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STALKING THE ELUSIVE BUSINESS CASE FOR CORPORATE SUSTAINABILITY

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Executive Summary

For the private sector, a critical issue is how social and envi-ronmental investments impact a company's bottom line. The conventional wisdom is that such investments adversely affect corporate profits, yet many companies have found that prudent environmental investments can lower costs or improve efficiency sufficiently to be a net economic gain. But is their sound financial evidence to back these claims?

Using an analytical approach that focuses on estimating the expected financial results of specific strategies at a particular company, this paper examines the business case for corporate sustainability strategies and the modest attempts to quantify it financially. It explores some interesting new possibilities for quantifying the value of corporate sustainability strategies that are not yet fully developed. "Corporate sustainability" strategies are defined here as adding social and/or environmental value to external stakeholders while increasing value to shareholders.

Applying Conventional Valuation Methods to Sustainability Strategies

Relative valuation (also known as fundamental analysis) can assess the value of strategies that reduce costs or increase earnings, so long as there are reliable estimates of the impact on these income statement items.

Analysts have applied discounted cash flow (DCF) methods as a fundamental tool to evaluate alternative corporate environmental strategies and projects. Paired with scenario and probability techniques, analysts have estimated the relative financial exposure of companies to potential changes in environmental requirements.

Applying Emerging Valuation Methods to Sustainability Strategies

Risk analysis can provide insights into the value of corporate sustainability strategies through refined understanding of how the strategies might reduce economic cycles and downside risks associated with incidents or changing acceptance of corporate business practices. Particularly intriguing is the notion that some companies—mostly in resource extraction businesses—face a potential loss of "social license to operate."

Intangible assets make up an increasing portion of the overall value of firms. Much of the potential for corporate sustainability strategies to add value comes from improved management of intangible assets such as brand, reputation, employee goodwill, and intellectual property associated with delivering social and environmental benefits. Existing methodologies for valuing brands and reputation do not offer corporate sustainability practitioners much help in understanding the financial contribution their strategies contribute to the overall value of reputation.

An emerging methodology for valuing competitive advantage by estimating the length of time that a company is ahead of competitors, and the incremental return the firm can earn as a result, has interesting potential appli-

cations to evaluating corporate sustainability strategies.

Arguably the most potent emerging valuation methodology for illuminating the value of corporate sustainability strategies is real options analysis. This technique is so effective because of its ability to model the value of these strategies as hedges against changing social and environmental performance expectations and as platforms for whole new businesses. Included here is a hypothetical example of how real options methodology might be applied to valuing a strategy designed to enhance a company's social license to operate.

Applying Financial Analysis to Different Corporate Sustainability Situations

There are two important keys to successfully applying financial analysis to corporate sustainability: 1) asking and trying to answer the right question, and 2) using a technique that is appropriate to the circumstances. Analysts can apply financial techniques to four different questions:

- What is the financial justification for the corporate sustainability strategies we are already pursuing?
- How can we use corporate sustainability strategies to add more value?
- How do we know whether or not we are adding value?
- What do we tell financial stakeholders?

Different methods make sense for different strategies. The key to good analysis and choosing what model to use in any particular situation is understanding what is known and not known, what can be reasonably estimated, and what cannot be estimated.

Conclusion

The financial business case for sustainability is most difficult when the value created is not just in the future and uncertain, but also from intangible assets. That doesn't make it less valuable, just more difficult to analyze. The emerging techniques of competitive advantage and real options analysis are capable of shedding light on the value of intangibles such as reputation, knowledge of how to operate more sustainably, and social license to operate. Companies will become increasingly sophisticated about this issue as the financial stakes involved in social and environmental strategies increase. The first key audience for this will be internal financial staff.

I. Introduction

A small but significant group of companies continue to both speak and invest as if they believe that certain strategies deliver new value to both society and shareholders. Yet, the business case for corporate sustainability remains an enigma.

As many have observed, there is a strong *theoretical* case that strategies that improve environmental and social performance can increase shareholder value. Another case is that there is a statistical correlation between some measures of social and environmental performance and financial performance. It has been easy for believers to make much of these observations. Taken together, they are sufficient to persuade sustainable development advocates that "something is happening here," but insufficient to move all but a few major companies to take on more than a thin slice of what civil society argues is necessary to bring about a sustainable future.

Theory is not practice. Generic business cases and statistical correlations may be indicative, but they are also ambiguous, are not persuasive to many, and do not distinguish the relative value of distinct strategies. More importantly, if companies believe delivering more social and environmental benefits to society is good for shareholders, why are there so few specific examples of corporate sustainability initiatives with well-documented, significant financial

benefits? Why do those that want to peg the financial case for corporate sustainability all end up with a familiar set of shopworn examples?

The relative absence of financial quantification is understandable for several reasons. First, the field is new. Second, few of those involved in environmental and social strategies have financial experience. Third, perhaps the efforts are so integrated into other decisions that it is difficult to isolate the sustainability effect. Fourth, for many strategies in use to date, the efforts and value created may be relatively small. Nonetheless, there is unexplored potential in applying modern techniques of financial analysis to understanding the value of corporate sustainability strategies, or the financial side of the business case.

The goal of this paper is to think through the business case for corporate responsibility, examine the modest attempts to quantify it financially, and explore some new possibilities for quantifying the value of corporate sustainability strategies that are interesting, but not yet fully developed. The landscape is made up of a variety of corporate sustainability strategies and a comparable number of different techniques for quantifying the value of those strategies. The challenge is how to take what is known about how companies are valued and blend in knowledge of how companies are building environmental and social strategies into their business.

Though every effort has been made to make this analysis accessible to those leading the corporate sustainability effort in major companies, most will require assistance from either internal or external sources to implement some of the techniques described here.

The starting point is to put in place some fundamentals of the business case such as defining terms, evaluating where we stand, suggesting what it might look like if we were to find the elusive business case, and describing general approaches people have taken to making the business case. The next step is to offer a framework for understanding the basics of valuation. This lays a foundation for the rest of the paper, which provides examples of how both traditional and modern valuation techniques can be applied to corporate sustainability strategies. The piece ends with practical advice for applying financial analysis techniques to corporate sustainability strategies, particularly answering the right questions and selecting the right techniques.

II. Business Case Fundamentals

Defining "Corporate Sustainability" and "Valuation"

Definitions of "corporate sustainability" continue to evolve both broadly and company-by-company; in this paper, the term refers to business strategies that are intended to add social and/or environmental value to external stakeholders while increasing value to shareholders.

Though certainly not exhaustive or definitive, the following framework is useful in describing these strategies. Figure 1 identifies four main types of corporate sustainability strategies, what business values they address, their focus, and their main financial impacts. For company-specific examples of these strategies, see both *Green Shareholder Value: Hype or Hit?* and *The Next Bottom Line*.[1]

Valuation is an organized way of thinking about how assets should be priced. Here, it refers mainly to the value of equity, or ownership interest, in all or part of a company. Financial analysis provides the tools buyers and sellers use to decide whether or not to transact. In this sense, valuation tools underlie market valuations. Market valuations are useful for assets that are "liquid," or are traded commonly in quantity. For example, to find the value of a share of IBM stock, simply get a current quote from the New York Stock Exchange. For illiquid assets, however, market valuations may be

unavailable or require extensive modification for a particular situation. To estimate the value of IBM's services business, for example, it is necessary to use valuation methodologies. Similarly, to assess an outlook for the future of business computing services, you need valuation tools to judge the relative value of IBM and its competitor, EDS.

Valuation is an art, yet it often uses mathematical tools that suggest the precision of science. There are a variety of different valuation methodologies. Different analysts use different techniques, and a given analyst might well use different techniques in different situations. While it is well beyond the scope of this paper to delve deeply into different valuation methodologies,[2] the section below gives an overview of the discipline and the following text demonstrates the application of a variety of valuation techniques.

What would the business case look like if it existed?

The business case is not a generic argument that corporate sustainability strategies are the right choice for all companies in all situations, but rather something that must be carefully honed to the specific circumstances of individual companies operating in unique positions within distinct industries. Successes in whole industries and at other companies are useful examples, but the case still has to be applied one company at a time. In addition, social and environmental agendas may not be equally important in all industrial sectors, businesses, and companies. Nor should the business case suggest that greater social responsibility is a panacea that adds value to shareholders intrinsically, rather than as part of a carefully planned corporate strategy.

A useful business case would lead those exposed to it to say, "Yes, that seems like a good business idea and the preponderance of evidence confirms it." One way of understanding what a suitable business case might entail is to compare the case for corporate sustainability to another significant trend in corporate practice, such as total quality management (TQM) and its descendant, Six Sigma.

Both TQM and corporate sustainability were untested and initially resisted on economic grounds. In both cases, those who adopted the approach at an early stage believed in the concepts' rightness, rather than clear evidence that shareholders would benefit. In fact, the contagious quality of TQM that eventually took hold was probably more a function of customer preference and the pursuit of market share than of explicitly increasing returns to sharehold-

Figure 1. Corporate Sustainability Strategies & Financial Impacts

	Franchise Protection	Process Changes	Product Changes	New Market Development
Business Value	Right to Operate	Cost & Liability Reduction Reputation	Customer Loyalty Reputation	New Markets
Focus	Compliance	Efficiency	Value Chain	Innovation
Main Financial Impact	Reduces Earnings Reduces Risks Can Open New Markets	Increases Margins Reduces Risks Often Increases Capital Efficiency	Increases Competitive Advantage	Increases Revenues Increases Competitive Advantage Diversification

ers. With corporate sustainability, could it be that we are only beginning to see the customer response that fans competitive flames to become more sustainable?

The analogy with TQM suggests the possibilities for corporate sustainability, but there are also differences between the two as business concepts. TQM was a well-defined prescriptive program; corporate sustainability is diffuse and more difficult to define. TQM, if properly implemented, tended to enhance shareholder value because the consumer benefited. Over time, producers learned to provide greater quality at the same or lower price, which increased both market share and earnings. The same dynamic has yet to become obvious for corporate sustainability.

Approaches to the Business Case

WRI has identified four distinct ways that corporate sustainability leaders make the business case. The different approaches and statement of motivation are:

Story Telling – *"We should act because others have had good results."*

Risk Avoidance – *"We should act because if we do not, something bad will happen to us."*

Overall Excellence – *"We should act because these actions demonstrate excellence and we are excellent at all we do."*

Analytical – *"We should act because an evaluation of our situation suggests action is in our best business interest."*

Storytelling. The stories about actual corporate experiences are the most common approach to making the business case. In WRI's experience, most of the stories are about implementing particular strategies and what has happened financially as a result. The stories may or may not have analytical evidence to support them, and any evidence may or may not be financial in nature. One primary value of stories is that they can bring abstract strategies to life.

The aspects of stories that appear to us to be most important are the strategy described in the story, the level and scale of the example, and how different the situation of the company telling the story is from those examining the story (e.g. "That would be completely different in our industry or corporate culture.")

The overwhelming majority of anecdotes can be categorized as successful pollution prevention projects. In practice, many firms have found that pollution prevention can be a cheaper way not only to comply with many environmental regulations, but also to improve operating margins through greater energy and materials efficiency. Most of the early anecdotes in this category involved saving money by finding a less costly way to comply with regulatory mandates. Increasingly, companies have applied the same techniques to going beyond the regulatory requirements because they believe they can gain some financial advantage from doing so. This latter category is more commonly thought of as the heart of "eco-efficiency." There are many well-documented examples of financial benefits from these strategies, but the best known is probably 3M's bold claim that it has achieved cumulative savings of $810 million since 1975 through pollution prevention.[3]

Virtually all of these anecdotes are about cost savings. That is consistent with WRI's experience of what most companies are doing, as well as what is most likely to be measured. One recurring problem with this cost savings data is that it often lacks information on the expenses associated with obtaining the savings. Information on gross savings is not as meaningful financially as net savings data would be. It is the same as the difference between sales and earnings.

The "level" of the anecdote is important. The vast majority of the stories were about a single process, plant, or product. A few were at the level of a division of a company, or were company-wide on a particular topic such as waste reduction. Only a few stories offer company-wide information on the financial contribution of environmental efforts. While examples at all levels are instructive and indicative, larger examples tend to be the most persuasive. Scale is an issue that goes to the "materiality" of environmental strategies. Even if one agrees that these issues matter, the subsequent question is whether or not they matter enough to focus on as a central strategy.

Many of these examples come from mature, commodity businesses such as chemicals and forest products. These industries are extremely price sensitive. They compete for miniscule cost leadership and fight vehemently over fractions of a percent in market share.

This suggests that even small cost reductions may be significant.

With few exceptions, which are discussed later, the anecdotes offer little information to compare the financial impact with the size of the plant, division, or company. Without this context, it is difficult to make even a cursory estimate of whether or not the impact is "material." Nonetheless, it is easy to conclude that most of the dollar totals in the examples are quite modest by almost any standard.

While companies may be acting on the belief that their corporate responsibility strategies generate value, their stories do not offer much convincing *evidence* of the financial results. This is not to say that the benefits to shareholders are absent, but rather that very few companies are capturing the information to demonstrate the financial results. This is admittedly difficult, because the desired information will vary with the strategy used. What information to gather and how to organize it is discussed later in this paper.

Storytelling does not work well for those who are trying to push the horizons. It also does not seem to be very motivating, unless the stories come from within the audience's culture. It seems to be far more powerful if the success with a certain strategy is in another division of the company than if it happens at another company.

Risk Avoidance. Some have made the business case by noting that adopting corporate sustainability strategies is the only alternative to avoiding large perceived risks such as consumer boycotts, negative publicity, or environmental incidents. These risks are usually not quantified, but the threat of "getting creamed" is quite real even in the absence of a formal assessment or quantification of the external threats to the firm related to social and environmental performance.

The risk avoidance approach to the business case is arguably really just the negative side of the storytelling approach. It involves transposing the experience of others onto your own situation without doing a detailed analysis of the specifics of your situation. I distinguish it here because different corporate cultures respond very differently to negative and positive stimulus. In many corporate cultures, avoiding negative events or performance is paramount, and the power of the risk avoidance approach is not overly sensitive to the examples of misfortune being in the same or similar industries or situations. In less risk-averse corporate cultures, the relevance of risk avoidance is heavily dependent on how close the example is to the company and its situation. Shell's experience with loss of market share connected with the controversy over the disposal of the Brent Spar oil platform may motivate some strongly risk-averse companies, but others find it hard to imagine a parallel for them unless they believe their situation is quite similar.

Fear can be a powerful motivator, but the power of this approach to the business case is limited without quantification of the scope of the threat. This approach cannot address how much a company ought to be willing to spend on an initiative in order to avoid future events. Overall, this approach suggests only a limited set of appropriate corporate responses.

Part of Excellence. A less-explored approach to making the business case is to argue that delivering social and environmental benefits to stakeholders is just another part of being an excellent company. This enterprise-wide leadership approach is built on the premise that companies that are genuinely good at what they do are also good at corporate sustainability. This is parallel to an approach taken in the business classics on organizational excellence *Built to Last* and *In Search of Excellence*.[4] This approach is also consistent with the statistical case. Excellent companies deliver superior financial results. Great social and environmental performance is just part of that pattern.

While there are a few specific companies such as Johnson and Johnson that relate corporate sustainability to their overall excellence, only modest research backs up the claim. There are, however, two pieces of work that do relate to supporting this argument. One is a study by two management professors at Boston College's Carroll School of Management, Samuel Graves and Sandra Waddock, who showed that the original *Built to Last* companies not only have continued to outperform their peers financially, but also have better employee relations, community relations, product (treatment of customer), and diversity measures.[5] While these characteristics do not exactly define corporate sustainability, they are reasonable partial measures. The water is muddied, however, by another study that questions whether *Built to Last* companies have continued to outperform their peers.[6] The other study, by the Centre for Tomorrow's Company, is a compilation of research that shows companies practicing an "inclusive" or

stakeholder approach enjoy greater success than do others.[7]

Analytical. In the storytelling and risk avoidance approaches, the emphasis is on the anecdote and its relevance: "Another company did this and these were their results." In the excellence approach, the emphasis is on the extension of corporate culture to delivering social and environmental benefits.

In the analytical approach, companies focus on a method of estimating the expected financial results of a strategy. Companies have done very little of this type of financial analysis. Much of the existing analysis is at the project level and comes from the internal capital budgeting process. A fairly well-documented example of this is Georgia Pacific's analysis of a purchase of conservation lands for habitat for a particular bird species.[8] These analyses typically relate to current capital expenditures and to specific projects rather than broad corporate strategies.

There are few efforts to analytically explore the value of corporate sustainability strategies at the enterprise level. Such efforts are difficult, and the quality of the numbers inevitably goes down. The efforts often seem small relative to other factors driving value.

There is potential to use the tools of modern financial analysis to shed greater light on the value to shareholders delivered by well-planned and executed corporate sustainability strategies. The point is not to argue that the analytical approach to making the business case is better than the others; quite to the contrary. Rather, the point is that different people "get it" in different ways, and a quantified financial argument is persuasive to many. I believe financial audiences in particular can best be reached with an approach that uses a range of analytical techniques to give scale to the financial impact.

III. A Framework for Understanding Valuation

Figure 2, on the following page, lays out the main categories of valuation methodologies.

The most mature valuation technique is relative valuation, which is also known as fundamental analysis. In this approach, analysts compare ratios of certain market and accounting numbers for a company to its peers or the market as a whole. While certainly the most widely used valuation technique, it has substantial drawbacks. It does not explicitly deal with important financial concepts such as risk, the cost of capital, and the time value of money. It is also subject to the peculiarities of the accounting choices of specific firms.[9]

Everyone who has survived a modern business school program knows that the answer to nearly every interesting question involves "discounted cash flow." The notion that the value of any asset can be determined by projecting the net cash flows associated with the asset over its life and discounting that cash flow by an appropriate discount rate is accepted dogma.

Much has been made in the business world of value-based quantification methods such as Economic Value Added©, Cash Flow Return on Investment (CFROI), and others. These techniques are all based on the same valuation principles as net present value and DCF, although they emphasize moving from accounting data to information about building shareholder value.[10] Among the key virtues of DCF is its ability to perform sensitivity analysis, which assesses the sensitivity of shareholder value to certain factors.[11]

However, there are weaknesses in these approaches. For starters, they can be difficult to implement. Specifically, the level of risk is accounted for by the discount rate used to bring the estimated cash flows to a present value. While there is some disagreement about how best to do this, it is particularly difficult on individual projects, where the risks are unclear or difficult to quantify. It is also difficult to estimate some future cash flows under any circumstances. Will customers love the new product or hate it? In answering this and many other questions, a single estimate of cash flow seems inadequate.

Figure 2. Equity Valuation Techniques

	Techniques in Family	General Limitations	Corporate Sustainability Strategy Potential
Relative Valuation	Fundamental Analysis, PE, Price-to-Book ratios, etc. Comparison to similar companies (comparables)	Excludes: 1) risk, 2) capital needs, and 3) time value of money Generally subject to accounting vagaries	Limited
Discounted Cash Flow (DCF)	Dividend Discount Model Discounted Free Cash Flow (DCF) DCF with scenarios Value-Based Strategies such as EVA, CFROI, and SHV	Hard to incorporate risk; setting discount rate is difficult Hard to estimate future cash flows or dividends	Limited to cases with very good data and applications to operating issues. DCF with scenarios is promising when good operating information is available
Emerging Techniques	Risk Analysis Intangible Assets Brand/Reputation Competitive Advantage Real Options	Consensus on methods only beginning to emerge	Selective application shows promise as explored in this paper

One approach to dealing with this problem within the framework of discounted cash flow is to devise scenarios around different possible outcomes, estimate the probability of each scenario, quantify the cash flows associated with each scenario, and apply discounted cash flow techniques to get a probability-adjusted figure. WRI's Robert Repetto and Duncan Austin in *Pure Profit: The Financial Implications of Environmental Performance* have successfully applied this approach to valuing environmental performance and positioning in the U.S. pulp and paper industry.

A range of emerging valuation techniques have evolved that address the various weaknesses of the tried-and-true relative valuation and DCF. For the most part, they serve as adjuncts to the established valuation methodologies that add insight in particular situations in which the traditional techniques seem inadequate. This text will deal with several of these emerging techniques in turn, but the key point is that they are relatively new and less commonly used than relative valuation and DCF.

In the last decade, a number of management thinkers have devised and promoted business performance measuring systems that place emphasis on factors they believe lead to the creation of value rather than on the measures of actual value. The best known of these is the Balanced Scorecard.[12] Others have referred to a set of "soft" factors that are precursors to financial value, or leading indicators. This category includes characteristics discussed here such as reputation, intellectual property, and environmental performance, as well as others like innovation; customer satisfaction; cus-

tomer retention; quality; new product development; research and development investment; research and development productivity; employee turnover; employee satisfaction; and employee training.

While measures of these characteristics are quite appropriate in evaluating strategies including corporate sustainability, they are typically not sufficient for many finance purposes. They are not an established part of the valuation realm. There are abundant examples of companies excelling in these characteristics and still not delivering financial results. Here, I will make reference to these precursor characteristics, but will emphasize how they deliver results in conventional financial terms.

With this foundation in the basics of equity valuation, we now turn to how specific types of corporate actions on sustainable development lead to specific financial results.

IV. Applying Conventional Valuation Methods to Sustainability Strategies

Most of the efforts to apply the techniques of financial analysis to understanding corporate sustainability strategies have employed two established methods of valuation. The first technique is relative valuation, which is based on financial statements and estimating future revenue, earnings, and/or cash flow. The second is discounted cash flow, which is based on estimating future cash flows and adjusting for the cost of acquiring capital. The next section describes examples of each of these two methods.

We will then turn to a variety of other methods for understanding value that are less broadly used, but may be usefully applied to the value created by companies using sustainability strategies. These methods include risk analysis; intangible assets, including brand and reputation; competitive advantage; and real options.

Relative Valuation and Earnings from Cost Reductions

The most commonly used tools in relative valuation are price ratios such as price-to-earnings (PE), price-to-sales, or price-to-operating profit. At the risk of oversimplifying, there are two steps to using this method. In the case of using forward PE ratios, the first step is estimating future earnings. The second is deciding what "multiple," or PE ratio, is appropriate to apply to those estimated earnings. While sustainability strategies potentially relate to both steps, most of the effort to date has been applied to the profit estimates.

A handful of companies have gathered and organized data on the impact of their environmental programs in a way that shows their impact on earnings through reducing waste, lowering costs, and creating revenue streams from waste. Cataloging these efficiency improvements and relating them to the broader operations of the company provides some insight into the financial benefits of those environmental programs.

At least two companies have disclosed estimates of the net financial impacts of their environmental programs as a part of their corporate environmental reporting (CER). Baxter International has done this since 1992, and IBM began the practice in 1997. This information is parallel to that provided by the income statement in a firm's financial report. Hence, the analyst can apply the same sort of techniques ordinarily used to analyze an income statement.

Table 1 takes information from Baxter International's CER report and combines it with parallel numbers from the company's financial report to provide insight into the relative importance of environmental activities to the overall business. A quick look at what a financial analyst might do with both sets of information show both the potential and limitations of this approach.

Baxter International's CER identifies and quantifies ways in which the company's environmental programs have a positive impact on net income by either generating income or reduc-

Table 1. **Contribution of Baxter International's Environmental Programs to Operating Margin** ($ in millions)			
	1998	1997	1996
From EH&S Report[1]			
Total Environmental Income, Savings, and Cost Avoidance	106.8	109.0	100.5
Total Environmental Costs	21.6	21.3	22.6
Net Environmental Contribution[2]	85.2	87.7	77.9
From Financial Report[3]			
Sales	6,599	6,138	5,438
Operating Profit	1,550	1,442	1,287
Operating Margin[4]	23.5%	23.5%	23.7%
Comparison			
Environmental Contribution to Operating Margin[5]	1.3%	1.4%	1.4%
Portion of Operating Profit from Net Environmental Contribution[6]	5.5%	6.1%	6.1%

1. Figures for "total environmental income, savings, and cost avoidance" and "total environmental costs" are taken from Baxter's 1999 environmental health and safety performance report.

2. Remainder from income minus costs in pre-tax dollars. WRI calculation.

3. Figures for "sales," "operating profit," and "operating margin" are taken from Baxter's 1998 financial report.

4. Portion of sales remaining after deduction of the cost of goods sold and expenses for selling these goods and for general administration. WRI calculation.

5. Quotient of "net environmental contribution" divided by "sales." WRI calculation.

6. Quotient of "net environmental contribution" divided by "operating profit." WRI calculation.

ing costs. This includes the sale of materials that are recovered or recycled and other activities that generate "environmental income;" activities that result in savings as measured by year-to-year reductions in actual costs (increases in actual costs are considered "negative" savings); and waste reduction and other activities that allow costs to be avoided. The largest contributor to such savings is recycling (income), followed by energy conservation (cost reduction), and decreased waste of non-hazardous materials (cost reduction). Baxter also reports the total cost of its environmental program, including the activities that produce the income described above. Although Baxter International does not do this in their report, I calculated the net impact of their environmental efforts by subtracting the costs from the income.

At the end of 1998, Baxter International was trading at a price-to-operating profit ratio of 12 and had a market capitalization of $18.6 billion. This implies that the company's environmental strategies were worth approximately $1 billion in total value to shareholders. ($85.2 million in operating profit from environmental contribution times a price-to-operating profit ratio of 12 equals $1.02 billion.)

A similar analysis of the numbers from IBM suggests that their programs make a much smaller relative contribution to that company's oper-

ating profits. For IBM, the percentage of operating margin from environmental efforts was only 1.1 percent, versus 5.5 percent at Baxter International.

In both cases, the companies are reporting historical accounting figures, while analysts are most interested in future earnings. The same is true of all financial reporting. The implicit argument to analysts in this case is that environmental programs will continue to contribute profits in the future and are part of the "quality" of earnings. If analysts believe that earnings are of a high quality and likely to be steady into the future, then they typically are willing to pay a higher multiple as well.

While this method does show how the scale of the environmental program relates to the financial performance of the company as a whole, it has a number of limitations. First, the accounting numbers in the CER are heavily dependent on a set of assumptions about what the operating conditions would be if the program had not been in effect. The EHS leadership of Baxter makes no claim that their numbers are of a comparable quality to those coming from the financial reports. As such, they are uncomfortable with analysis such as this that juxtaposes numbers from these two sources. Second, gathering and organizing the data for the CER "income statement" requires a great deal of work, starting at the plant level. Third, the valuation itself is heavily dependent on the assumption that past efforts continue to yield comparable benefits in the future. In the final analysis, one must ask: Is the level of confidence in the results worth the effort?

B. Discounted Cash Flow/ Economic Value Measures

Discounted cash flow (DCF) is based on the idea that the value of any asset can be determined by projecting the net cash flows associated with the asset over its life and discounting that cash flow by an appropriate discount rate that is adjusted for the risk. The method is built on the understanding that the asset holder has particular rights to future cash flows. The technique deals with both the time value of money and the notion that economic value is only added when an asset produces a return greater than its cost of capital.

Company financial reports categorize cash flows by their source. The three types of cash flow are driven by the following common financial metrics:

> *Cash flow from operations—sales, margins, and tax rate*
>
> *Cash flow from finance—cost of capital*
>
> *Cash flow from investing—amount of fixed and working capital*

Together, these yield the components used in calculating discounted cash flow: cash flow from operations, the discount rate, and the level of debt.

Several different researchers have applied DCF to valuing corporate environmental efforts. Frank Figge and Stefan Schaltegger laid out the overview case that most corporate environmental strategies have results that are positive for shareholder value (as cal-

Box. Implementing an Income Statement Approach

There are several points to remember when pursuing this approach. First, one has to develop a system—to gather both costs and benefits from the process changes and program elements—that is parallel to the existing systems for gathering plant and product financial data.

Get help from your finance office. Explain that you are trying to produce something like an income statement. You will usually want to compare at operating profit level (revenue minus expenses, including administration, but before taxes and interest).

Those who have pursued this approach say that it is important to be willing to balance credibility and "doability." It will not be possible or worthwhile to gather every relevant piece of information without getting bogged down in complexity. This means one should:

- **Build a pipeline of information between those with the operating data (typically at the plant level) and those responsible for aggregating the data;**
- **Build momentum by starting with data that is relatively easy to gather and build to more difficult data collection tasks;**
- **Design and implement systems for collecting data that is already being gathered by someone;**
- **Become relevant to plant managers; and**
- **Build slowly, with initial results showing the value of discrete, identifiable efforts to give everyone the opportunity to say, "This is a good idea."**

The approach requires you to make reasonable assumptions. It makes sense to be transparent about those assumptions so that analysts can vary them and gauge the results.

The types of adjustments to consider include a) corporate actions, buying, or selling businesses; b) opening and closing plants; c) growth or decline in production levels; d) prices for commodities disposal; and e) persistence of savings.

culated by DCF) by reducing capital intensity, reducing materials used, boosting sales, increasing margins, and reducing risks.[13]

Kaspar Mueller and his firm, Ellipson, have applied DCF, and particularly the approach laid out by Alfred Rappaport, to strategy and valuation decisions in several company-specific corporate sustainability situations. The most detailed of these in the public domain involves Ciba's Chemicals Division (before the merger that produced Novartis). This research examines the impact of process changes at two different units of the chemical company. It begins with an analysis of the free cash flows of each operating unit and the relative degree to which they are sensitive to changes in weighted average cost of capital, working capital, fixed capital, operating margins, and sales growth rates. The research then demonstrates the impact of the process changes on each of these factors in both business units. The study concludes that the value of an environmental strategy can be quantified, that environmental strategies must be adapted to a business unit based on the value driver sensitivities, and that only the "right" strategies add value to the company.[14] Ellipson has also applied this technique to estimating the impact of AssiDoman's decision to have its forestry operations certified by the Forest Stewardship Council.[15]

In 1995, Ralph Earle and Todd Rhodes set out the foundation for applying DCF to environmental strategy decision-making based on a process involving issue identification, scenario analysis, and DCF.[16] The process described is designed to generate and evaluate alternative strategies to deal with the risks and opportunities associated with the uncertain development of specific environmental issues as those issues progress through a lifecycle.

A different application of DCF techniques to the valuation of corporate environmental strategies comes from WRI's Repetto and Austin in *Pure Profit*. This path-breaking study combines DCF with the development of scenarios around key environmental issues facing a particular industry—the U.S. pulp and paper industry in this case—to estimate the financial value associated with different environmental performance and positioning within an industry. The results show that a set of environmental issues identified by the industry as being significant is financially material, and that its financial effect varies substantially from one company to the next.

These techniques work particularly well in situations where the analyst has a reasonable ability to project the cash flow impacts. It all comes down to what one can best estimate. The application of scenarios and probabilities to the analysis increases the range of this technique, but the fundamental limitation remains the difficulty of estimating certain types of cash flows, especially those that involve the existence of future decision points.

V. Applying Emerging Valuation Methods to Sustainability Strategies

The traditional means of valuation discussed so far have served analysts well over several decades. They do, however, have profound limitations that are not confined to understanding the value of corporate sustainability strategies. Analysts and academics have developed a number of new methods for quantifying, or at least estimating, the value of a variety of corporate qualities that used to be taken for granted or understood only in qualitative terms. In several instances, these techniques build upon or incorporate DCF. This section will briefly explain some of these sources of value, techniques for measuring them, and—where possible—how they can be applied to corporate sustainability. While less universally used, they are established tools with the ability to reveal certain aspects of corporate sustainability strategies better than relative value and DCF.

Risk Analysis

The most common methodologies for determining the value of a change in the level of risk are incorporated in the relative value and DCF methods. Using relative value techniques, an analyst might say that a particular decrease in risk for a company should warrant an increase in its price-to-earnings ratio to that of another company in a comparably risky situation. Alternatively, an analyst using DCF might say the decreased risk would lead to a lower discount rate, and thus an increase in value. Neither of these techniques is particularly useful in understanding or measuring the value of corporate sustainability strategies in reducing risk. The lack of comparable companies with similar strategies limits the use of the relative value technique and there is no accepted means for determining the size of a discount rate change in the DCF methodology.

I have included risk analysis in the category of emerging valuation methodologies because this section focuses on other methods of analyzing the value of risk reductions. Risk, like beauty, is in the eye of the beholder. Many different concepts masquerade under the single heading of "risk." Just within the financial world, risk is a concept with several different meanings.

Most advocates of corporate sustainability tend to focus on individual company risks, such as the risk of:

- an accident or major incident (arising from normal operations) with social or environmental consequences for which the company will be held responsible;
- unexpected costs or benefits from changes in regulation; and
- damage to reputation and brand equity.

In modern financial theory, however, the risk of owning an asset is defined by how much it contributes to the overall risk of an investment portfolio. Thus, financial risk analysis puts the emphasis on the degree to which the stock of a company is correlated to the rest of the market.

We know of one example where a company, DuPont, specifically argues that its corporate sustainability strategies make their company less correlated to the market, reducing the company's financial risk to shareholders. DuPont argues that the decision to replace a portion of their petroleum-based feedstocks with renewable resource feedstocks makes the company less cyclical, and hence less correlated with the market. The argument is sound, but lacks the quantification and rigor ordinary in communications with investors.[17]

Two works have related corporate environmental performance to this concept of systematic financial risk. ICF Kaiser has done a statistical regression of beta to a large range of factors, including several measures of environmental performance and environmental management systems.[18] The conclusion is that the relationship between these measures of environmental performance and the standard measure of systematic financial risk are statistically significant. The second work is a piece by Bank Sarasin that makes the theoretical case for how to think about the effect of environmental performance on a company's correlation to the rest of the market and how some environmental risks cannot be eliminated through diversification.[19]

While these two studies contribute to our understanding of these issues, they do not offer much help to companies trying to quantify the financial impact of their corporate sustainability efforts. They do not help answer the questions, how much does this reduce our risk? And how much is that reduction in risk worth?

In reality, investors do not think about risk solely in terms of correlation with the market. Investors also care about "downside" risk. What is the risk that a company will have some unexpected bad experience that will cause the stock to go down? Harvard Business School Professor Forest Reinhardt points out that environmental risks are asymmetric. They are more like "security risks such as war and kidnapping, in that it has no short-term upside," than financial risks such as currency risk.[20] It is these risks that best correspond to how many companies are thinking about the risk-reducing value of their corporate sustainability strategies.

The insurance industry routinely prices some of these risks for underwriting purposes using historical probability and cost information. Actuarial data may be useful inputs for a variety of approaches to risk analysis, although it is not widely used outside of the insurance industry. Companies can also estimate the value of certain risk reductions by understanding how their corporate insurance premiums would be affected if they adopted corporate sustainability strategies. This

may be difficult information to obtain, especially for the substantial number of companies that are self-insured.

Various services offer the financial services industry ratings of company-specific environmental risks. While they are intended to show how companies are in different risk positions, they are not structured as pricing tools, but rather as screening tools.[21]

There is another category of risk that several companies believe their corporate sustainability strategies reduce. These companies face the risk that society will not let them continue to operate despite their compliance with all applicable laws. This is most frequently referred to as a potential loss of "social license to operate." The most noted example is Shell's experience with Brent Spar, the oil platform in the North Sea. They faced a spontaneous consumer boycott over their handling of the disposal of the rig, even though they were in compliance with the law. Timber companies in environmentally sensitive areas are another example. Because the public outcry against clear-cutting particular holdings was so powerful, the BC Coastal Group of Weyerhaeuser Canada (formerly MacMillan Bloedel) faced the risk that they would not be able to harvest timber they had legal rights to, even though there were in compliance with the law.

How does one capture and describe the financial dimension of these risks? One alternative would be to use DCF with scenarios like those used by Repetto and Austin. You could describe scenarios of different possible outcomes for the social license to operate of a company. For example, the scenarios might be 1) no change, 2) limitations applying only to certain assets, and 3) broad loss of right to operate. Then, you would consult a range of experts about the probability of each scenario. The next step is to estimate the financial impact of each scenario on the relevant set of companies. Another alternative is discussed in the section on real options.

Valuing Intangible Assets

Intangible assets generally. Many of the assets developed by companies trying to improve their sustainability are intangible. They are knowledge, brand, and reputation. Intangible assets are a broad category that includes basically everything of value at a company that is not property, plant, equipment, cash, or securities. Established accounting techniques focus primarily on tangible assets, with only a few concessions to the notion that intangible assets produce value. The key intangible assets of brand and reputation are discussed separately below.

Despite the general agreement that intangible assets are an increasing portion of the market values of companies and are increasingly important to companies' futures, the literature on the subject is somewhat confused. There is no consistent language used in categorizing different intangible assets, which are sometimes also referred to as intellectual capital.

The clearest framework for categorizing intangible assets was developed by Sveiby and is used by Skandia, a Swedish financial services company, in its annual reporting. It lays out four types of intangible assets: 1) human; 2) intellectual property; 3) internal systems, methods, and tools; and 4) (external) customer loyalty and brand.

Sveiby argues against putting financial values on these intangible assets in favor of focusing on a scorecard approach that measures attributes of the individual components rather than financial values.[22] It is therefore not helpful in actually valuing intangible assets.

Professor Baruch Lev of New York University's Leonard Stern School of Business and Marc Bothwell, a portfolio manager with BEA-Credit Suisse Asset Management, have developed a new method for valuing knowledge assets that is based on segregating out earnings from tangible and financial assets from overall earnings.[23] While this technique gives dimension to intangible assets, it is difficult to relate it to any corporate sustainability efforts in a meaningful way. Nonetheless, the intangible nature of many of the sustainable development assets stands. It is unique knowledge that enables a company to operate its facilities more efficiently, to design new products and business models that use less material, and to connect with its stakeholders in a strategic way.

Brand and reputation. Reputation and brand value are important business issues across a large range of industries. They have become such standard ideas in the sustainable shareholder value lexicon that they merit a separate discussion here. While "reputation" and "brand" are not synonymous, they are close enough to be discussed as a single topic. The emphasis placed on this topic in discussions of corporate

sustainability is clearly appropriate, but lacks analytical rigor. Analysts have been valuing brands rigorously at least since the late 1980s, when there was a wave of brand acquisitions.

Analysts think of two different types of brands: company brands and product brands. Sometimes the two are nearly indistinguishable. Coca-Cola is a good example. Procter and Gamble, on the other hand, is built around many different product brands, in addition to a corporate brand. One can imagine social and environmental performance issues affecting both product and corporate brands, but most of the emphasis has been on corporate brands. Likewise, it is unclear whether or not consumers sufficiently connect corporations with the product brands for this to be an important consideration. For example, if the Tide brand is tarnished, how much does this matter to other Procter & Gamble product brands?

In thinking through the importance of this issue, there are two separable questions. How important is corporate sustainability (in both positive and negative ways) to a given brand? And, how dependent is a given company on branding? An appropriate analytical technique needs to deal with both questions.

There are a number of techniques for valuing brands, but only one is sophisticated enough and addresses both of these questions.[24] Interbrand, a unit of the advertising group Omnicom, is arguably the guru of brand valuation. Interbrand annually values the top 60 global brands and compares that valuation to the market capitalization of the companies. Coca-Cola is the most valuable brand at $84 billion, or 59 percent of the company's market cap. Other highly valued brands represent high proportions of the total value of the firms, with Apple, Nike, and BMW each coming in at 77 percent of market cap from brand value. On the other end of the spectrum, General Electric has the fourth most valuable brand in the world, but that value is only 10 percent of GE's market capitalization.

If the threat to highly valued brands is such a powerful motivator for companies to pursue sustainable development priorities, then why are none of the owners of the top ten brands typically identified with the corporate sustainability agenda? In fact, some of the sustainable development leaders, whose brands made the list of most valuable brands, have minimal portions of the market cap in the form of brand value. British Petroleum and Shell were 45th and 49th respectively, but their brands represented only 3 percent and 2 percent of their total market capitalization.

The method used by Interbrand to estimate the value of brands is to 1) estimate the earnings from intangibles; 2) estimate the proportion of earnings from intangibles attributable to brands; 3) evaluate the strength of those brands going forward, and hence, the security of future brand earnings;[25] and 4) discount the revenue stream by a factor that accounts for the differences in risks to the brands (as determined in step 3).

It is these last two steps where the impact of corporate sustainability strategies comes into play. How do you go from the evaluation of the strengths of the brand to the discount rate? Presumably, corporate sustainability strategies reduce the risks to the brand, but by how much? This is the same issue raised earlier with adjusting the discount rate in DCF calculations to account for lower physical environmental risks.

This study found no corporate efforts or studies that quantify the value of corporate sustainability strategies to brands. The existing methodologies for valuing brands don't lend themselves to obvious adaptations to focus on the value of these strategies. One possibility would be to apply the Interbrand approach to several different scenarios for both positive and negative possibilities for a particular brand.

Valuing competitive advantage. An alternative way of thinking about the problem of valuing these intangible assets is that reputation, brands, technology, and "know-how" all boil down to competitive advantage. Some analysts object to the general nature of the concept of competitive advantage, arguing that any advantage will ultimately take the form of increased sales, margins, or other more standard financial measure. While this is true, there are instances in which competitive advantage is broad, and perhaps more easily measured as broad advantages rather than in future sales. Microsoft is an example. Do analysts really know what volume of what products the company will sell years into the future, or are they more likely to be on solid analytical ground estimating the broad advantage the company has over its competitors?

One recently developed valuation technique focuses on the dimensions

of competitive advantage and translates that into valuation terms. This technique is the sales-driven franchise value model.[26] Focusing on the competitive advantage of firms, the model involves specific analysis of both the size of margins earned above what a well-financed competitor could earn (excess returns) and the length of the competitive advantage period (CAP). Figure 3 plots excess returns and CAP on the two axes. In the first graph, the shaded area below the line represents the financial value of the competitive advantage. In the following two graphs, the shaded area shows how greater excess returns and longer CAP increase the financial value.

The underlying argument is that analysts are better able to estimate the margins and length of the competitive advantage period than they are able to estimate the specific impact on future earnings. This technique represents an opportunity for equity analysts to capture the new level of the value that sustainable business strategies generate.

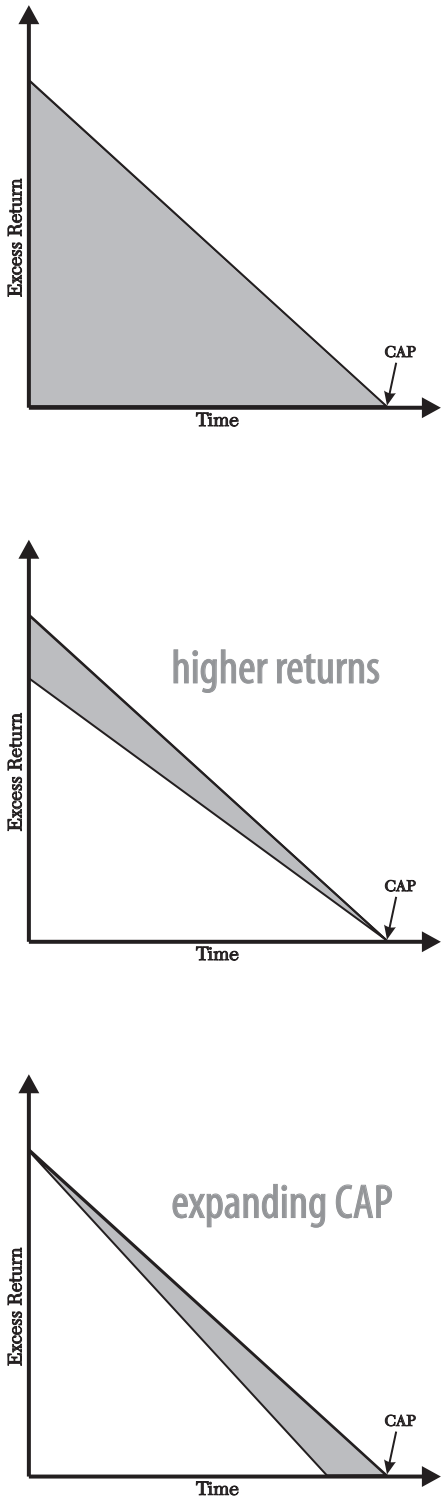
The use of this analysis is still in its early stages, but several prominent investment banks have incorporated it into their company-specific analyses.[27] If the model shows promise explaining the value of competitive advantage, then the connection to corporate sustainability is one of relating the sustainability strategies to the length and magnitude of those advantages. Could one reasonably argue "a company has an 18 month sustainability advantage over its competitors and that it is worth a quarter of a percent in marginal return"? If so, this model shows promise in explaining how sustainable development strategies can lead to direct value to shareholders. The underlying point goes back to using a model that utilizes the inputs you are best able to estimate. In any given situation, the question for the analyst is, "Am I more confident in my ability to estimate the length of the competitive advantage period and the premium in margins, or am I better off estimating future earnings or cash flows?"

An example focuses the question. Toyota and Honda are the first automobile manufacturers to introduce generally available hybrid gas-electric vehicles. Given major uncertainties such as the size of the market for such a vehicle, one might be more confident in a valuation built on estimates of the length and margin impact of Toyota and Honda's competitive advantage, than one based on estimates of future net cash flows.

Real Options

Some investments produce discrete, reasonably estimable cash flows with a beginning, middle, and end, while other investments create business options and will involve additional choices in the future. Discounted cash flow techniques work well for analyzing the former investments, but do not produce reliable results for investments that create options that require future choices. This has led some to explore other techniques that explicitly incorporate the value of options created by these investments. These options have a great deal in common with financial options, and thus, the real options approach is defined as "the extension of financial option theory to options

Figure 3.
Competitive Advantage



on real (non-financial) assets."[28] This section discusses when it is useful to apply real option analysis and how it can be applied to valuing corporate sustainability strategies, then concludes with a hypothetical example of such a valuation.

When to use real options. Amran and Kulatilaka, leading authors on real options valuation, advise analysts to use real options analysis when there is:

- a contingent investment decision;
- sufficient uncertainty to wait for more information;
- value from possible future growth for which estimates of DCF are difficult or impossible;
- uncertainty large enough to make flexibility a key criteria; or
- a likelihood of project updates and mid-course strategy corrections.

Others have observed that real options are best at valuing the "next big thing," such as most Internet, or dot-com companies. Many have argued that the valuations achieved by these companies even after these stocks fell from their heights of early 2000 is merely a speculative bubble, but the underlying premise of almost all valuations of early-stage companies is that they are establishing platforms that give them the option to participate in future markets. That option to access these future markets is the primary source of value for which it is virtually impossible to estimate future cash flows. Likewise, analysts valuing these companies have little hope of estimating future cash flows. Any estimate of future cash flows would be a product of mildly informed guesswork.

Discounted cash flow accommodates situations with "detail complexity," in that the analysis involves many detailed assumptions about the future.[29] The technique of combining scenario analysis with discounted cash flow mentioned above adds to the quality of the valuation, but also adds considerable detail complexity. Real options, however, work best in situations characterized by "dynamic complexity." That is, this technique models the complex alternatives that a company faces in the future as it develops or abandons a project.

Perhaps the most helpful advice about when to use which technique comes from someone in the securities valuation profession. Michael Mauboussin, chief strategist with the research department of Credit Suisse First Boston, advises analysts to use discounted cash flow to value a company's current businesses, then add the value of the real options they have created.[30]

The underlying concept is that deferring decisions about when and how much to invest or even whether or not to continue operating has value. This value flows from two sources.[31] First, it is generally preferable to pay later than sooner. The same preference applies to making decisions. The second source of real option value is that the world can change, and it is therefore better to make some decisions later rather than sooner. That is true both broadly and in the specifics of acquiring assets, developing systems, and hiring people.

While it may be a bit early to judge, it seems fair to say that much of the field of valuation is heading in the direction of using real options. In fact, valuation expert Tom Copeland anticipates that in 10 years real options will be the primary means of valuation, with DCF used as a special instance of real options valuation.[32]

Application to corporate sustainability. Applying the concept of real options to corporate sustainability is not exactly new, but very little work has been done in the field. The possibility was mentioned as early as 1992,[33] and developed in more depth recently.[34] Nonetheless, the hypothetical example developed here is the only attempt I know of to apply real option analysis to a specific valuation of a corporate sustainability strategy.

There are several types of real option value that can be created by corporate sustainability strategies. One is developing new products or changing existing products through environmentally beneficial technology. For example, a company that develops a significantly lighter fuel cell may be concentrating on the applications in the transportation market, but is also creating a real option to enter the market for powering remote or off-grid electronic devises. Using real options analysis to value new technologies is not unique to sustainability strategies; the same analysis should be useful to understanding a range of new technologies.

A second instance in which real option analysis appears to be relevant is hedging risks, a primary function of financial options. The relevant corporate sustainability risk might be that the world will become decidedly less friendly toward business practices that do not add value to society. Developing corporate sustainability strategies can be a hedge against the risk of such

a change in the operating environment of a business.

Certain strategies might create a third type of real option value that is arguably unique to corporate sustainability. The section above on risk analysis refers to preserving or enhancing "social license to operate" (SLTO). Increasingly in many industries, maintaining legal compliance is insufficient to preserve the corporate SLTO. WRI has worked with forest product companies that believe their SLTO may be severely limited in the future despite operating entirely within the laws. Likewise, WRI has worked with a metal mining company that believes that it gains SLTO in emerging markets because of its sustainable development efforts. In both cases, the value created is best understood through the use of real options analysis.

So how much is it worth to these companies to develop a program that preserves or enhances their SLTO? No estimation will be precise, but an order of magnitude would be helpful. Is it worth only $1 million, or is it worth $100 million? Real options analysis can provide an answer.

Methods of using real options analysis. There are two different techniques used to value real or financial options. The first is the Black-Scholes model, which uses information on publicly traded instruments such as commodities or stocks as inputs to value options. It is difficult to apply this model to real options unless there are market instruments such as other stocks, commodities, or derivatives that represent the corporate sustainability strategy being valued.

In the second technique, the analyst constructs a binomial model of expected values of the strategy at specific future times in order to calculate the value of an option today. That is the technique used below and depicted in **Figure 4**. A binomial model is built on the assumption that the value of the asset at a particular time in the future will be either A or B, and that a similar process can be used to describe the value for each successive period.

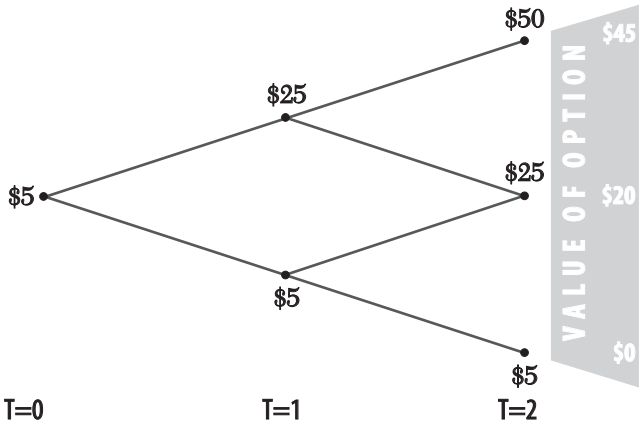
A hypothetical example of real options. In our hypothetical case, a mining company is deciding whether or not it is worthwhile to invest $5 million today in making its operations more sustainable in order to enhance their SLTO. They believe there is a 50 percent chance in each of the next two years that there will be a change in the marketplace that will give their SLTO strategy greater value. This could be either an opportunity to develop a new property or avoid losing the right to operate in an area. Several resource extraction companies with which WRI works take this view of the value created by their corporate sustainability strategies. In the mining arena, several companies believe that their access to future concessions will depend heavily on their ability to demonstrate better social and environmental performance than their competitors.

Figure 4 depicts a binomial model of the estimated value of this strategy in one year and two years, separate from its costs, which will be incorporated later. At the start, or T=0, the strategy has a value of $5 million, equal to its cost. At the end of one year (T=1), it has an estimated value of $25 million if the SLTO strategy bears fruit, and only $5 million if no situations arise that give the strategy uncommon value. Likewise, by the end of year two, the value of the strategy could either go up or down from each of the two states that existed at the end of year 1. At the end of two years (T=2), the strategy will have experienced either: 1) two years in which the strategy produced new value ($50 million), 2) one year in which it did produce new value and another year in which it did not ($25 million), or 3) two years in which it did not produce value ($5 million).

Where did the values come from? Here, they were made up. Ordinarily, one could estimate them using discounted cash flow based on appropriate assumptions for the conditions. The column on the right shows the value of the option at the end of year two. This is the value of the strategy. In option terms, the $5 million cost to put the strategy in place is the "exercise" or "strike" price.

Given this information, one can calculate the value of the real option. The process is essentially working backwards from the option value at the end of year two to its value at the end of year one, and finally to its value at the time of the initial investment decision. Appendix 1 goes through the calculation, but it is not necessary to understand the computation to understand the value of this methodology.[35] The conclusion is that the real option created by the mining company's SLTO operate strategy has a positive value of $470,000 net of the $5 million cost at the time of the initial investment

Figure 4. Valueing an SLTO Strategy Using Real Option (in $MM)



decision. This option value would not be obvious through other analytical techniques.

Spending money on making the operations of the company more sustainable and enhancing the license to operate creates future opportunities for the company to grow. Many companies believe they can enhance their SLTO, but expect that the main payoff will be at an unknown time several years hence. The value of such intangible "sustainability assets" is both uncertain and volatile. The uncertainty pertains to both the amount of benefit and the timing, the two things an analyst would most want if using DCF. The volatility is not the same as the day-to-day volatility of prices that are often associated with options. The volatility of the value of "sustainability" assets stems from the possibility that these assets may be of relatively little value, or they may be enormously valuable.

All else being equal, an option becomes more valuable when volatility increases. Options are useful for hedging specific risks. Developing sustainable competencies and assets is a hedge against a future in which those assets could suddenly become substantially more valuable. Thus, the analytical framework developed for valuing options seems appropriate for certain corporate sustainability strategies.

One key downside of real option analysis is that it is relatively complicated and unfamiliar to most. As such, it has not taken corporate planning offices by storm. In the most recent annual survey of corporate managers on analytic tools by Bain Consulting, 46 percent of companies in North America said they had experimented with real options analysis, but had given up on it.[36] Likewise, the application of real options to investment analysis has also drawn criticism, largely on the basis of difficulties applying the technique.[37] Perhaps those trying to better understand the value of the corporate sustainability strategies will find it worth the extra effort.

VI. Applying Financial Analysis to Different Corporate Sustainability Situations

How to best apply these financial techniques to corporate sustainability depends critically on two questions:

1) What question are you trying to answer?

2) What analytical technique is the best match with the strategy being evaluated?

Applying the right technique to a given strategy to answer the pertinent question of the moment seems obvious, but all too often people fail to get these two right.

Answering the right question

There are many different questions about corporate sustainability that could be answered with financial analysis. Those questions fall into categories that typically depend on where the company is in the process of integrating corporate sustainability into their business: deciding whether or not to pursue corporate sustainability strategies generally, justifying what they are already doing, planning new

efforts, evaluating efforts, and communicating results to stakeholders.

Should we pursue a corporate sustainability strategy? The initial business case is often the most difficult. Companies typically lack relevant internal financial data and are uncomfortable with the modest or nonexistent financial information on comparable companies. Naturally, a company will not have internal evidence of financial gain until they are further down the road. As was the case with the early adopters of TQM, the goal is a solid logical case, but the only truly convincing evidence will be proof a company generates itself. The key to success is to avoid getting bogged down in theoretical and philosophical issues in favor of planning and evaluating specific initiatives using the techniques of financial analysis.

What is the financial justification for the corporate sustainability strategies we are already pursuing? Frequently, a company has developed a collection of activities that constitutes its corporate sustainability strategy. Often, these are actually several unrelated initiatives that have evolved separately and are really a coherent, proactive strategy. Likewise, these strategies often evolved without a consistent view towards how they would create value. They typically lack a mechanism for gathering and organizing data to evaluate whether or not they are creating value.

It is difficult to retrospectively determine whether an existing set of initiatives is creating value if data collection was not designed into the efforts from the outset. Many retrospective looks at sustainability value creation are left trying to determine the broad impact on reputation. As noted above, the existing tools for valuing reputation do not lend themselves to attributing portions of that value to corporate sustainability. In short, it is much harder to demonstrate value creation without an established plan for how it is to occur and means of confirming that it is or is not taking place.

How can we use corporate sustainability strategies to add more value? Once a company has committed to developing a sustainability strategy, the question becomes, "What exactly should we be doing that would add the most shareholder value?" Here a company needs a conceptual framework that helps generate ideas combined with an evaluation of the shareholder value impacts with which to compare alternatives, refine initiatives, and establish performance targets. This instills the discipline of connecting planned actions to traditional financial return measures or measures of value precursors such as customer satisfaction that are accepted in the industry.

Companies can use a four-step process deciding what financial techniques to use to evaluate strategies, ideas, and initiatives against other alternatives:

1) If you can estimate the basic numbers necessary for a DCF analysis, do it.

2) If evaluating different scenarios applies to the situation, add them to the DCF approach using estimated probabilities.

3) Think next about how the strategy may create real options. For example, does it create a platform or capability that could be used to form other new businesses? Use real option analysis to value these option qualities.

4) If you still believe you are not capturing all the value, think of what precursors to financial value this effort creates and how the plan will ensure that the precursors actually lead to the financial value.

How do we know whether or not we are adding value? Surprisingly few corporate sustainability efforts have been designed with data collection to answer this question. It is critical to set targets in the planning stage and to track results. This provides both the basis for a system of measuring the impact on shareholders and critical information necessary to improve the planning process in the future.

What do we tell financial stakeholders? The reporting process should produce evidence if strategies are really creating value, but to effectively convey the financial value of its environmental and social strategies—or other strategies for that matter—a company must understand how it is being valued in the capital markets and provide financial stakeholders with information that relates to how investors are valuing the company. If investors care primarily about the ability of the company to introduce new products, then talking about the cost savings of their sustainability strategies is less valuable than explaining how social issues provide a source of insight for new product development.

Most publicly traded companies have at least one person dedicated to communicating with investors. Usually this Director of Investor Relations

(IR) is the best starting place for understanding how a company is presently being valued. Do not assume that you already know the answer. Ask the IR person what measures shareholders use in the industry and how the company stacks up against others in the industry by these measures. Also ask for help in thinking through how the sustainability strategies at the company might affect those measures. It may help to see a few reports from investment analysts on the company.

The goal is to have several "story lines" to test, such as, "Our reputation as the most sustainable operator in our segment of the mining industry gives us preferential access to certain new properties in the developing world," or "By involving nearly everyone in the process of thinking about process changes that reduce emissions, we have an advantage over others in our industry at reducing our costs in a commodity industry where the goal is to be the least-cost producer."

If one has followed the steps in planning and documenting the financial effects of the corporate sustainability strategies, the company should have documentation on the real value created and how that compares with planning expectations. While this is useful information to convey to investors, its greatest import is not in the numbers themselves, but rather in providing evidence of a focus on shareholder value and the ability to demonstrate whether or not a strategy is working.

Selecting an Approach

Figure 5 re-visits the framework I used at the outset to describe corporate sustainability strategies. The addition is a row with the most likely techniques for quantifying the value of each strategy.

Different methods of analyzing the financial impact of sustainability strategies make sense for different strategies. The key to good analysis and choosing what model to use in any particular situation is understanding what you do and do not know, what you are reasonably capable of estimating, and what you cannot estimate.

If you actually feel you can estimate cash flows and the cost of capital for a given initiative, use discounted cash

Figure 5. Corporate Sustainability Strategies & Financial Measurement

	Franchise Protection	Process Changes	Product Changes	New Market Development
Business Value	Right to Operate	Cost & Liability Reduction	Customer Loyalty and Reputation	New Markets
Focus	Compliance	Efficiency	Value Chain	Innovation
Main Financial Impact	Reduces Earnings Reduces Risks Can Open New Markets	Increases Margins Reduces Risks Often Increases Capital Efficiency	Increases Competitive Advantage	Increases Revenues Increases Competitive Advantage Diversification
Tools for Valuing	Real Options and Scenario DCF	Relative Value, DCF, and Scenario DCF	Real Options & Competitive Advantage Anal.(**??**) DCF for sensitivity analysis	Real Options & Competitive Advantage Anal. (**??**) DCF for sensitivity analysis

flow. This would typically be true of investments that increased energy or material efficiency. The example of Ciba Chemical's shareholder value approach by Mueller discussed above illustrates this well.

If an analysis indicates there are different outcomes that would each lead to well-defined costs and benefits, but where the eventual outcome is uncertain, then combining discounted cash flow with scenario and probability analysis is most appropriate. The example is the work of Repetto and Austin on the U.S. pulp and paper industry.

If, however, cash flows are very difficult to predict or if the value of a particular possible outcome will change significantly over time as an event approaches, then other means are necessary.

In some cases, it is possible to predict how a strategy will affect competitive advantage. For example, if a strategy will provide an advantage that should earn a return 1 percent greater than that of a competitor and that advantage should last six months, then the sales-driven franchise value model could be used. This technique fits best with strategies designed to develop broad competitive advantages with significant expected duration. More tactical moves are difficult to value.

With new product development and preserving or enhancing "social license to operate," the most appropriate method is real options valuation. The common element is the changing nature of the competitive environment and the opportunity to make new decisions at later points in time.

There are certainly other cases where little is known about either the likelihood of particular outcomes or their scale. This is ignorance and should be recognized as such. There are some situations in which no analytical tools will help.

As for using measures of characteristics that are logical precursors of financial value such as innovation and customer satisfaction, keep two points in mind. First, if you believe that a precursor is key to understanding the value of a corporate sustainability effort, then assure that it is strongly associated with value in your industry. For example, it is true that customer satisfaction is always a good thing, but it is not necessarily an important driver of value in commodity industries in which customers have low switching costs and are extremely price sensitive.

Second and more important, building precursor measures alone is not enough. As noted above, there are numerous examples of companies getting these "soft" measures right, but still failing to deliver financial value. In using these measures, you should also be able to explain how those precursors will in fact deliver results in conventional financial terms.

VII. Conclusion

An increasing number of major corporations are moving seriously on business strategies that create shareholder value by delivering social and environmental value to society. All else being equal, it is good to produce more value to society, but "all else" is almost never equal. That is why superior tools to evaluate the shareholder value created are critical to the success of corporate sustainability strategies.

Those who care about the value to society also should care about the ability of companies to deliver shareholder value. The financial dimension of the case for corporate sustainability strategies has long eluded those who have sought it. Many of the pat answers can safely be rejected. The financial case is neither obvious, nor impossible. It is not a matter of aggregate statistics. It is understood most meaningfully at the company level in the context of that company's strategy within their industry.

There is a transition in thinking about financial value in business. Relative valuation is still the standard in much of the investing world. DCF and related techniques show advantages, are dominant in corporate capital expenditures, and are ascendant among in-

vestors. Emerging techniques—particularly real options—are beginning to take root on the corporate planning side, but are still drawing puzzled looks among investors.

Investors will not be the ones to break the code to understanding the value of corporate sustainability strategies. Investors do not lead the creation of value; they follow it. It is up to those companies that believe they are creating value through sustainability strategies to clearly articulate that value to investors and financial analysts.

Those who are struggling to more fully understand the elusive financial value of corporate sustainability strategies do, however, have much to learn from the evolving discipline of financial analysis. There are a variety of possibilities for how one might take what those on the investment side of the shareholder equation have developed and apply it to the company side.

The financial business case for sustainability is most difficult when the value created is not just in the future and uncertain, but also from intangible assets. That doesn't make it less valuable, just more difficult to analyze. The emerging techniques of competitive advantage and real options analysis are capable of shedding light on the value of intangibles such as reputation, knowledge of how to operate more sustainably, and social license to operate.

Companies will become increasingly sophisticated about this issue as the financial stakes involved in social and environmental strategies increase. The first key audience for this will be internal financial staff. Once chief financial officers become comfortable with these applications of financial analysis, they will then be willing to make the case to shareholders. This step is essential if companies are to claim credit for the value of their corporate sustainability strategies. Likewise, CFOs need to be more familiar with how leading companies are managing risks and realizing opportunities through corporate sustainability strategies, and measuring the financial results. While the techniques range from accounting to options valuation, they all have a key common characteristic. They will not make a difference unless enough companies start using them to differentiate themselves from their competition in the investment marketplace.

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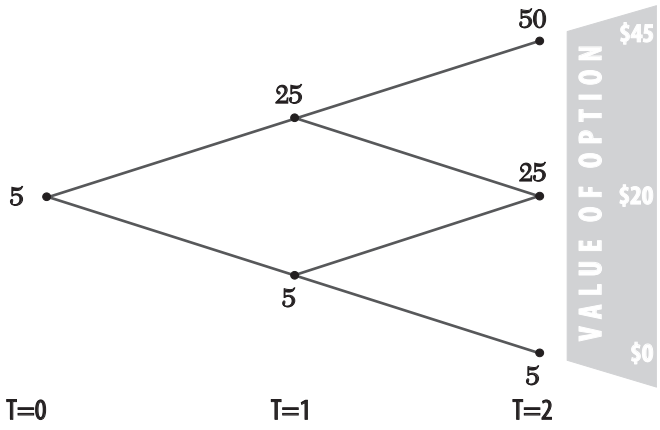
Appendix 1. Using Binomial Models

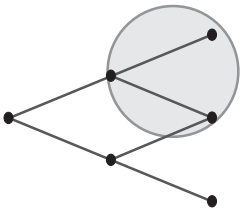
The binomial model is based on the idea that the cash flow of any option can be replicated with the right portfolio of risk-free borrowing or lending and the underlying asset.

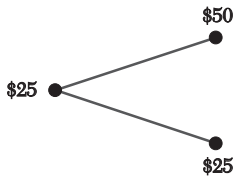
The value of a call option is the current value of the asset times the number of units of the asset in the replicating portfolio (A) minus the borrowing needed to replicate the call option value (B).

$C = V^*A - B$



Solving a specific binomial model of an option value is done in two steps. The first is to value the end of the nodes.

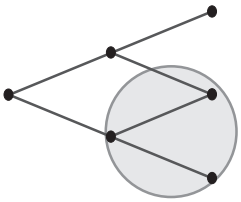


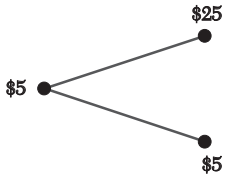


CALL VALUE	
$50	$50*A – (1.05*B) = $45
$25	$25*A – (1.05*B) = $25

A = 1 B = $4.76

Call option = $25*1 – $4.76 = $20.24

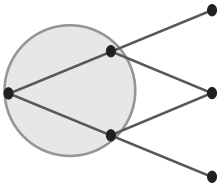


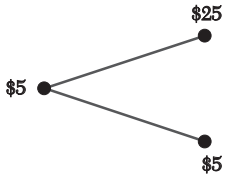


$25	$25*A – (1.05*B) = $20
$5	$5*A – (1.05*B) = $

A = 1 B = $4.76

Call option = $5*1 – $4.76 = $.24





$25	$25*A – (1.05*B) = $20.24
$5	$5*A – (1.05*B) = $.24

A = 1 B = $4.53

Call option = $5*1 – $4.53 = $.47

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