[21] Or at least that's the stated purpose—to buy only what they need. What's the value in this? It might seem that this reduces Patagonia's sales revenue. And it may. But it may also increase customer loyalty such that Patagonia's sales revenue increases over the long term. Customers may be so impressed with Patagonia's desire to create less waste that they actually buy more of Patagonia's products. And if Patagonia is able to convince consumers to buy less overall, Patagonia's revenue relative to its competition will increase if the customers are spending a greater share of their budget at Patagonia. Through this *Common Threads Partnership,* Patagonia might create value through market access, image enhancement, risk mitigation, and innovation over the long term—even if the valuation spreadsheet shows lower sales revenue in the short term.

As these six examples show, direct cash flows associated with any investment are important, but we cannot ignore the indirect and long-term implications of any investment. In many cases, that's where the most significant value creation or destruction will occur.

Maximizing corporate profits and long-term value creation

Corporate profits and long-term value creation are the result of making sustainable financial investments. Everything a firm does—every decision it makes and every strategy it employs—is an investment. Resources are being traded for value; even if those investments are not direct uses of financial resources, they are indeed an indirect use of financial resources. These financial resources always come from the stakeholders. Customers trade financial resources for goods and services that they believe give them increased value or utility. Investors trade financial resources today for financial returns on those resources in the future. Employees trade labor and intellectual capital to the firm in exchange for a paycheck. Profits and value are created when stakeholders are willing to pay a premium to the firm. As resource availability is becoming more constrained, as consumer preferences are changing, and as employees look for different sources of fulfillment in their jobs, value is coming from different places and different investments. The economics of investments are changing, and technology is enabling value to be captured in ways that were not considered possible a decade or two ago; more than ever, value is being created through investments in social, human, and environment-focused strategies.

- Tesla has grown from nothing to a $30 billion company in just a few years as economic forces from consumer preferences, government regulations, and technological advancements have converged. The firm is not yet maximizing corporate profits, or even generating profits, but the financial and resource markets expect the favorable economic forces to continue and for Tesla to benefit from these economics. Presumably, maximizing corporate profits will only be a matter of time for Tesla.
- Solyndra went out of business because its investments didn't create value. Its plan to maximize profits through thin-film solar technology failed because its competitors were able to offer a comparable product at a much lower price to consumers. Even if their technology was inferior, the competitors had the economic advantage of significantly lower input prices. As a result, any product inferiority wasn't significant enough to offset the cost savings. Solyndra's competitors created value when they were able to create a product and strategy that capitalized on the economic

drivers; Solyndra went out of business because it couldn't capitalize on those drivers.

- Whole Foods may have lost 20 percent of its value in May 2014 when investors lowered their expectations of Whole Foods' ability to maximize profits in the future, but its model of creating value through healthier food, healthier lifestyles, engaged employees, and an enjoyable shopping experience had generated significant profits and created a $14 billion company. That 20 percent drop in stock price was due to concerns about other companies entering the organic grocery business and trying to replicate Whole Foods' model and taking away Whole Foods' competitive advantages. We know that success breeds competition, which can ultimately reduce individual firms' profits. But it doesn't have to mean that all value is not maximized for all stakeholders. And, Whole Foods' stock price did regain all of that 20 percent drop six months later when investors revised their spreadsheets and expectations with new information—quickly returning the value of the company to nearly $18 billion.
- Nike is a footwear and apparel company. Its star endorsers and revolutionary shoe designs attract consumers. But much of its value comes from its ability to procure the materials needed for its footwear and apparel as cost-effectively as possible. To this end, the company is investing substantial resources in the ability to benefit from economic drivers in the future. These forces may include the availability of raw materials, motivated employees, and an environment where athletes can thrive. Nike is incurring short-term costs in an effort to maximize long-term profits and value creation.

Profits are calculated as revenues minus expenses, and value creation is the result of accumulated or expected profits. To maximize profits, firms must optimize the relationship between revenues and expenses—they must figure out how to get the greatest amount of revenue while incurring the least relative amount of expenses—both directly and indirectly. The examples above highlight the economic drivers of where profits and value comes from while also emphasizing the dynamic nature of value creation: what works today may not work in the future. Every economic decision any firm makes is an investment and will have a direct or indirect impact on current and future profits. These examples also emphasize how corporate investments are not just financial cash flows, but they are the products of integrated systems of

firmwide resources, including design, marketing, strategy, operations, employees, customers, suppliers, and all other economic resources that are part of the firm. Value is created over the long term from the entire system, not from any individual component in the short term.

Appendix
Valuation of a Rooftop Solar System

Picture a building, any building. It could be your office, a McDonald's franchise, or anything else. Maybe picture one of the 200 Walmart facilities that have installed renewable energy systems in the past few years. Assume that this building currently gets 100 percent of its energy from the electric grid. The grid could be powered by coal, or it could be powered by hydroelectricity or some other renewable energy source; it doesn't matter much. Now imagine that you've been asked to analyze whether or not the building's owners should install a rooftop solar energy system. The building will stay connected to the grid to receive whatever energy it doesn't get from the solar system. Your job is not to make the case for investing in a rooftop solar system. Your job is to determine whether or not this investment adds value to the building's owner. How would you do that? How would you analyze the financial implications? You would start with the business case.

The business case for investing in a rooftop solar system

The business case tells the story of the investment—what are the drivers and where does value come from? It may include numbers, but it doesn't need to. It is designed to frame the analysis so that we know where the costs and benefits come from with this investment. So let's walk through our business case drivers for this rooftop solar system.

- *Increased market access:* Whether or not this investment leads to increased market access probably depends on who owns and is using

the building—and who the stakeholders are. It is unlikely to lead to new products or entirely new market opportunities. But it may convince some customers, employees, suppliers, and other stakeholders to engage with the business.

- *Greater risk mitigation:* Having two sources of power certainly reduces the risk of either source failing, during a grid blackout or during a rainy season. Reducing dependence on one source also has long-term risk mitigation benefits. The expected cash flows may not change, but we might work this benefit into either a lower discount rate or into different scenarios.
- *Innovation:* It is unlikely that there will be significant cash flows related to innovation with this investment. While the solar system certainly may be very innovative and game changing within its industry, it may not change the way an accounting firm, fast food restaurant, or Walmart runs its business.
- *Greater operating efficiency:* This is where the value is. This investment is a classic eco-efficiency investment; the value is driven by efficiency gains from environmentally friendlier technologies or applications. The purpose is to lower expenses: the majority of the future benefits related to this investment will come from having lower energy bills, avoiding dependence on the grid, and avoiding any rate increases caused by fossil fuel constraints. The short-term and long-term energy costs savings will likely determine whether or not this investment adds value.
- *Regulatory compliance:* As of today, late 2014, regulatory compliance is not a driver for this investment. Most jurisdictions simply encourage renewable energy use through subsidies and other benefits. But we are likely moving to a world where using renewable energy might be part of some broader regulatory mandate. While there may not be any immediate cash flows or benefits related to regulatory compliance, those may arise in the future (we can file this under risk mitigation, too). In this sense, this investment has value from the flexibility it creates should renewable energy use become a requirement in the future.
- *Image enhancement:* Whether or not this investment improves the owners' or users' image depends on who they are and who their stakeholders are. Which company would benefit more from an investment in this solar system, Whole Foods or Walmart? REI or Bass Pro Shops? Interface or Nike? This is where economics gets fun because we can make the case for any position. Maybe Whole Foods' customers and stakeholders assume that Whole Foods is already 100 percent powered by renewable energy and there would be absolutely zero image gains from this investment. Maybe some potential Walmart

customers see this as a major improvement in Walmart's values and those potential customers become actual customers. This is the art of investment analysis and valuation. This difference of perspective is exactly what makes a market and creates opportunities for different decisions.

When thinking about the business case, it is important to appreciate that these are not necessarily reasons to make or avoid an investment. The business case analysis simply guides us toward what the costs and benefits might be. The business case is designed to make sure we are thinking about all of the cash inflows and cash outflows, direct and indirect.

What are the cash flows?

Now let's think about the cash flow effects that are related to this investment and the business case. For now, we're not thinking about the numbers. We'll apply the numbers later and then do the valuation analysis; consider yourself warned. What are the likely cash flows that exist only as a result of making this investment?

- *Initial up-front investment to purchase the rooftop solar system:* The amount of this investment will depend on the size of the roof and the system or technology that is selected. We should be able to estimate this number with considerable accuracy.
- *Subsidies:* For many different investments, including rooftop solar systems, there are government-provided incentives to make the investment. These incentives may be one-time lump-sum incentives—such as a 30 percent federal tax credit on acquisition[22]—or they may be recurring benefits over the life of the investment—such as generous depreciation rules. These incentives may occur in several different jurisdictions: federal, state, local. Many subsidies expire, so waiting to make the investment may have substantial consequences. There may also be renewable energy credits that the owner receives for making this investment. These credits have a market value. If the owner doesn't need them, it should be able to sell them to a third party who can use them. All of these count as subsidies and should be included in the analysis.
- *Reduced energy costs:* Using solar power and using less energy from the grid will reduce future energy costs for the building. But by how much? We have to predict what future energy prices will be to know what our savings will be.

- *Maintenance costs:* For most of us, there are no recurring maintenance costs to using energy off the grid. If we install and own a rooftop solar system, we will now have increased maintenance expenses that will cut into our energy cost savings.
- *Salvage value:* At the end of the project's life, will the equipment have any salvage value? That is, will we be able to sell it to back to the manufacturer or to a third party? If so, we need to include this value in the analysis.
- *Incidental costs:* Investment analysis is about marginal or incremental cash flows. We only care about cash flows that wouldn't exist if the investment had never been made. This includes legal and accounting and other administrative costs. This also includes labor and construction costs: if the current roof of the building is not secure enough to support a rooftop solar system and we have to spend significant money to improve the roof's condition, we have to include that in the analysis.
- *Risk mitigation:* We can account for any reduced risk by lowering the interest rate or we can do it through scenario analysis and making different cash flow assumptions.
- *Image enhancement:* Are revenues higher than they would have been without the investment? Is employee productivity higher? Are labor costs lower? Are the costs of borrowing debt or using equity lower? What if we don't make this investment: what cash flows might we lose as a result of that decision? Coming up with the answers to these questions and quantifying them is not easy, but we have to try.
- *Market value of building:* If the building owner decides to sell the building in the future, will having the solar system already installed affect the market value? Perhaps having a solar system already installed is very desirable to future owners of the building—this value increase should be included in the analysis, if possible.
- *Taxes:* No investment should ever be made without thoroughly understanding all of the related tax effects. In this case, there may be a tax subsidy to make the investment. Perhaps it's a 30 percent federal tax credit, which would effectively make a $1,000,000 investment only a $700,000 investment. Perhaps the federal or state tax codes allow us to use accelerated depreciation on this investment; this will lower our tax costs in the near term. And there will likely be tax effects throughout the life of the project, too. For example, any costs related to maintaining the system will lower future taxable income, which will lower taxes paid. But if we use solar power instead of the grid, our energy costs will be lower. That's good—but our taxable income will be higher without those energy costs, meaning our overall taxes

will be higher. We need to be sure to adjust for these increased taxes on any avoided energy costs, too. Finally, we need to be sure we do not double-count tax effects. If we include a 30 percent tax credit above as a subsidy, we cannot include it again as a tax effect. See your tax accountant regarding any of these tax issues.

In addition to the cash flows, we also need to estimate the life span of the investment. Estimating how long the project will last is a critical component of the analysis. Since most of the cash outflows occur at the beginning and the cash inflows occur in later periods, it would seem that a longer life will likely lead to higher valuations. That is probably true, but there may be recurring costs to getting that longer life, such as significant maintenance costs in years 10–20.

We've probably overlooked some costs or savings, but this should get us started. While this is essentially a straightforward eco-efficiency project, the cash flow and valuation analysis is more complicated than a simple comparison of investment cost outflows and energy savings inflows. All marginal, incremental, or relevant cash flows must be included in the analysis. We don't have to have all of the answers. There is quite a bit of uncertainty with any investment, even an investment as simple as a solar system investment—this is why we do sensitivity and scenario analyses. Uncertainty is normal; predicting the future is very difficult. We'll talk about how to deal with this uncertainty when we get to the actual valuation analysis. Be patient.

Investing in a rooftop solar system

Like it or not, we now have to put some numbers to the story and actually do the math to determine the value of this opportunity; your finance department and investors are going to want to see it. In this base-case analysis, we will make the cash flow assumptions shown in table 5A.1.

- The first assumption is that the cost of the rooftop solar system will be $10,000,000. We can just as easily make this $1,000 or $1,000,000,000—it matters for the math, but it does not matter for the process or decision. Most of our other assumptions will be based on this $10,000,000 initial investment, and we can easily scale all other numbers up or down. What other assumptions do we need to include in the financial analysis?

Table 5A.1 Solar System Base-Case Assumptions

Solar system cost	$10,000,000	up-front, today
Incidental investment costs	$250,000	up-front, today
Federal tax credit	30%	of total investment today
State/local incentives	$0.10	per kWh for first 5 years
Energy produced	5,000,000	kWh in year 1
Year 1 avoided energy cost	$0.105	per kWh
Energy cost increase	2.80%	per year
Decrease in panel efficiency	1.00%	per year
Carbon per kWh from grid	1.22	pounds
Cost of carbon credits	$10.00	per ton of CO_2
Maintenance cost	$50,000	in year 1
Increase in maintenance cost	2.50%	per year
Tax rate—federal	35.00%	
Tax rate—local	8.00%	
Depreciable value for taxes	$10,250,000	includes incidental costs
Depreciation schedule—federal		
Year 1	20.00%	of initial depreciable value
Year 2	32.00%	
Year 3	19.20%	
Year 4	11.52%	
Year 5	11.52%	
Year 6	5.76%	
Depreciation schedule—state	10.00%	per year
Image enhancement—net profits	$78,275	increasing at same rate as energy cost
Life span of the solar system	20	years
Cost of capital	12.00%	

- *Incidental costs*: We will assume that we have to spend $250,000 to strengthen our existing roof to support a $10,000,000 system. Maybe this is a 20-year old Walmart store that needs some renovation. Both the initial investment and these incidental costs receive the same subsidy and depreciation benefits.
- *Subsidies*: As of late 2014, the US government provided a 30 percent investment tax credit on qualified renewable energy systems.[23] This federal subsidy could expire and we could lose this 30 percent credit if we wait too long. If the building is owned by a nonprofit—such as a public university—it is not eligible for the 30 percent tax credit. Many states provide subsidies on top of the federal investment tax

credit; we will assume that this building is in such a state. A standard subsidy is a cash payment for a set period of time based on the amount of power being produced by the system; we will assume this cash payment is $0.10 per kWh for the first five years only.

- *Energy generated by system*: 5,000,000 kWh of energy is estimated based on a cost of $2.00 per kilowatt-hour (kWh) of power and a $10,000,000 system. Of course, the amount of energy the system will generate also depends on many factors other than cost: location, weather, quality of the system, and others.
- *Reduced energy costs*: According to the US Energy Information Administration, the (EIA) average cost of commercial electricity in the United States in late 2014 was 10.5 cents per kWh.[24] Hawaii has the highest cost—at $0.348 per kWh—and Oklahoma has the lowest cost—at $0.077 per kWh. Of the 48 contiguous states, New York and California have the highest electricity costs, at around $0.15 per kWh; combine this with the abundant sunshine and relatively high state subsidies, and it explains why about half of Walmart's recent solar system installations have been at stores in California alone. We would want to customize these rates for the location of the building. For this analysis, we will use the US average of 10.5 cents per kWh.
- *Energy cost growth*: Over the ten years from 2004 to 2014, the average electricity cost increase was 2.8 percent per year.[25] In these ten years, the greatest annual increase was 9.6 percent from 2005 to 2006 and the lowest annual change was a decrease of 2.3 percent from 2011 to 2012. The increase from 2013 to 2014 was 2.4 percent. This is one of the most important assumptions we will make. This is where the art of valuation is employed. If you want to make the case that fossil fuels will soon become much more constrained than they have been in the past, maybe you would want to argue that the future electricity cost increases will be 5 or 8 percent. We could even use different growth rates for different years without complicating the analysis much. If we can come up with numbers to match the story, we can put it into the financial model. For this analysis, we will assume that energy costs grow at 2.8 percent.
- *Efficiency loss over project life*: The system is likely to become less efficient over its life. We'll assume that it loses 1 percent of its production, in kWh, each year.
- *Carbon credits:* Assume that the owner has been purchasing carbon offset credits. This is a discretionary expense, presumably because it's important to stakeholders. With the system producing noncarbon-based energy, this cost can be avoided. According to the EIA, natu-

ral gas-based electricity generates 1.22 pounds of CO_2 per kWh of energy; this is the lowest amount of any fuel source.[26] The late 2014 prices of carbon credits range from about \$7 per ton of CO_2 in Europe to about \$11 per ton of CO_2 in California.[27] We'll estimate a price of \$10 per ton for our building. Both of these numbers could be way off when our system goes live, but neither should be a driving factor in the investment decision.

- *Maintenance costs:* This \$50,000 is an estimate based on 0.50 percent of the cost. We will assume that this increases at a rate of 2.50 percent, which is about the long-term average inflation rate in the United States. We do not necessarily want this to increase at the same rate as the energy costs increase because there could be different factors that drive different increases.
- *Taxes*: The 35 percent federal tax rate is a standard corporate tax rate that would affect most firms making this investment. State-level taxes would be different for each state. We will assume that our state has a corporate tax rate of 8 percent.
- *Depreciation schedule*: Solar systems are depreciated for federal purposes using a five-year, modified accelerated cost recovery system. This means that we get to depreciate the entire investment over five years (even though we expect it to last for twenty years), and we get to recognize more depreciation in the early years. We will assume that the state allows us to depreciate it over a ten-year period, using straight-line depreciation. Most states do allow some form of accelerated depreciation, but this is reasonable enough to illustrate the financial analysis.
- *Image enhancement*: We will assume that our customers, employees, and suppliers like that we have made the switch to solar power—more than they like us just buying carbon credits. Through our extensive analysis of past industry trends and customer preferences, we are confident that the after-tax cash flows attributable to our stakeholders valuing our investment in solar power will be precisely \$78,275.15 in the first year. The case can be made that a firm like Walmart will benefit considerably in terms of its image and public relations by making an investment in renewable energy. This benefit could be through increased revenue because customers value the solar power or through lower costs, if, for example, employees are more engaged and productive as a result of this investment. This benefit will grow at the same rate as the annual energy cost throughout the life of the project.
- *Salvage value*: We will assume that this equipment does not have any value after its useful life; we will also assume that there are not any remediation or clean-up costs associated with dismantling or dispos-

ing of the equipment. Any amounts we did assume would hopefully be negligible and insignificant in the analysis.

- *Market value of building*: We will assume that this investment does not affect the market value of the building to keep the analysis simple. This is reasonable if it's a Walmart store and the company intends on owning the location for many years.
- *Life span of the investment*: Many manufacturers currently offer a 25-year warranty,[28] so we could easily include that as the life. But we'll go with 20 years because of the increased uncertainty of what technologies will be beyond the next 20 years.
- *Cost of capital*: We will assume that the buyer of this system is an established investor who can access funds relatively easily. As such, assuming a cost of capital for this investment of 12 percent, a rate just a little higher than the long-term average common stock return, might be reasonable. For a firm like Walmart, this is reasonable—comparable to the large company common stock returns we saw in the previous chapter, with a small risk premium added on. Walmart does have considerable experience of making solar energy investments, which should reduce the uncertainty it has with an investment such as this. If you think there is much greater risk in this investment than in most investments, you may want to increase this rate. But if the building is in Arizona or some other sunny location and we are confident in the technology and its benefits, then we may be able to use a lower cost of capital for this investment.

That should be most of the key variables relevant to this investment. Please do not get hung up on whether or not any of these numbers are right. For now, we want to focus on the process and the analysis. We can—and will—change assumptions later to see what happens when we make different assumptions and to see which ones are driving the analysis.

This book has emphasized that valuation is as much art as it is science. The science is the math and structure. The art is in understanding the story of where value will come from. These assumptions above should be both art and science. Tax rates, depreciation schedules, subsidies, and some other variables are not really assumptions; they are known. But many of the other assumptions require understanding the story and making the case for what the future will be: energy rates, benefits from image enhancement, risk mitigation, and other variables. Our job is to establish a reasonable starting point and then tell the story about what these values will be in the future—with numbers.

Table 5A.2 Solar System Valuation

	Today	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 10	Year 15	Year 20
CASH OUTFLOWS:										
Investment										
Solar system cost	$10,000,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Incidental investment costs	250,000									
Total Net Investment	$10,250,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operations										
System maintenance	$0	$50,000	$51,250	$52,531	$53,845	$55,191	$56,570	$62,443	$70,649	$79,933
Taxes										
Tax on local subsidies	$0	$215,000	$212,850	$210,722	$208,614	$206,528	$0	$0	$0	$0
Tax on avoided energy purchases	0	225,750	229,750	233,821	237,965	242,182	246,473	264,413	288,685	315,185
Tax on avoided carbon credit purchases	0	13,115	12,984	12,854	12,725	12,598	12,472	11,981	11,394	10,835
TOTAL CASH OUTFLOWS	**$10,250,000**	**$503,865**	**$506,834**	**$509,928**	**$513,149**	**$516,499**	**$315,516**	**$338,837**	**$370,727**	**$405,953**
CASH INFLOWS:										
Incentives										
Subsidy—federal	$3,075,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subsidy—local	0	500,000	495,000	490,050	485,150	480,298	0	0	0	0

Operations										
Avoided purchase of energy from grid	$0	$525,000	$534,303	$543,771	$553,406	$563,213	$573,193	$614,914	$671,360	$732,989
Avoided purchase of carbon credits	0	30,500	30,195	29,893	29,594	29,298	29,005	27,862	26,497	25,198
Image enhancement net profits	0	78,275	80,467	82,720	85,036	87,417	89,865	100,360	115,220	132,280
Taxes										
Depreciation tax shield—federal	$0	$717,500	$1,148,000	$688,800	$413,280	$413,280	$206,640	$0	$0	$0
Depreciation tax shield—local	0	80,000	80,000	80,000	80,000	80,000	80,000	80,000	0	0
Tax benefit from system maintenance costs	0	21,500	22,038	22,588	23,153	23,732	24,325	26,851	30,379	34,371
TOTAL CASH INFLOWS	**$3,075,000**	**$1,952,775**	**$2,390,002**	**$1,937,822**	**$1,669,619**	**$1,677,238**	**$1,003,028**	**$849,987**	**$843,456**	**$924,837**
Annual net cash flows (Inflows – Outflows)	**($7,175,000)**	**$1,448,910**	**$1,883,168**	**$1,427,894**	**$1,156,470**	**$1,160,740**	**$687,513**	**$511,150**	**$472,729**	**$518,885**
Cumulative net cash flows	**($7,175,000)**	**($5,726,090)**	**($3,842,922)**	**($2,415,028)**	**($1,258,557)**	**($97,818)**	**$589,695**	**$2,588,089**	**$4,866,840**	**$7,367,021**
	0	**1**	**2**	**3**	**4**	**5**	**6**	**10**	**15**	**20**
Annual net present value	**($7,175,000)**	**$1,293,670**	**$1,501,250**	**$1,016,347**	**$734,958**	**$658,635**	**$348,315**	**$164,577**	**$86,366**	**$53,791**
Cumulative net present value	**($7,175,000)**	**($5,881,330)**	**($4,380,080)**	**($3,363,733)**	**($2,628,776)**	**($1,970,141)**	**($1,621,825)**	**($854,695)**	**($327,929)**	**$1.07**
Cumulative IRR		**–79.81%**	**–37.69%**	**–18.10%**	**–7.62%**	**–0.49%**	**2.61%**	**8.12%**	**10.78%**	**12.00%**

Valuing the rooftop solar system investment

So, let's run the numbers now. Valuation analyses like this one are similar to an income statement, but with cash flows specific to the investment. In this analysis, much like with an income statement, we will focus on cash inflows and cash outflows. The valuation analysis for this rooftop solar system is presented in table 5A.2.

- *Cash outflows:* These are initial investments, maintenance, taxes on expenses not incurred (not having these expenses anymore—purchasing energy from the grid—means that our taxable income is higher, which means the taxes we pay are higher).
- *Cash inflows:* These are federal and state renewable energy subsidies, the expenses we no longer have (electricity and carbon credits), image enhancement, and tax benefits from depreciation and maintenance.

These line items will answer our first two most important questions in finance: what are the cash flows and when do they occur. The bottom section of the analysis answers the third question: what are those cash flows worth today. The present value of each annual cash flow contributes to the net present value, which is the number that we really care about. The NPV is the amount of value created by this investment. The internal rate of return—IRR—is also presented just to show how it is related to NPV. Overall, this presentation should be thorough and clear enough to demonstrate to our CFO and investors how this investment does or does not create value. For conciseness of presentation, the analysis in table 5A.2 does not show all years of the 20-year project life; years 7–9, 11–14, and 16–19 are hidden, but the relevant math and data are included in the totals.

Looking at the numbers, this is a good investment: the NPV is greater than $0 (by a dollar) and the IRR is at least 12 percent, which is the cost of capital or required return for this investment. Of course, concluding that this is a good investment relies on a lot of assumptions. If I was an investor, CFO, or financial manager and someone submitted this analysis to me, the first thing I would do is laugh at it. In this position, a big part of my job would be to exercise professional skepticism about nearly everything; if I ever saw a valuation analysis showing an NPV of exactly $1, I would immediately question every variable in that analysis. Never give anyone a proposal with a financial analysis showing an NPV of $1. I would

immediately look for the assumptions in the analysis that are most subjective and wonder how the analyst came up with those assumptions. In this case, I geared the analysis to have an NPV of $1 to illustrate that we can tweak the numbers to come up with any result we want. This should encourage us to think critically about how we came up with this result and what variables are driving it. And it should force us to perform additional analyses to make sure we are comfortable with the analysis and our investment decision. So let's revisit some of our assumptions.

- *Incidental investment costs:* Assuming that there are no additional incidental costs throughout the life of the project is not likely to be accurate. Perhaps we should schedule several subsequent investments during the 20 years to account for renovation or refurbishment.
- *Annual energy cost increase:* This variable is probably one of the bigger guesses in this analysis, and we could reliably justify just about any increase between 0 percent and 15 percent. We also assume that the energy cost increase is 2.8 percent each year for all 20 years. We did this for simplicity's sake; a more rigorous analysis might include a unique energy cost increase for each year of the investment's duration.
- *Cost of carbon credits:* Since the financial markets price carbon credits, predicting future prices is very speculative. Market prices of carbon credits through the European Union's Emissions Trading System were near $40 per metric ton of CO_2 in mid-2008 and were under $1 per metric ton of CO_2 in mid-2013.[29] Your guess is as good as mine about what these will be in the future.
- *Annual maintenance costs:* We can talk to other customers and do some research, but the maintenance costs related to our building and situation are likely to be unique. Further, these costs are unlikely to be constant for the duration of the investment. Maybe they are relatively higher in the early years as we learn how to operate the technology, or maybe the costs increase over time as the wear and tear requires more substantial maintenance spending in the future.
- *Image enhancement:* As you might have guessed, I made the image enhancement benefits equal to $78,275.15 so the NPV would equal exactly $1. Had these benefits been 15 cents less per year, the NPV would have been negative. The better we understand our business, value drivers, and our stakeholders, the better we will be able to estimate what the image benefits of this investment will be. Perhaps the benefits are greatest in the early years but wane in later years as they become less of

a novel source of value to our stakeholders. Or perhaps our stakeholders do not value them now, but will value them more in the future if climate change and other issues reach more of a critical level.

- *Cost of capital:* This variable represents the return our investors expect in return for providing us the financing to acquire this solar system. That return will come from the cash flows provided by the solar system; the riskiness of those cash flows is part of the risk premium incorporated into this cost of capital. Pricing risk is the holy grail in finance. Confidently knowing a project's cost of capital is one of the more difficult aspects of valuation finance.

The main reason we rigged the analysis to have the NPV equal exactly $1 was to show how sensitive any valuation analysis is to the assumptions we make. Before we decide whether or not to make this investment, we want to be confident in our analysis. In finance, information is very valuable; the more we analyze this investment, the more value we will get out of the analysis.

Sensitivity analysis

To perform a sensitivity analysis, we start with the base-case model and we change variables, one at a time, to see how each change impacts the overall NPV. Since most of these variables could span a wide range of actual values, we could perform a nearly infinite number of analyses. To spare our sanity, we will just focus on some reasonable variations of the key variables to get an idea of how sensitive this analysis is to each. All of the following results assume that we just change the one variable that is highlighted, and the rest of the analysis stays exactly the same as in the base case.

- If the system produces 4,000,000 kWh of energy instead of 5,000,000, the NPV is –$725,301. If it produces, 6,000,000 kWh, the NPV is +$725,304.
- If energy prices increase at 1 percent per year instead of 2.8 percent per year, the NPV is –$336,941. If energy prices increase 5 percent, the NPV is +$499,314.
- If the annual maintenance costs are $25,000 instead of $50,000, the NPV is +$124,521. If the annual maintenance costs are $100,000, the NPV is –$249,038.
- If the annual image enhancement benefits are $25,000 instead of $78,275.15, the NPV is –$474,788. If the annual image enhancement benefits are $200,000, the NPV is +$1,084,814.

- If the cost of capital is 10 percent instead of 12 percent, the NPV is +678,255. If the cost of capital is 15 percent, the NPV is –$821,082.

We could continue playing around with different sensitivities forever, but just by looking at the above five variables, we can get a pretty good idea of which ones have the most influence on our NPV. Of these five variables, four seem to have a significant influence on the NPV; only the annual maintenance costs do not seem to have a substantial effect. This tells us that we want to invest our forecasting resources into getting these other four variables as accurate as possible in the analysis.

This also tells us that we may want to focus more of our resources on getting the system's energy production as high as possible—which may require spending more on maintenance. If we combine these two variables and assume that spending $100,000 on annual maintenance can help the system produce 6,000,000 kWh of energy, the NPV is $476,265. Obviously, these higher maintenance costs would be worth it if they lead to more energy production. This analysis also tells us that we might want to focus on getting the image enhancement benefits as high as possible. Unfortunately, this also might not come without cost; perhaps we would have to launch a marketing or public relations campaign to make our stakeholders aware of what we have done. Many of the assumptions we have made are likely interrelated. As such, we might want to consider alternative scenarios where we take these relationships into account and change more than just one variable at a time.

Scenario analysis

In scenario analysis, we change many of the variables, typically adjusting the base case either to the best-case and the worst-case extreme scenarios or to customized scenarios, such as scenarios with a republican president and a democratic president for this energy system valuation. We could also perform several scenarios for different energy price and technology combinations. There are no rules. If you can envision a scenario you think is plausible, model it and use it. For this rooftop solar system investment, we will consider three scenarios: the base case we have already considered, a worst case and a best case—or, more accurately, a good case and a bad case; all three should be scenarios we can imagine as possible. This is far more helpful than modeling unlikely extreme scenarios.

Table 5A.3 shows the assumptions for our three scenarios. Presumably, we have done some research that shows the values in this table are realistic for this project. All of the numbers in this table should be rooted in economics; in practice, we should not just be picking numbers to bookend some range (even if that is what we're doing in this hypothetical example).

You will notice that some numbers vary quite a bit across the scenarios and that others do not change at all. The federal tax credit, the state incentives, the carbon per kWh emitted from the grid, the initial energy cost, the state and federal tax rates, the depreciation schedules, and our cost of capital are all the same across the scenarios. This may or may not be appropriate. Certainly, some of these should be known up front and will not change. But the carbon emitted from the grid could change over the next 20 years; we could make a case for it increasing (if old grid technology becomes less

Table 5A.3 Solar System Scenario Analysis, Assumptions

	Worst-Case Scenario	**Baseline Model**	**Best-Case Scenario**
Solar system cost	$10,000,000	$10,000,000	$10,000,000
Incidental investment costs	*$500,000*	*$250,000*	*$250,000*
Federal tax credit	30%	30%	30%
State/local incentives	$0.100	$0.100	$0.100
Energy produced, yr. 1 (kWh)	*4,000,000*	*5,000,000*	*5,500,000*
Year 1 avoided energy cost/kWh	$0.105	$0.105	$0.105
Annual energy cost increase	*2.00%*	*2.80%*	*5.00%*
Annual decrease in panel efficiency	*2.00%*	*1.00%*	*0.50%*
Carbon per kWh from grid (pounds)	1.220	1.220	1.220
Cost of carbon credits (per ton of CO_2)	*$5.00*	*$10.00*	*$20.00*
Annual maintenance cost	*$100,000*	*$50,000*	*$25,000*
Annual increase in maintenance cost	*3.00%*	*2.50%*	*2.00%*
Tax rate—federal	35.0%	35.0%	35.0%
Tax rate—local	8.0%	8.0%	8.0%
Depreciable value for tax purposes	*$10,500,000*	*$10,250,000*	*$10,250,000*
Depreciation schedule—federal	Same—5-year MACRS		
Depreciation schedule—state	Same—10-year straight-line		
Image enhancement, net profits	*$50,000*	*$78,275*	*$200,000*
Cost of capital	12.0%	12.0%	12.0%

efficient) or for it decreasing (if the electricity company upgrades to more efficient technology). We could include five or seven different scenarios rather than just three. There are no rules, other than to make the assumptions grounded in economic plausibility.When we update the assumptions in these three scenarios, we get the results shown in table 5A.4.

We now have a better understanding of possible outcomes. And this may help guide our investment decision. If we are a firm with a relatively conservative investment strategy, which means the possibility of a large loss is more important to us than the possibility of a large gain, then we may avoid this investment to avoid the possible $1.65 million loss in the worst-case scenario. If we have a relatively aggressive investment strategy, we may decide to make this investment because of the large upside associated with the best-case scenario.

We may go one step further and apply our confidence in the above forecasts by weighting each scenario and then finding a weighted

Table 5A.4 Solar System Scenario Analysis, Valuation

	Worst-Case Scenario	**Baseline Model**	**Best-Case Scenario**
Net Present Value			
Over 10 years	($2,060,414)	($854,695)	$721,818
Over 20 years	($1,653,868)	$1.07	$2,559,021
Internal Rate of Return			
Over 10 years	2.0%	8.1%	14.9%
Over 20 years	5.8%	12.0%	18.7%

Table 5A.5 Solar System Scenario Analysis, Weighted Average Net Present Value

	Worst-Case Scenario	**Baseline Model**	**Best-Case Scenario**
20-year NPV	($1,653,868)	$1.07	$2,559,021
	x	*x*	*x*
Probability of Scenario	20%	50%	30%
	=	=	=
	($330,774)	$1	$767,706
EXPECTED NPV	**$436,933**	*(Sum up the above 3 numbers)*	

average net present value of the investment. These weightings should be grounded in economic rationale; perhaps they are based on our understanding of the technology or based on our independent forecasts of the future economic climate. For example, weighting these three scenarios might produce the results shown in table 5A.5.

From this weighted-scenario analysis, we should make this investment because we expect it to create $436,933 of value.

Long-term vs. short-term nature of investments

There is nothing wrong with the above approach of choosing three discrete scenarios and averaging them. But given the nature of this investment in a rooftop solar system, perhaps we could come up with an analysis that was a little more customized for the unique characteristics of this specific investment. Depending on economic conditions or stakeholders' preferences, it is possible to imagine some variables being much higher (or lower) in 20 years than they are now—and these changes would not be caused by regular changes in the economy but by significant shocks to the factors driving those variables (such as energy prices or the benefits of image enhancement). It may be helpful to model scenarios that take these timing differences into account since the long-term and short-term nature of these investments could be quite different.

So let's create two new scenarios: one where the benefits are considerably higher in the early years of the project and one where the benefits grow significantly as the project matures. To keep things reasonably simple again, we will only adjust two of the assumptions: annual energy cost increase and image enhancement benefits. Table 5A.6 shows these assumptions.

In scenario A, the cumulative benefits are much greater than those in our base-case scenario: the average annual energy cost increase is 5.1 percent and the average annual image enhancement benefits are $112,500, each considerably higher than the 2.8 percent and $78,275 values in the base-case. When we calculate the NPV of this scenario, we find the NPV of scenario A is $50,246—better than in the base case.

In scenario B, the cumulative benefits are less than those in our base-case scenario: the average annual energy cost increase is 2.6 percent and the average annual image enhancement benefits are $75,000, each lower than the 2.8 percent and $78,275 values in the base case. In this scenario, the NPV of scenario B is $248,510.

Table 5A.6 Solar System Scenario Analysis, Long-Term vs. Short-Term Assumptions

	Scenario A	**Scenario B**
Annual energy cost increase:		
Years 1–5	2%	5%
Years 6–10	4%	3%
Years 11–15	6%	2%
Years 16–20	8%	1%
Annual image enhancement benefit:		
Years 1–5	$50,000	$200,000
Years 6–10	$150,000	$125,000
Years 11–15	$200,000	$75,000
Years 16–20	$250,000	$50,000

Scenario B, which has lower absolute cumulative benefits than scenario A, has an NPV that is more than $200,000 higher than the NPV of scenario A and more than $248,000 higher than that in our base-case scenario.

What's driving these perhaps surprising results? One thing is: the time value of money. Time value of money tells us that we would rather have a dollar today than a dollar tomorrow. This means that we cannot compare absolute dollar amounts across time; we have to look at everything in terms of present value. While scenario A does have larger benefits in later years and larger average benefits because so many of these cash flow benefits occur far in the future, they are discounted more and reduced substantially in today's terms. The larger nominal cash flows in scenario B occur in the earlier years and are not discounted as much to get them into today's dollar terms. The future growth in energy costs in scenario A is not large enough to make up for the amount that those costs are discounted relative to scenario B. We will see this factor in any comparison of investments that have different cash flows over time.

For better or worse, this is one reason why it can be a challenge to justify sustainability-related investments: the benefits accrue far into the future. But that may change as resources become more constrained and as technology continues to improve. This highlights the need to properly account for the timing of the cash flows in any valuation analysis and make sure to really understand what we expect the cash flows to be in the early years of the investment

because these are the ones that will have the greatest impact on the overall valuation.

Summary of rooftop solar system investment

This investment in a rooftop solar system is a pretty standard capital investment. We could have done the same thing for installing wind turbines or any other eco-efficiency project. The financial analysis in these investments is about as straightforward as possible—certainly for a company like Walmart that has significant experience with similar investments. We could have performed the analysis on Whole Foods' employee engagement practices or Unilever's community engagement investments, but we would have had to be much more creative with our assumptions. The business cases with those investments will be driven less by measurable factors and more by subjective, intangible factors, such as market access, innovation, risk mitigation, and image enhancement. We need to justify every investment with an appropriate financial analysis, no matter how intangible the benefits might be. Just making an investment because it's the right thing to do shouldn't be a good enough reason for any chief financial officer or for any stakeholder trying to create value or make an impact. Every investment is a decision about economic choices; knowing the costs, benefits, and value creation associated with every choice, as best we can, is essential to making our stakeholders happy. That means we should make the business case and then try to quantify that business case for every investment we could make. That means we have to understand the economics and the finance. That takes a lot of work, but creating value isn't supposed to be easy.

6
A Systems Perspective of the Firm

> *Value creation begins with providing a good or service the customer desires, but ultimate success is the result of the combined efforts and contributions of many different people, functions, and strategies. All aspects of the firm must be aligned in purpose and mission for the firm to be successful. They must work together to create value for the entire entity. The value of the firm is determined by the system, not by any individual part of that system.*

We've talked about the economics of value creation and how competitive advantages lead to profits and sustainable economics. We've talked about how each firm is a nexus of contracts and stakeholders that create value for the firm by each contributing resources that combine to create something—either financial or non-financial—that is greater than what could have been achieved without that combination of resources. We know that all of the revenues any firm has ever received have come from customers; since value creation is impossible without customers, it must begin with the customers, with the firm providing a good or service that customers desire. In their efforts to maximize their utility, customers buy products that make them better off. From a market equilibrium perspective, since consumers have limited budgets, the prices of these products will be the result of some trade-off analysis every customer performs. But what is a customer? Who is a customer? Stakeholders are responsible for making the firm what it is. It is reasonable to think of each stakeholder as a customer—as a consumer of utility. As a result, value creation comes from the firm enabling each of its stakeholders to maximize their utility by consuming the products, resources, or opportunities provided by the firm. Since the firm is a

nexus of these stakeholders, their actions and preferences determine the firm's competitive advantages that will create this value.

The business as a system

Think about where you work. Aside from you, what's the most important part of that business? Can you identify one specific aspect of the business that is singularly the biggest creator of value or competitive advantage? If you and all your coworkers were to identify what they thought was the most important driver of the business, do you think you would all agree on the single greatest asset your company has? Probably not.

Even if we were able to identify some of the most important value drivers, these drivers would be different for different firms. For law firms, accounting firms, and consulting firms, we might think the value comes from their intellectual capital. Perhaps the value of Whole Foods is driven by its mission and principles. Perhaps Nike, Interface, Apple, and Tesla are successful because of their design expertise. Maybe you identified people or leaders as the firm's competitive advantage. Even among leaders, each person's skill sets will be different and unique. CEOs use their intellect, their personality, their industry expertise, and their instincts to be successful. No CEO can be a great CEO just by focusing on the financials or product design; success comes from the dynamic integration of many talents. Each CEO is also affected by the environment—the skills needed to succeed in a financial firm on Wall Street are different from those needed to succeed in a tech firm in Silicon Valley.

Every business is a system—a system of assets and value drivers. What is optimal for the entire system may not be optimal for each component, except that each component will be better off when the entire system is optimized. Systems theory has been around for centuries, and it has been applied formally to business relationships since in the mid-twentieth century. Understanding how the business as a system functions to maximize value is what really matters for our analysis of the firm as a system. In general, systems are:

- *dynamic*—they change based on their components and environments;
- *interconnected*—they depend on their components and environments, both inside and outside the organization;
- *synergistic*—they form a whole that is greater than the sum of its parts.[1]

Internal and external influences determine how the system will behave and how it will respond to challenges and opportunities. If this reminds you of the interconnected web of stakeholders discussed in chapter 2, that's good—the comparison is appropriate. Systems theory takes a big-picture view of the firm, rather than a task-based view. The focus is on *what* the firm is and does and not necessarily on *how* the firm does what it does. The entire firm is the product of actions and relationships involving all components of the firm, both internally and externally; the success of the firm as a whole is the result of all the components working together to optimize value for the firm.

What does all this have to do with making sustainable investments? Each investment is a system or a subsystem within the organization, too; likewise, each system and subsystem is an investment. The entire firm is the product of all of its investments and subsystems. Nike's investments in the technology to reduce water usage in its dyeing process only adds value if it does not compromise the athlete's experience; Whole Foods' investments in each store and region establishing relationships with local farmers only adds value if the employees are able to nurture those relationships and customers are willing to pay for those partnerships. These are examples of isolated investments that become subsystems for Nike and Whole Foods; but, they become a part of the larger value creation system as they influence other functional areas, stakeholders, and investments within each firm.

Think back to the investment we made in the previous chapter with the rooftop solar system. It might be tempting to think of this as a simple eco-efficiency or cost-savings project. But its value can come from much more than just eco-efficiency or cost savings. There may be image-enhancement benefits, which will come from knowing the customers and employees, but also from introducing marketing or human resources programs to create value from the investment. Benefits associated with risk mitigation will come from macroeconomic and industry analyses of future costs and threats to the organization. Any value associated with regulatory compliance will come from the legal expert's understanding of when and how future changes to energy policies are likely to affect the investment. In terms of market access, benefits will come from knowing which stakeholders value this investment and crafting programs to generate additional benefits—such as selling excess energy to neighboring buildings or partnering with the city on a marketing campaign.

Or maybe the firm can't realize value from any of these drivers and can only benefit from the direct energy cost savings—that's okay, too. Presumably the firm chose to make these investments because it has the systems and assets in place to create value more easily with those investments than with whatever other investments it might have made but didn't. The investments we make become the firm; they become the portfolio of opportunities and projects we pursue, and the firm then becomes a system from which value can be created.

Sources of value creation

If every dollar of revenue that any firm ever receives comes from customers, the firm needs to provide a product that customers will value. Value creation begins with design—with the design of a good or service that is or will be in demand. This design can be for a revolutionary new product (such as the first iPad) or it can be for an incremental modification of an existing good or service (such as the latest version of the iPad). Value creation comes from matching products with preferences through design, which will generate demand and, therefore, revenue. Value creation through design does not just occur at the end of the period when the accountants report profits; design impacts long-term value creation throughout the life of the product or service. Creating a corporate culture where designers informally compete with each other leads to continuous innovation in design that creates value consistently over the long term.

Think about some of the major societal factors that may affect your business or your personal preferences over the next decade. These factors will vary across different individuals and businesses, obviously but there are likely many common themes:

- *government policies:* rules, regulations, taxes
- *macroeconomic factors:* interest rates, exchange rates, state of the economy
- *climate change:* impacts, timing, causes, threats causing alterations to weather patterns and physical environments
- *population:* growth, redistribution across socioeconomic classes, income inequality, urbanization, demographic shifts, health and wellness needs
- *resource scarcity:* availability of clean and fresh water and of raw materials, deforestation and agricultural devastation, availability of energy and fuel, ecosystem disruption

I don't know if these are the most important societal trends, nor do I know what form they will take, but most of them will influence businesses in the future. Now think about the possible impacts on business:

- Markets may be created or terminated as a result of product innovation or new regulations.
- Resource constraints in production may lead to increases in input costs and to more volatility, which will lead to price increases and more volatility.
- Consumer preferences and needs will change, and some of these changes may be short term, but many will be long-term.
- The assumptions in your financial plans will be the wrong assumptions—and they will certainly be different than the assumptions you were making in the past.

All of this is to say that the future will not be like the past, due to reasons and drivers that didn't exist in the past. For some firms, this will present a number of business opportunities; for others, this will present a number of threats. Design of products and processes must be focused on these—societal factors to fully take advantage of the opportunities they create.

In its *2013 Sustainable Business Performance Summary*, Nike identifies six global metatrends that may significantly impact its business: environment, health and wellness, demographics, governance, connectivity, and security.[2] From this list of six global metatrends, Nike further identifies five business challenges and eight business opportunities it expects to be faced with in the coming years; these are presented in table 6.1.

Imagine that you didn't know that these challenges and opportunities were in Nike's sustainability report; you probably would never have guessed that they are Nike's challenges and opportunities. None of these 13 issues seem to be uniquely related to athletic footwear and apparel. These same 13 challenges and opportunities could apply to most companies. Also notice that Nike lumps risks and opportunities together, which is exactly as it should be—but this is not always how firms think. Nike believes it can turn global risks into business opportunities by adapting its strategies to changing preferences and dynamics. This is long-term design at its core: none of these trends will completely develop over the next year or two, but they will evolve over years or decades. Turning these challenges and risks into opportunities, competitive advantages,

Table 6.1 Nike Inc.: 2013 Sustainability Challenges and Opportunities

NIKE Inc. **FY 12/13 Sustainable Business Performance Summary** **Sustainability Challenges & Opportunities**	
Challenges	**Risks & Opportunities**
(1) Resource cost volatility	(1) Increasing energy consumption
(2) Performance innovation	(2) Water inadequacy
(3) Labor inflation	(3) Changing climate
(4) Efficient supply chain	(4) Income divides & bridges
(5) Growth	(5) Obesity spreads
	(6) Coming of age in the southern hemisphere
	(7) Women in a new light
	(8) Easy access to information

and profits will be a long-term and continual process for Nike. That process has already begun—it begins with designing the processes, systems, and products that will best position the company to take advantage of these global metatrends.

Companies like Nike are always looking for metatrends and the risks and challenges that will lead to either opportunities or problems in the future. As such, Nike's challenges and opportunities are always changing. We can look back to Nike's *2004 Corporate Responsibility Report* to see what Nike considered its key challenges and opportunities then:[3]

- *China:* both in terms of utilizing labor in contract factories and generating sales revenue in China
- *Multi-fiber Arrangement:* essentially guaranteeing production quotas in many developing countries and orchestrated by the World Trade Organization, the arrangement was phased out in 2004; this subjects many factories to the short-term whims of the global marketplace and thus creates greater pricing volatility
- *Bringing corporate responsibility to our subsidiaries:* approximately 11 percent of Nike's revenues came from non-Nike or Jordan products, and these subsidiaries had not been subject to an umbrella corporate responsibility program
- *Stakeholder engagement:* continuing to work with critics, nongovernmental organizations, and others to better understand how the company can improve its corporate responsibility systems and processes

- *Transparency:* both within the firm and across the industry so that all vested stakeholders can understand what the company is doing and where it is going

We can see that there is little overlap between the 2004 list of challenges and opportunities and the 2013 list. The 2004 list covered a narrower set of issues and took a defensive approach. The 2013 list includes more specific ideas about where value creation will happen and takes a more offensive approach. As an example, note that the 2004 approach to stakeholder engagement was still concerned with the labor issues of the 1990s; in contrast, the 2013 approach to stakeholder engagement employs a team of environmental experts so Nike can better understand how to create value from climate change. And this is part of the strategic journey, of designing standards and strategies that will create value. Challenges and opportunities will naturally change over time as industries, technologies, and environments change. How companies respond to these challenges and opportunities and how they can convert risks and challenges into opportunities for value creation depends on the design, vision, and structure of the entire system.

Mark Parker, Nike's CEO in late 2014, began his career at Nike as a shoe designer.[4] He rose through the ranks based on his ability to design products and processes, including the transformative Air Max technology. He's probably not doing much work on shoe technology anymore; he's probably spending most of his time thinking about how to turn the above metatrends into lasting value. Just as the Air Max technology gave Nike a competitive advantage in the footwear market when it was introduced in the 1990s, designing products and systems that evolve from current meta trends can give Nike a competitive advantage.

In his opening letter in the *2013 Sustainable Business Performance Summary*, Parker asserts "sustainability and business growth are complementary." [5] To this end, Nike is looking to integrate innovation into its products and corporate strategies in three key ways:

1. Deliver a portfolio of sustainable products and services that enhance athletes' performance, such as breathable fabrics, completely recyclable products, and Flyknit shoes.
2. Prototype and scale sustainable sourcing and manufacturing models, such as investments in clean water and secure materials as well as institute enhanced oversight of labor conditions.

3. Explore new sources of revenue not based on constrained resources, such as closed-loop recycling structures and turning used shoes into courts, playgrounds, running tracks, and even back into soles for new shoes through the Nike Grind venture.[6]

Any competitive advantage that Nike gains from this approach will begin with design, with recognizing the issues and then creating products and processes around those issues. Design will determine what materials to use in the products, what production processes to implement, what labor requirements and characteristics to establish. It will determine how labor and mechanization will be balanced in the production process and what logistics and distribution systems will be required to turn the raw materials into products and then to get those products to the market.

In 1994 Interface made the strategic design decision to shift from petroleum-based carpeting to environmentally sustainable and renewable carpeting.[7] This was a huge shift—and a huge risk. The company had to redesign the technologies and systems that created its products. Old carpeting materials based on fossil fuels were harvested and recycled into new products; most of the technologies to do this did not yet exist in the mid-1990s, so Interface had to invent them. It had to shift the mind-set of its workforce from the take-then-waste model to one that eliminated waste and harmful emissions. Products, services, and processes were redesigned to work toward the goal of zero emissions and zero waste. In 1996, only 1 percent of Interface's raw materials were recycled or bio-based materials; in 2013, as much as 49 percent of its raw materials were recycled or bio-based materials.[8] In 2013, waste sent to landfill per unit of production was down 94 percent from 1996. Water use per square yard of carpet decreased from 1.3 gallons in 1996 to 0.3 gallons in 2013—a 77 percent decrease. None of this happened through the natural evolution of the business. These improvements are the result of radical transformation of the company's design and production systems. Changing a carpet company from petroleum-based materials to more eco-friendly materials is a huge investment. This investment is the result of understanding the metatrends impacting the business, understanding the firm's stakeholders, understanding the business case for the investment, and then executing the strategic and operational initiatives necessary to make the investment as successful as possible. The entire business system functioning to generate

and expand these opportunities and strategies is what created value for Interface.

In making this investment, Interface also saw an opportunity to learn from nature. For example, Interface incorporated more cellulose products into its design and production processes. Nothing is more sustainable than nature, and designers can learn about long-term sustainability by understanding how nature sustains itself. Biomimicry, or using natural organisms and systems as the models for design of sustainable products and processes, is a revolutionary perspective on design that does just this. Interface has introduced a number of products created through biomimicry including an entire line of carpet products inspired by the natural design of the forest floor that allow Interface to discard fewer off-quality tiles and adhesive products inspired by the natural occurrences of adhesion in nature (adhesion without glue). The result is a class of products that is more efficient, less wasteful, less harmful, and more profitable.

It wasn't just the carpeting and production processes that required radical redesign. Interface changed the way it sold and distributed its products, too—and this inevitably changes the company's relationship with its customers. Design will also determine how customers use and interact with the products as well as what happens to the products at the end of their useful life. Interface's shipping and distribution policies match these trends. Interface ships its products by the most efficient means possible—usually rail or ship—unless explicitly requested to do otherwise by the customer. The company plants trees and purchases carbon offsets to counteract business travel, commuting, and company vehicle costs. Interface has partnered with Subaru to make its vehicle fleet carbon neutral.

Interface isn't the only company that has recognized that investment in water reduction and protection can spawn opportunities for value creation. At Nike, the introduction of its Flyknit shoes in 2012 was revolutionary; the shoes are designed to be as functional and fashionable as other shoes while creating 50–80 percent less waste of input materials.[9] In addition, Nike Grind finds innovative ways to reuse old shoes and materials, converting them into playgrounds and athletic courts.[10] Considering that 59 percent of the entire waste in Nike's value chain occurs at the end of a product's life, the more Nike can design solutions to reuse and end-of-life shoe issues, the greater the value creation can be in the long term. Only 8 percent of the waste from Nike distribution centers ends up in a landfill; the remaining 92 percent is diverted through reuse, recycling, and

composting. Nike Grind uses 90 percent recycled waste and 10 percent recycled shoes. Moreover, Nike Grind is a revenue source. Nike Grind meets most of the criteria in our business case: new market access, greater operating efficiency, innovation, image enhancement, and risk mitigation, as it decreases its dependence on external parties through a closed-loop sourcing and production process.

Ultimately, with any investment, we still need to ask ourselves "Who cares?" Design must be supported by the business case for sustainability, which will inform what cash flows will materialize. Those cash flows will come from the firm's stakeholders. Product design must satisfy customer preferences. With demanding customers and intense competition, it is unlikely that many firms can sacrifice functionality or aesthetics for the sake of innovative design: customers won't pay for it. Nike is well aware that the majority of its customers will not pay extra for a more eco-friendly, closed-loop designed shoe if the performance and style attributes are inferior to those of other products.

Design must also consider internal stakeholders: the employees. One of Interface's biggest challenges in 1994—and still in 2014—has been to get its employees to buy into the company's mission.[11] Commitment from the top, leadership, transparency, and communication all helped the internal stakeholders engage and connect to the mission. The result was mission alignment and value creation. At Nike, the designers are stars: they create competitive advantages for the company, and the company knows how valuable they are. Being a design-driven firm results in value creation from multiple sources: from customers demanding the best and most innovative technologies, from designers motivated by the challenge of creating the most innovative products, from eco-efficiency in all aspects of design and production, and from the short-term and long-term cost savings from having products and systems that reduce the use and dependence on scarce resources. Better design is only better, however, if it aligns with the firm's mission and ultimately increases utility and value for stakeholders.

Long-term systems analysis: Firm operations

Designing a product that will meet or create consumer demand involves the collaboration of many different internal firm functions. Marketing has its finger on the pulse of the consumer market. Sales wants as many different options as possible to appease

as many customers as possible. Engineering and manufacturing want as few different options as possible to make their lives simple. The strategy folks want to understand how the product fits into a long-term plan for addressing market needs and the firm's capabilities. And the finance folks just want to understand the cash flows: what financial capital is needed to get the product launched and what financial capital will come back to the firm. Throughout its life, each product is improved by many different functional areas within each firm, and each product exposes the firm to many costs and benefits. For this reason, it is critical for firms to consider the long-term systems involved in every product's life in order to understand how all of these costs and benefits can lead to the creation or destruction of value.

Life-cycle analysis and cradle-to-grave methodologies consider the life span of any product—the entire life span, from the resources utilized to create the raw materials (such as water and fertilizer) all the way through the effects of disposal, reuse, and recycling. By understanding and measuring the financial, human, and environmental impacts at every point along a product's life cycle, a firm can get a better understanding of what the long-term impact of a product is. By understanding the long-term impact, the firm can better understand how value is created and what strategies it can employ to create even more long-term value. The investments in climate change that Nike is making today are a perfect example of incorporating this type of long-term analysis into current strategies.

Developing a business case for any firm to utilize life-cycle analysis is straightforward: innovating systems and technologies along the value chain, managing risk through a broader understanding of threats, hedging strategies and operations to prepare for new regulations, aligning strategies and operations within the company and among all external stakeholders, and improving the firm's overall image. Of course, when embarking on a systems' analysis, the firm is likely to find a number of challenges and concerns. Myopic firms will ignore these and try to excuse them in the short term (as Nike did prior to 1998); firms focused on long-term value creation will see these challenges as opportunities (as Nike does today).

Think of how different functions within the firm form an interconnected system; think of the financial, human, social, and environmental impacts of each connection. Together, these impacts contribute to the direct and indirect economic value of the firm.

- *Raw materials sourcing:* Options that have the lowest short-term financial cost may have the greatest long-term environmental and economic costs. The forestry industry provides a clear example of this.
- *Manufacturing:* Innovative technology can greatly enhance a firm's uniqueness, competitive advantage, and production efficiency. However, manufacturing can impose significant costs on the environment, on employee morale and productivity, and on society. This applies to almost all firms, including those with less obvious manufacturing functions: there's a reason that Microsoft, Apple, and Google have made substantial investments in renewable energy farms to support their growing data center needs.
- *Packaging:* Nike has a goal to reduce the weight of its shoeboxes by 10 percent by 2015 compared to their 2011 weights.[12] Two significant questions need to be addressed when making the business case for whether or not pursuing this goal adds value to Nike. First, how much will Nike need to invest in design, engineering, and partnerships to achieve this goal? From 2011 to 2013, Nike was able to reduce the weight only by 3 percent; the company knows it is going to be very difficult to achieve the remaining 7 percent of reduction by 2015. Any reduction won't be free. Second, will the lighter shoebox lose any integrity that harms the consumer experience or results in increased returns due to damaged products? Ensuring that neither of these concerns materializes won't be free, either.
- *Warehousing:* Walmart has focused on improving the eco-efficiency of many of its warehouses and distribution centers for a simple reason: they are major cost centers, and these improvements can result in significant savings. In addition, they can also result in better alignment of employees with the firm's mission, better working and safety conditions, and better relationships with the communities where Walmart operates stores.
- *Logistics, transportation, and distribution:* Interface delivers as many products as possible by rail and ship and avoids next-day shipping whenever possible. The environmental effects are obvious; the human and social effects result from a consistent walking-the-walk message throughout the company's operations. The company further incentivizes (with cash) employees to use public transportation, to carpool, and to purchase vehicles with lower emissions. Should Nike implement a similar policy to incentivize the 78 percent of its employees who drive to work alone?[13]
- *Retail and marketing:* As of the end of 2013, Whole Foods diverted or recycled 79 percent of the waste in its stores, with the goal of getting

above 90 percent by 2015.[14] Whole Foods' primary stakeholders expect nothing less. Consistency between corporate mission and the stores' actions is critical to getting engagement from all stakeholders, and it ties the human, social, and environmental components together. Getting to 90 percent won't be costless; it will take significant human and financial resources. For a firm like Whole Foods, the costs of not getting to 90 percent are likely considerably greater. Nike had a goal of reducing its finished goods manufacturing waste by 10 percent between 2011 and 2013; it fell short, reducing waste by 8.6 percent.[15] The challenge was complicated because this figure includes waste created by contract factories, which Nike does not own or directly control. While reducing waste by 10 percent may seem like an admirable goal for Nike, it begs the question of what the business case is for that number? Does a 10 percent reduction add more value than an 8.6 percent reduction? Why not shoot for a 20 percent reduction? For a company like Whole Foods, given its stakeholders and their preferences, the value created by waste reduction goals can be quite significant; for a company like Nike, given its stakeholders and their likely very different preferences, the analysis of the business case would look different.

While Nike did fall short of its goal of 10 percent waste reduction, its absolute performance is considerable: Nike diverted 44 percent of the waste in its retail stores, 69 percent at world headquarters, and 92 percent at distribution centers in 2013.[16] Measuring in this way will help Nike determine where it needs to look to address the waste reduction goal. If we focus on a strict environmentalist perspective and emphasize the scarcity of resources, we might be tempted to think that greater waste reduction is always better. But it's not always free, and Nike may be able to make much larger impacts—human, social, environmental, and economic impacts—by investing in other projects rather than in a waste reduction program. This might be a more difficult economic case to make at certain other companies such as Whole Foods or Interface.

- *Consumption:* What happens at the end of a product's life? The compact fluorescent light bulb (CFL) serves as a warning about failure to consider the economic costs of consumption and the end-of-life issues of their products. By using energy to produce light rather than heat, which is what incandescent light bulbs do, CFLs arguably offer much greater value: a lot more light, a little more cost. That part of the business case is pretty easy to assess. But CFLs also contain mercury. Mercury is poisonous, and we don't want it in our landfills and other waste facilities. We also don't want to touch it if the CFLs

break. While the direct environmental benefit of less energy used with CFLs seemed straightforward, the indirect human, social, and environmental costs made the overall economic benefit less clear. This uncertainty contributed to the innovation of light-emitting diode (LED) bulbs filling a market need; LEDs offer similar benefits in terms of light and costs as the CFL without the nasty mercury.

The internal functional areas have direct involvement with each product or process that a firm creates. Each area is doing its own net present value (NPV) analysis on its work, at least implicitly, to better understand how it can add value to the entire system. However, as we know, this system involves many more parties than just the internal functional areas of the firm: systems are interconnected. The internal stakeholders are critical cogs in the system, but they are not the entire system. They are part of the complex nexus of relationships of all stakeholders, and all of them are trying to create their own value through their relationship with the firm. This is how systems become synergistic.

Long-term systems analysis: Stakeholders

Just as each functional area is constantly trying to determine how it can add value to the system, each individual stakeholder is constantly performing an NPV analysis on his or her investment in the firm. Remember that, for some stakeholders, the investment is not directly financial but can be in terms of other resources, such as time, energy, and happiness for employees. Stakeholders will have a lot to say about the value that is created by the functional investments; the differences between Nike's stakeholders and Whole Foods' stakeholders likely lead to them placing a different value on each firm's waste reduction initiatives. As a result, when we analyze how any business system creates value, we have to continually ask ourselves the most important question of any business case analysis: "Who cares?" In other words, how do our stakeholders create value through this interconnected system?

- *Consumers:* The decision to purchase is all about utility and price (or value). Consumers will pay more for greater innovation or increased utility, and they will pay less for greater inconvenience or lower quality. Do Interface customers care whether or not their carpet is sourced with petroleum-based materials or recycled and plant-based

materials? Maybe: the company's sustainability-driven mission may be a value driver for some customers, and they may be willing to pay more because of it. But they still want a high-quality, long-lasting product to accompany this mission. What about Whole Foods' customers? Some of them might only shop at Whole Foods because of its mission and commitment to natural, local, organic products. They are willing to pay more because of this mission. And what about Nike's customers? Nike knows that most customers care only about quality, performance, and price. They are unlikely to pay more for its investments in sustainability even though these investments may lead to lower prices and greater innovation in the future.

- *Employees:* Employees exchange their time, energy, and intellectual capital for a paycheck. Many are also investing in a quality of life and a work experience. The trade-offs between environmental, human, social, and financial investments have a significant effect on what employees receive and value. Employees are customers, where the work experience is the product, and their labor is the price. They want to maximize the utility of their employment—for many, utility is about more than a paycheck, just as it is not always about price when consumers purchase a product.
- *Suppliers:* Much of economics is about leverage and power; this is possibly best exemplified in a firm's relationship with its suppliers. "We expect our suppliers to share our standards," says Nike in its *2013 Sustainable Business Performance Summary*.[17] Nike can try to impose its sustainability standards on its suppliers: Nike has too much to lose if it doesn't do so (in terms of image), and the suppliers have too much to lose if they don't comply (in terms of business with Nike). Whole Foods' suppliers care about its drive to increase local products in its stores. Should companies relocate so that Whole Foods will consider them local? Can farms relocate? What sacrifices or investments are suppliers willing to make to maximize the value they get out of their relationship with Whole Foods? Suppliers are also customers, and they have to make their own business decisions about what actions are best for their own long-term interests.
- *Investors:* For the most part, financial investors care only about financial return: do the investments and trade-offs along the entire value chain lead to greater financial return? Some investors may care about the character of those investments—in terms of mission, ethics, integrity—but only to the extent that they affect the cash flows of the investment. The challenge then is to translate such nebulous ideals along the value chain into objective numbers that create value and financial return. How does paying more for fair-trade labor at

the source lead to higher financial returns in the future? How does Whole Foods paying wages above the industry average lead to higher financial returns in the future? When will Nike's investments in climate change result in increased cash flows?

- *Community and Society:* An individual firm's value chain has the firm itself as the focus. There are resources, suppliers, manufacturers, partners, customers, and others spread across this value chain. Each of those entities also has its own value chain, where it is at the center, creating a complex and interconnected web between multitudes of firms and parties. To society, the goal is not to maximize the value of any single entity, but to maximize the value of society as a whole. To society, total value creation is the sum of all value created for all constituents. But to society, value includes impact, wellness, quality of life, happiness, and other qualitative ideals. Whereas the NPV calculations performed by the investors may be the most straightforward since they contain the most purely objective information, the NPV calculations performed by society may be the most difficult since they contain the most subjective and abstract information. How does any country measure quality of life? How does anyone compare this to financial wealth? What are the long-term societal costs of focusing on short-term wealth maximization?

Given this complex system of strategies, operations, functional disciplines, and stakeholders, how does a systems' approach to investment strategy lead to value creation? The common themes in this chapter point to two key drivers of value through strategy: innovation and efficiency. Innovation leads to increased revenues, and efficiency leads to increased margins.

As we know, every dollar of revenue comes from customers. To make customers happy and willing to exchange cash for goods or services, those goods and services have to mesh with the customers' own utility drivers. Competition—the drive for profits between different firms—provides customers with options and allows them to choose how best to maximize their utility. Innovation is both the cause and result of this competition for customers' utility. Firms work to create competitive advantages throughout their value chain to empower whole systems solutions to innovating and meeting those customer demands. We've seen many examples throughout this book of companies creating demand through innovation: Nike's Flyknit shoes, Apple's iPhone and iPad families, Tesla's luxury electric vehicles, Whole Foods' customer service. The rooftop solar system has the potential to create value by saving the firm money

on energy expenses. That's the direct, short-term benefit; it may also give the firm's sales and marketing functions the opportunity to launch a campaign around the new energy system to better engage customers, suppliers, and the community. One investment in energy efficiency can spawn other investments in strategic initiatives that can create value in ways beyond the direct cost savings.

Innovation doesn't just occur on the customer-driven product side of the business. It occurs throughout the value chain—sourcing, manufacturing, distribution, and elsewhere. Innovation can drive efficiency, and the quest for efficiency can drive innovation. For many firms, the sources of this innovation will be in addressing the demand for securing limited resources needed in production. Since 1994, innovation in how it uses natural resources has been Interface's mission. Innovation also occurs in how firms use human and social resources. Whole Foods is trying to maximize employee welfare and utility with its compensation policies and is trying to maximize customer and community welfare with many of its programs, such as its My Street Grocery food access initiative. For each of these investments, the business case points to many opportunities for value creation throughout the entire value chain.

If anyone ever tells you they can identify exactly where value was created along the entire value chain, chances are that person is wrong. Aficionados of Apple products may believe that Apple's most significant competitive advantage is in the design of its products. Apple's customers certainly rave about the design. But Apple's marketing folks convinced us that we needed their products, the strategy folks devised the plans to live and thrive outside a PC-focused world, the finance folks found the financial capital to allow Apple to pursue its strategy and to design revolutionary products, and every other function along the value chain contributed, too. Identifying where value is created along the value chain quickly becomes a chicken-and-egg situation: is Apple worth $700 billion because of its design, its strategy, its finance, or something else?[18] There is no answer and it doesn't matter: value is created by the entire system and by all stakeholders. The same is true for every other firm and business out there (except they aren't worth over half a trillion dollars). Certainly, there may be aspects of the system that seem to provide a more significant competitive advantage, but even that competitive advantage needs the rest of the system to be turned into value. This is true for all firms and all systems, regardless of what their competitive advantages may be. Successful systems are

synergistic; the whole system becomes greater than the sum of its parts.

Each stakeholder makes his or her own choices based on his or her own unique value-maximizing function—which is inextricably part of the larger system of relationships between all other stakeholders. Remember game theory? These stakeholder interactions are one very complicated game. Each firm's goal is to understand its system of stakeholders and to maximize value for them and through them. Within a system, each stakeholder's investment in the firm becomes a subsystem of the firm. But the stakeholders performing their NPV analyses are not the only subsystems within the firm's larger system. Discipline-specific subsystems make up the internal components of the organization: marketing, operations, design, accounting, finance, information technology. and others. These different subsystems perform different roles in different firms. For Nike, the design, marketing, and advertising subsystems may be unique value drivers. For Walmart, much of its value may come from its operations and logistics functions, as this enables the firm to charge low prices. For Tesla, the research and development function may create much of its competitive advantage. Even so, at each of these firms, the value of the entire firm is created by the system of functions. Nike could not thrive without its manufacturing function; Walmart could not survive without its accounting function, and Tesla could not survive without its strategy function. The interplay of preferences between stakeholders and functions creates a very complicated system—a dynamic system that is constantly adapting to these preferences and to market conditions. The value of the firm—and of any investment it makes—is determined by how well the system works through all the competing functions and priorities.

Value creation from the integrated system

Value comes in many different forms and perspectives. Financial markets place a value on firms and investments by adjusting the stock price of the firm making those investments. But the stock price is the result of value creation; it is not the process of value creation. Stock prices increase or decrease because the firm has made investments or operational decisions that make the firm's stakeholders better off. Stakeholders decide they are better off when the firm makes decisions that improve their lives. These improvements are economic improvements: the benefits of the decisions or actions

are greater than the associated costs. Firms may pay their employees higher-than-average wages because doing so improves overall employee morale and productivity. The gains from the morale and productivity are greater than the higher wage costs. But not all firms can create value by paying a higher-than-average wage. Some firms choose to pay a lower-than-average wage because, for that firm, any morale and productivity gains are lower than the explicit wage costs.

These morale and productivity gains cannot be viewed in isolation or independent of the other stakeholders: ultimately, the productivity gains will be codetermined by the customers' willingness to pay for the firm's goods and services. Higher quality goods and services may take more labor or other input resources and cost more as a result, but if the customers place added utility on the higher quality experience, then it is a worthwhile investment. In this case, all stakeholders are better off as a result: employees earn a higher wage, suppliers are compensated for their time, effort, and resources, stockholders and other investors have a financial gain if the investment adds economic value, and customers are happier because they have a good or service that increases their personal utility and happiness.

When any stakeholders feel as if they are not getting the return they demand for their investment, they take their investments elsewhere. This could be in terms of investors taking their financial capital elsewhere, employees quitting, customers and suppliers going to the competition, or society supporting alternative investments. The entire system will determine if a firm creates value or not. This is true for the firm as a whole, and it is true of any investment the firm makes. We cannot analyze any component of the investment value chain without considering the systemic interactions across all other parts of the value chain. Each firm and any investment must be viewed as a holistic entity comprised of a network of economic decisions and actions. And from a valuation perspective, all investments are valued the same way. Like systems, investments themselves can be dynamic, interconnected, and synergistic.

Sustainable financial investments

From a pure finance perspective, the value of any investment is determined by the cash flows or benefits that the investment provides. Finance doesn't care about the character of any investment. Finance

doesn't care about whether or not the cash flows are the result of human, social, or environmental factors. Finance ultimately cares only about what the cash flows are and when they occur. But the cash flows will come from the investment's value drivers; human, social, and environmental factors will certainly be among these drivers. We have seen plenty of examples throughout this book of firms making investments in sustainability-related projects because they believe such projects will be the source of value.

From a systems' perspective, the value of each investment comes from the combined contributions of all economic value drivers. In chapter 4 we introduced the Triple Bottom Line and The Five Capitals approaches to thinking about the role of human, social, and environmental factors in business. In each of these models, it is the system that matters, not any individual component of the system. In the Triple Bottom Line approach, the three-legged stool only stands if the people, planet, and profit legs are all in place. In The Five Capitals approach, the business begins with natural capital contributing the base raw materials, then this natural capital is improved upon with human, social, manufactured, and financial capital to create a product or business that is greater than the sum of its parts. The result is a product or business that would not exist without the combined contributions of all of these sources of capital. This is synergy in action.

The Triple-E framework of embedded, emerging, and extraneous sustainability orientations presented a continuum of sustainability orientations—from firms that have embedded the ethics of human, social, and environmental investments into the business model and would not exist without these investments to firms that have used such sustainability investments as extraneous add-ons that have minimal core purpose to the function of the firm as a whole. Between these two extremes is a continuum of other structures. No structure is necessarily right or wrong. Each is a function of the firm's stakeholders' preferences and what they believe provides them with the most value or utility. The systems of stakeholders and functions within the firm will make continuous trade-offs until their combined contributions find the point on the Triple-E continuum that will maximize value for the firm—where the marginal benefits of investing in the continuum exactly equal the marginal costs of doing so. Nike does not have as embedded a sustainability orientation as Whole Foods does because that's not how its stakeholders feel the company can create the most value.

But Nike has more sustainability-related projects embedded into its operations and strategies today than it did 10 or 20 years ago. This is the result of changing stakeholder preferences and of changes in Nike's economic environment. Increasing populations, resource constraints, and consumer preferences have played a major role in generating new opportunities for firms like Nike, Whole Foods, and Interface to create value by focusing on human, social, and environmental value drivers. Tesla did not exist 10 years ago, but it has created billions in value by aligning its technology and design with consumer and stakeholder preferences. Solyndra did not exist 10 years ago, and it does not exist today because it was unable to provide a product at a price that customers valued; its technology seemed superior to traditional photovoltaic panel technology, but that incremental superiority was not enough to make up for other costs. It all comes back to consumers and their utility functions—and the utility functions in the system of stakeholders—as the starting point for any value creation. Sustainable financial investments create value because they align investment attributes with stakeholder utility over the long term. All firms are hoping that every investment they make is a sustainable financial investment; for firms like Nike, Whole Foods, and Interface, only time will tell whether or not their stakeholders value their investments in ways that will lead to long-term value creation for each of those firms. Each of these firms—and many others—are certainly betting that sustainability-related investment will do just that.

7

Economic Development and Sustainable Financial Investments

Investments come in all sizes. Some investments are for the short-term and affect only a small number of people. Other investments are for the very long term and have implications for millions of people. The economic principles behind making large-scale investments in sustainable economic development are the same economic principles that drive any other type of investment. The art is in knowing what to analyze and what priorities will influence the future.

In September 1970, Nobel Prize laureate economist Milton Friedman wrote an editorial in *The New York Times* titled "The Social Responsibility of Business Is to Increase Its Profits."[1] Friedman was the quintessential classical, rational economist who believed that free markets are always right. The provocative title of the editorial, and much of its content, sparked outrage among many critics who felt that businesses should have broader societal responsibilities. Given the political climate of the times, much of Friedman's editorial was a defense of free markets and a tirade against socialist influences. But the editorial also included many ideas that are perfectly consistent with the actions of many contemporary companies—including Nike, Whole Foods, and Interface—that are taking a more holistic view of where value comes from and how a business might satisfy its social responsibility to increase its profits.

Friedman's focus was on shareholders as the ultimate owners of the firm, but he recognized that employees, suppliers, and other stakeholders play a critical role in any firm's value creation. If the

firm makes decisions and invests resources that go against the will of its investors, customers, employees, and other stakeholders, then it will destroy value. Friedman explained, "There are no values, no 'social' responsibilities in any sense other than the shared values and responsibilities of individuals. Society is a collection of individuals and of the various groups they voluntarily form." Firms also are collections of individual stakeholders who are working to maximize their own utility; the goal of the firm is to maximize value through these individual stakeholders working to maximize their own utility. We know that value can mean different things to different people: to some, it means financial value, to others it means something more abstract, such as impact.

This is not new to us. We've been talking about the diverse meanings of the concept of value creation throughout this book. The essence of making sustainable financial investments is to identify which economic drivers create the most value by understanding that all economic decisions and actions are initiated by individual preferences. We've seen how individual preferences can influence corporate investments in the examples of Nike, Whole Foods, Interface, and many other firms. Value creation is the result of individuals acting on their preferences; value creation is an integrated process of individuals, firms, and societies working together to become better off.

Shared value investments: Firms and society

The approach of focusing on the values of all stakeholders has led many firms to establish stakeholder engagement partnerships that are focused on long-term value creation. Few global companies are doing this more aggressively than Unilever. In November 2013, Unilever launched Project Sunlight, an initiative to promote healthy and sustainable living and to work toward a world where everyone has an opportunity to have a fulfilling life without compromising the natural limits of the planet.[2] The purpose is to engage consumers and other stakeholders with the company such that they can work together to create a better place. It's a pretty ambitious venture. And it's all-encompassing: promoting better lives through greater access to healthy food, clean water, responsible consumption, fair trade, zero waste, cleaner communities, and peace. That's all—a consumer products company trying to change the world. Project Sunlight was launched on Universal Children's Day to highlight that this mission

will be pursued by children and for children. The launch included a vigorous campaign of e-marketing, websites, and videos. By late 2014, Project Sunlight had registered over 170 million "acts of sunlight," each one an effort, small or large, to further this mission by people all around the world.

To the cynic, of course, this is an effort to get people to buy Unilever's consumer products; Unilever does have over 1,000 brands used by over 2 billion people worldwide every day.[3] But does that matter? Even if this is merely a marketing ploy, does that make it a bad thing? Can it not still be genuine and sincere? Perhaps Unilever's focus is on getting us to buy more of its products, which it believes are more sustainable and better for society than the competition's. Perhaps Project Sunlight will drive awareness of the major issues and concerns that are likely to affect us all in the coming years. No purchase is necessary; we don't have to buy any of Unilever's products to engage in an act of sunlight and further the mission.

The attentive economist can see both sides of any investment. Maybe the cynical view is right, and this is a marketing ploy designed to get young children to fall in love with Unilever's products so that they beg Mom and Dad to buy those products now and so that they become addicted to Unilever's products in the future. Maybe we will become so fond of Unilever's ice creams, butters, and mayonnaise that Project Sunlight will result in a greater obesity problem in the future. Maybe we will begin using Unilever's aerosol hair and body sprays and body lotions so much that Project Sunlight accelerates problems associated with climate change. In the short term the result might be increased profits for Unilever, but in the long-term there might be significant costs to society; Project Sunlight might be very good for Unilever but very bad for society.

Or maybe this is a perfect example of Unilever attempting to partner with society and with community organizations—such as UNICEF, Save the Children, and the World Food Programme—to create a society and future that benefit us all.[4] Maybe this is Unilever making a small investment today to generate even better returns in the future. After all, if all of our consumer resources are devoted to fighting obesity and if climate change further constrains the availability of the natural resources that Unilever relies upon for its products, then consumers won't be able to buy any of Unilever's products, and this could lead to a very bleak future for the company. With shared value investments, stakeholders can work in isolation

and solve little, or they can work together and make significant progress.

Unilever's chief executive officer (CEO), Paul Polman, has been preaching and practicing shared value for years—at least since he became CEO in 2009. Polman believes that "business is here to serve society."[5] Milton Friedman believes that business is here to serve itself and its stakeholders, but isn't society one of the most critical stakeholders that determines the long-term value of any firm? Of course it is—especially when we remind ourselves that society is not an entity unto itself but a collection of individuals, individuals who are customers, employees, investors, and other stakeholders; they have their own values and get to exercise their own preferences and economic choices. Polman explains:

> What we firmly believe is that if we focus our company on improving the lives of the world's citizens and come up with genuine sustainable solutions, we are more in synch with consumers and society and ultimately this will result in good shareholder returns.[6]

Maximizing profits should not come at the expense of long-term value creation; long-term value creation is the result of engaging all vested stakeholders in the firm and aligning the firm's goods, services, and mission with stakeholders' individual preferences.

This is exactly what Project Sunlight is attempting to do: create value, for the firm and for society, by aligning its mission with the nonfinancial needs and values that people all around the world share. What will be good for Unilever will be good for the individuals. Unilever is working to create demand for its own products but is also working on eliciting more sustainable behavior from consumers by consumers. Project Sunlight is:

- partnering with Oxfam in the Philippines to get clean water to 145,000 people following Typhoon Haiyan in November 2013 and participating in hand-washing and hygiene education to prevent diarrhea and other potentially deadly diseases;[7]
- working with small farms in developing nations to introduce technology that uses water more efficiently, to improve overall crop yields, and to maintain the biodiversity of the ecosystem to preserve the long-term productivity of the farms; and[8]
- empowering children to share their ideas for a better world, such as a drive-through composting facility or upcycling used shampoo bottles and grocery jars.[9]

This is not charity; Unilever is not spending its stakeholders' resources on projects that do not create value for the company. It's exactly the opposite; Unilever views this as an investment in economic value creation for its stakeholders over the long term.

Will Paul Polman's vision of Unilever becoming more in sync with consumers and society ultimately lead to good shareholder returns and increased value? Who knows? But the business case is consistent with the economics we have been discussing. When we do the math with a spreadsheet, value creation primarily comes from one of two drivers: increased revenues or increased margins. Project Sunlight can certainly increase Unilever's market access, getting the company's products into regions that it has not been able to access before (increased revenues). It can just as certainly lead to innovation, with stakeholder needs leading to new products and services (increased revenues and margins). And it can certainly improve the company's image and lead to more loyal customers, employees, and suppliers (increased revenues and margins). Starting with individual preferences and then building the business case from there, Polman is convinced that this is how Unilever can best satisfy its mission and its stakeholders.

Of course, it's possible that Project Sunlight will destroy value. Maybe Unilever will never realize the higher revenues to offset the increased costs to launch and manage the project. Maybe stakeholders preferences aren't what Unilever believes they are, and maybe resource constraints won't change behaviors and costs as much as Unilever believes they will. We won't know for years or decades. The market will decide.

Shared value investments: Nongovernmental organizations and society

This value creation perspective does not just apply to for-profit corporations. It applies to nonprofits, social enterprises, and governments, as well—they just measure value in terms of social impact rather than financial return. For supranational organizations, such as the United Nations (UN) and the World Bank, finding solutions to global challenges follows the same script of understanding incentives and preferences and taking advantage of the economic value drivers to increase impact and societal welfare.

To the UN, sustainability truly is a global, holistic ideal. Sustainability is about the ability of the earth to support its people

and provide an adequate standard of living. It's about the ability of the earth to support an estimated 9 billion people in 2050, up from 7 billion today, without compromising the resources necessary to provide that standard of living. We discussed the investments that Whole Foods is making to protect global fisheries and ocean waters; we also talked about the investments Nike is making to protect and improve water quality and water access. The UN is making similar investments in water quality and ocean systems, just in a different way. The challenges are significant, but the costs could be enormous. As an example of these challenges, consider these facts about our oceans and marine life:[10]

- More than 40 percent of all people depend on marine and coastal ecosystems for their livelihoods.
- More than 40 percent of the earth's oceans are directly impacted by human activities.
- Oceans absorb about 30 percent of the carbon dioxide (CO_2) created by human activity.
- Subsidies for fishing industries are destroying both ocean ecosystems and the economic infrastructures they support.

To maximize the value of ocean systems, the UN is investing in programs to address the future sustainability of these marine systems. Some of these investments are on a very large scale; many are relatively small. For example, a UN-led program in Burundi focused on fish-drying methods has revolutionized the local fishing industry.[11] In the mid-2000s, the UN and its partners set up 48 wire-mesh racks suspended a few feet off the ground for the fish to dry on; previously, the fish were simply left to dry on the sandy beaches. The results were profound: a 50 percent reduction in fish waste, improved quality of fish, higher prices, reduced drying times, greater employment, and a much higher quality of life for the region.[12] Today, the same area is home to more than 2,000 racks, and neighboring villages have copied the techniques with similar results. When we consider that more than 60 percent of the citizens of Burundi suffer from protein deficiencies that can be corrected through better access to quality fish, the value of this program can extend far beyond the fishery: more efficient fishing leads to better health and more economic opportunities in the surrounding communities.

The UN is also making long-term investments based on the need for fresh water. Lack of access to fresh water for drinking and sanitation

is devastating many of the world's poorest nations. The problem isn't one of water availability; the problem is one of access to water. In 2008, Nepal launched a program to get clean water and proper sanitation to all 27 million citizens by 2017 (the program is a joint partnership between the UN and Finland's government).[13] Water systems that pump water to storage tanks on the tops of hills have been installed; indoor plumbing has been installed in schools and other public buildings; newly installed communal water faucets are centrally located and easy to access. Many Nepalese used to spend six to eight hours daily hiking to remote water sources to pack a day's supply of water: 15 liters. Now most citizens can get a similar amount of water in less than one hour. The results are profound: cleaner water means less disease; less time spent hiking means more time spent working; and water access in schools improves the education base, the ability of women to participate, and the overall infrastructure of the country. It is not a stretch to envision this investment having significant long-term impacts on Nepal's gross domestic product (GDP), security, and other measures of economic development. When completed, the cost of this program should be less than $50 million—less than $2 per citizen.

The World Bank—created by the UN in 1944 with the mission to help facilitate reconstruction and development following World War II—is working to strike a balance between economic development and the costs it imposes on the environment and on vulnerable strata of society. As impressive as the economic progress of the past 70 or so years has been around the world, many challenges of inequality and substandard living conditions still remain. For example, close to a billion people around the world do not have reliable access to electricity, food, and clean, safe drinking water. Have the benefits of this economic progress since World War II been greater than the costs? Green growth, which incorporates all costs into its planning, is the key to future economic development. And the World Bank believes that this green growth will have to begin at the consumer level—with the need for changes in social norms and consumption patterns.

The World Bank is predicting rapid growth in the world's urban population over the next decade or two, with most of this growth occurring in developing countries.[14] The challenge of balancing short-term needs with long-term benefits is greatest in developing nations that may not have the resources to plan for the long term. Urban areas are responsible for more than 80 percent of the world's

GDP; this is both an opportunity and a threat, as these same cities use a similar amount of the world's energy and create a similar amount of the world's greenhouse gas emissions. Increased urban development leads to increased economic growth but also increases the risk for disasters, crime, health epidemics, shortages of natural resources, and other shocks. Finance theory encourages using broad-based diversification to mitigate the costs associated with collapses or catastrophes; from an economic planning perspective, the world's urban areas are becoming less diverse, increasing the potential costs and risks.

The World Bank and its partners are developing plans for urban development that has five characteristics: the cities should be green, inclusive, resilient, competitive, and strong. This is obviously what we would want any urban area to be. But the World Bank is putting its money where these words are. It is financing economic development in cities that best meet these five criteria. It has developed creative financing tools that it can deploy in different situations and locations. It is investing in infrastructure development to help cities meet these criteria; for example, the World Bank is investing in solid waste systems in Morocco, in retention walls to mitigate erosion, landslides, and flood risks in Honduras, and in a computerized management and tax-collection system in Tanzania. The success of any of these investments still depends on individual behavior and social norms and on how people respond to the incentives provided to them. For the World Bank and its affiliated sovereign nations, the ability to pursue value-maximizing strategies and investments is determined by the relevant stakeholders—just as it is for individual businesses.

Investing in crisis risk management

Henry Paulson knows a thing or two about crises: he was the US Treasury secretary from 2006 to 2009 and was intimately involved in rescuing the United States and the world from the depths of the financial crisis in late 2008. Prior to that job, he had been CEO of Goldman Sachs for eight years, and some might argue that he played a part in creating that crisis. After serving at the Treasury, Paulson transitioned to a new form of public service: he launched the Paulson Institute in 2011; the institute's mission is to address today's most critical economic and environmental problems through a working collaboration between the United States and China, the

two countries with the greatest ability and need to address such problems. To Paulson, economic and environmental problems are inextricably linked: each influences the other.

The financial crisis of 2008 cost millions of jobs and trillions of dollars in economic value to societies worldwide. More than six years later, economies and governments are still working to recover from the crisis, with central banks still employing monetary stimulus, sovereign nations threatening to default on their debt, and individuals still afraid to plan for the long term. To Henry Paulson, there are scary similarities between the financial crisis and the state of current policy and actions concerning global environmental problems. "For too many years, we failed to rein in the excesses building up in the nation's financial markets. We're making the same mistake today with climate change."[15] Everything is an economic decision; doing nothing is a decision, too. By doing nothing to rein in the excesses in the financial markets between 2000 and 2007, we—regulators, politicians, borrowers, lenders, Goldman Sachs—were saying we wanted to support and continue investing in the excesses. The choice not to rein in the excesses of risky and complicated debt was a choice to embrace the excesses of risky and complicated debt. This was a conscious action. Inaction also has economic consequences. "We must not lose sight of the profound economic risks of doing nothing," Paulson continued.[16]

We have talked about externalities and the interconnection of economic choices. Our focus has been on costs and benefits, both in the short term and the long term. The financial crisis was the result of societies focusing on short-term benefits without being concerned about the long-term risks or consequences. Many of us played a part in the excesses of the financial crisis, directly or indirectly. I know I did. Many of us were focused on our own short-term benefits and not on the potential long-term consequences to the global economy. We had little incentive to do otherwise; borrowing and spending in the short term was so cheap and easy that we did so and ignored any potential societal costs associated with these actions.

To Henry Paulson, we have the same attitude today with our energy policies. And by "we," Paulson means both individuals and governments. We are making economic decisions that contribute to the increased riskiness of climate change. But making decisions that will reduce this risk is costly; we don't want to pay to reduce the risks of climate change, in either financial terms or more abstract

utility terms. Today, driving a hybrid or an electric vehicle might be a big utility cost to many. But as we've seen with, for example, Tesla's growth over the past few years, many more consumers are now seeing value in buying an electric vehicle than they were just a short time ago. As with any economic decision, the analysis hinges on what we are willing to pay—or sacrifice—today and on what benefits our decision will get us in the future.

Paulson believes the cost we need to pay today is a carbon tax. A carbon tax would raise the price of the goods or activities that are causing the release of CO_2 emissions, and this should decrease consumer demand for those goods or activities. This should incentivize at least two economic behaviors: (1) less demand will lead to fewer CO_2 emissions, and (2) the higher prices will lead to innovation and technological competition to create cleaner technologies. Some sort of tax on CO_2 emissions makes enormous economic sense, in theory. The challenge is with the details and the implementation. What is the price of carbon? How much should this tax be? What goods and activities should be taxed? What if the United States loses its competitiveness as a result of this tax? How much short-term pain—in terms of financial costs and utility sacrifices—are we willing to endure? What will this pain get us?

This analysis is essentially no different than any of the other financial analyses we have been doing throughout this book—except that it is enormously more complex. There are far more variables, stakeholders, and uncertainties involved. It is extremely difficult to estimate the costs and benefits when almost all of the costs and benefits accrue in the long term and are indirect, intangible, and unpredictable. But somehow governments have already managed to do that financial analysis: the US government's choice to not have a carbon tax is an economic decision that the costs of imposing such a tax are greater than any associated benefits. Inaction is action, not making an economic decision is making an economic decision, and the decision not to tax is a decision to encourage. The current actions of the US government support the continuation of an energy policy based on fossil fuels, incurring long-term costs in terms of climate change risk. I don't know that this is wrong. I haven't done the financial analysis. But Henry Paulson has done it, and he understands the risks these economic decisions pose to both the economy and the environment. He would rather sacrifice a little today than sacrifice a lot in the future; we responded to the financial risks too late, and he would rather have us not respond to climate risks too late.

Paulson acknowledges one significant difference between the financial crisis and a potential climate crisis: one is a result of human behavior and the other is a result of natural processes that can be influenced significantly by human behavior. Natural processes are generally less flexible than human or social behaviors are. That's both good and bad. Natural processes are easier to model and predict than social actions are. Natural processes are governed by laws, while societal actions are determined by behaviors. Laws are more predictable than behaviors. It's easier to predict the future trajectory and consequences of our climate-related actions than it is to predict our consumer behaviors. That's the good news. The bad news is that scientific laws are immutable. I can change my economic behavior overnight, but the effects of climate policies persist for decades or generations; it takes a long time to reduce the CO_2 in the atmosphere, or to rebuild ice sheets, or to rebuild forests or fish stocks. These decisions we are currently making have short-term benefits and long-term costs; we need to be sure that the benefits are greater than the costs. Henry Paulson doesn't think they are.

Henry Paulson isn't the only one advocating a carbon tax as a way to reduce harmful greenhouse gas emissions and to stimulate competitive innovation. The World Bank and its partners are advocating a carbon tax, too. One of the biggest differences the World Bank can make in its pursuit of a carbon tax is that it can coordinate different governments to follow similar practices. This is vital. For developing nations, the short-term incentive is to lower the costs of their goods and services and to increase their competitiveness. While advanced economies may be better able to focus on long-term issues, they don't want to lose competitiveness and risk continued weakness. For any nation in isolation, a carbon tax seems to work against these competitiveness goals. For example, if Canada has a carbon tax but the United States doesn't, prices will be relatively higher on Canadian goods and purchases of Canadian goods will be relatively lower. So where is the incentive—in the short term—for the United States to institute a carbon tax? The long-term incentive comes from the basic economic argument made above by Henry Paulson—the same long-term argument we have been making throughout this book. But short-term desires can compromise this.

That's where the World Bank comes in, encouraging countries and multinational corporations to agree to common standards and policies. The World Bank is working to lead this charge in coordinating the corporate and national interests necessary for such a tax to

become a reality. Governments have been subsidizing carbon for decades—through direct and indirect methods. We are only talking about a carbon tax now because we are seeing the true, long-term consequences of these subsidies, and the business case for a fossil-fuel subsidy may not make as much sense now as it once did. Neither Henry Paulson nor the World Bank really knows what the future will hold. But each is convinced that the business case for investing in environmental risk management today can create significant value for society.

Return to shared value creation

Unilever, the UN, the World Bank, Henry Paulson, and many other people and organizations are utilizing Michael Porter's model of shared value. Of course, they may not realize that they're applying Porter's model of shared value; they are just focusing on following their mission to create value for their stakeholders.[17] For organizations like the UN and the World Bank, their stakeholders include all of society's members, and their analyses and valuation models are more complex than those for an individual business might be. But not all of their projects are that open-ended and nebulous. Many of their investments are more similar to the UN's water access initiative in Nepal, where the cash flows are more identifiable and measurable. For individual initiatives, the analyses are not much different from those performed by a business making an investment in a rooftop solar system or any other sustainability-related project.

The World Resources Institute (WRI) engages The Five Capitals model in recognizing that earth's natural resources are the foundation for all economic and human growth, well-being, and opportunity. WRI looks to tackle problems—such as access to water and food—by engaging corporate and community partners to get them to value the short-term and long-term costs and benefits of investing in our natural resources. Among other things, WRI performs research on the relationship between the use of natural resources and economic opportunity to help political leaders and corporations understand where value can be created.

To this end, WRI's Aqueduct project is a global water atlas that identifies macro level risks to water supply and access.[18] Major corporations, such as Anheuser-Busch and Nestlé, are working with WRI because they now view water access as water risk. What if the cost of water doubles or triples in the future? For these companies,

the immediate cash flow result would be lower margins, lower profits, and lower value. The long-term potential risk is lack of access to water: what are the costs associated with that? The business case for improving and ensuring access to water can be pretty strong. From a systems' perspective, there are many factors driving global water issues. Climate change will increase the risks to water and food access. Increasing populations will increase water usage and decrease access to water. Economic growth will do the same. Access, innovation, and efficiency are driving the model of how to incorporate access to water and food into strategic and investment planning. Seeing the systems' perspective of global challenges is imperative because the costs and benefits come from many different direct and indirect sources. Access to water is not an independent, isolated problem; it is connected to many other challenges and opportunities.

Approximately 70 percent of global water use is for food.[19] As populations grow, there will be a growing need and opportunity to use society's limited supply of fresh water more efficiently in order to improve access to food for that growing population. To this end, WRI and its corporate partners are also investing in food access and food knowledge. According to WRI, 25 percent of the food that is produced is wasted, yet nearly a billion global citizens are undernourished (and more than a billion are overweight). WRI is investing in many projects with corporate and community partners to combat these problems. One such project is regreening agricultural lands in sub-Saharan Africa. Regreening is the process of managing forests in such a way that they can be utilized and then regenerate on their own. The business case for these investments—which include simple low-cost changes to existing processes—shows many benefits: increased crop yields, reusable groundwater, carbon retention and improved availability of firewood and fodder. On the local level, the impacts can be profound over a very short period of time; on the global level, they may be more subtle but similarly profound. Much of the value from these investments comes from positive externalities or benefits that are not directly internalized and very difficult to quantify.

That's exactly why organizations such as WRI, the UN, and the World Bank are useful in facilitating these investments. Such investments may not happen if left to individual corporations: their inability to directly account for the positive externalities may mean that their stakeholders do not directly value those positive externalities. These investments also may not happen if left to

individual countries or governments to make: their drive to maintain economic competitiveness may mean that the short-term costs dominate their economic analyses. And the communities or direct stakeholders themselves may not have the resources or knowledge to make these investments that require taking a long-term perspective. These supranational organizations realize this, and that's where they create their own value—in coordinating these disparate interests to make sure these investments are made in order to create shared value over the long term.

Sustainable financial investments and value creation

At any level, the value creation analysis is the same. It doesn't matter if it's a large nation planning investments to benefit millions of citizens or a sole proprietorship installing a rooftop solar system. It starts with the business case, then goes to the stakeholders—and how much value they will contribute to that investment. Ultimately, it is all about the cash flows the investment creates. Much of the time, these cash flows will come over the long term and be indirect and abstract—as with most of the investments we have looked at throughout this chapter. Remember that only individuals have values, and any cash flows and intangible benefits are determined by individuals and their values. By understanding what these values are—or how people define their utility—we can then get a better understanding of whether or not an investment will create value. Ultimately, we may never really know whether an investment created value. We can only see whether people are better off, as defined by their utility drivers, to get a sense of whether or not value was created. This value creation is what will lead to long-term economic, human, social, and environmental sustainability, so pursuing it is certainly a worthwhile investment in itself.

Throughout this book, we've analyzed firms, NGOs, and societies trying to create value by investing in human, social, and environmental sustainability. For example, Interface is looking to create value by investing in methane-powered factories. Whole Foods is looking to create value by investing in access to healthy food options for people who might not normally consider themselves Whole Foods customers. Nike is looking to create value by transforming the role contract labor plays in its stakeholder engagement relationships. Unilever is looking to create value by encouraging

global citizens to create "acts of sunshine." Henry Paulson is looking to create value by investing today to prevent a climate crisis from devastating the global economy. The UN is looking to create value by investing in small, local projects that change millions of lives, one life at a time. These investments all share the same characteristics: they are looking to partner changing economic, societal, and environmental conditions with individual preferences and needs to make society better off—individually and collectively. Sustainable financial investments are those that maximize profits and create value over the long term, regardless of the character of the investments. The cash flows associated with any investment will be generated by individuals voting with their preferences to create benefits that are greater than their costs. As populations grow and the natural and human resources that drive the economy become more and more constrained, value creation will increasingly be driven by human, social, and environmental factors.

Notes

Preface

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1 The Purpose of the Firm

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