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Flexible Budgeting Applied to Sustainability Measurements

IMA Research Foundation

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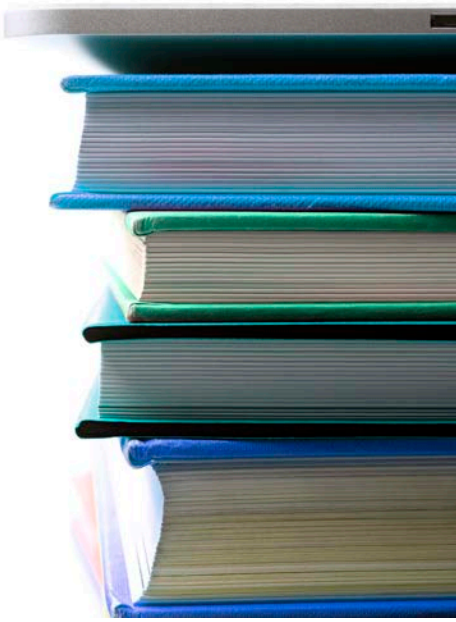

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IMA Research Foundation
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Topical Area

External Reporting and Disclosure Management
Thought leadership focused on organizational reporting, both financial and nonfinancial, to external parties. It includes the role of integrated/sustainability reporting in communicating with an organization's stakeholders as well as external reporting under various reporting frameworks.

Flexible Budgeting Applied to Sustainability Measurements

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Executive Summary

Stakeholders worldwide expect the measurement and reporting of corporate sustainability performance. Numerous global organizations have been formed to develop measurement and reporting guidelines, aggregate data, and evaluate corporate sustainability performance. Professional accounting organizations have advocated the engagement of corporate accountants in sustainability measurement and reporting, but, with few exceptions, practicing management accountants have remained on the sidelines. Bacardi Limited has developed a sophisticated metric for measuring improvements in efficiency for sustainability variables.

In the initial stages of its sustainability performance measurement and reporting, Bacardi Limited determined that the reporting guidelines of leading sustainability organizations produced erroneous measurements of the improvements the company was making in operational efficiency for its key sustainability variables. Bacardi Limited's new metric corrects the measurement error. It is a new efficiency index that accountants will recognize as an application of flexible budgeting concepts to sustainability variables such as tons of greenhouse gas emissions and cubic meters of water consumed. Bacardi Limited's innovation provides an illustration of both the need and the opportunity for management accountants to engage with environmental engineers and become directly involved with sustainability measurement and reporting.

Key Findings

Our research was sponsored by IMA® (Institute of Management Accountants) and is based on a case study of Bacardi Limited's innovative performance metric that applies flexible budgeting concepts to the measurement of efficiency changes in sustainability variables such as electricity consumption, water consumption, and greenhouse gas emissions. The research also examines the implementation of Bacardi Limited's Corporate Responsibility Initiative, which includes its environmental sustainability performance. Key findings include:

- There are increasing stakeholder expectations for corporations and other organizations to improve their management of environmental sustainability performance. This presents a challenge and an opportunity for management accountants to contribute expertise to the aggregation, analysis, and reporting of physical sustainability measurements.
- The globally accepted practice for measuring efficiency improvements for physical sustainability variables produces materially erroneous measurements for most companies because the practice ignores changes in product mix.
- Bacardi Limited has applied flexible budgeting to calculate an efficiency improvement index that adjusts for product mix changes. The result is an improved metric that corrects the error in current practice.
- Bacardi Limited's new index also allows the calculation of an aggregate (company-wide) measure of efficiency improvement for a sustainability key performance indicator (KPI), such as energy consumed, even when activity is measured by differing scales (e.g., tons, hours of operations, and miles traveled).
- Separate measurements of the variable and fixed drivers of a sustainability KPI improve the accuracy of efficiency improvement measurements for the KPI.
- Sustainability performance improvement will be facilitated by rapidly integrating sustainability into a company's standard management practices and management information system.
- The Bacardi Limited measurement methodology demonstrates the potential for management accountants to make important contributions to the measurement and reporting of sustainability performance data.

The Environment for Sustainability Performance Measurement and Reporting

The scope of performance reporting for corporations, not-for-profits, and governments has increased dramatically over the past 20 years because stakeholders are demanding more information about corporate social and environmental performance. In the private sector, "corporate responsibility" reporting and "sustainability" reporting have become the preferred labels for reporting on social, governance, and environmental performance. A recent survey by the Governance & Accountability Institute, Inc., found that 72% of S&P 500 companies published formal corporate responsibility or sustainability reports in 2013, up from only 20% in 2011.[1]

In the past decade, increasing stakeholder awareness of the potentially negative impacts of business activities on the environment and society has placed pressure on corporations to be more forthcoming in disclosing relevant, nonfinancial performance data. Governments have begun to mandate increased public reporting. In recent years, the European Union and several individual countries, including Australia, Korea, the United Kingdom, and South Africa, began requiring some companies to publicly report select data on environmental performance. In 2010, the Securities & Exchange Commission (SEC) issued *Commission Guidance Regarding Disclosure Related to Climate Change*, making explicit the requirement that financial statement preparers include risks related to climate change in the required disclosures of business risk.[3] In response to the SEC's requirement, the not-for-profit Sustainability Accounting Standards Board (SASB) was organized in 2013 to establish "industry-based sustainability standards for the recognition and disclosure of material environmental, social and governance impacts by companies traded on U.S. exchanges."[4] At the global level, the Sustainable Stock Exchanges Initiative brings together stock exchanges, regulators, investors, and other key stakeholders to promote improved disclosure of environmental, social, and governance performance.[5]

"Sustainability" is frequently used interchangeably with "environmental performance." This usage is based on a definition of sustainability developed by the United Nations' World Commission on Environment and Development in 1987: "the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs."[2] Today, many organizations apply the terms "sustainability" and "corporate social responsibility" interchangeably and broadly to environmental, social, and economic performance. In this report, "sustainability" refers to a company's impacts on the natural environment.

[1] Hank Boerner, "Flash Report: 72% of S&P 500 Companies Now Publishing Sustainability/Responsibility Reports," Governance & Accountability Institute, June 2014, http://ga-institute.com/Sustainability-Update/2014/06/03/flash-report-72-of-sp-500-companies-now-publishing-sustainability-responsibility-reports.

[2] United Nations, *Report of the World Commission on Environment and Development: Our Common Future*, March 1987, www.un-documents.net/our-common-future.pdf.

[3] Securities & Exchange Commission (SEC), *Commission Guidance Regarding Disclosure Related to Climate Change*, February 2010, www.sec.gov/rules/interp/2010/33-9106.pdf.

[4] SASB (Sustainability Accounting Standards Board), *Conceptual Framework of the Sustainability Accounting Standards Board*, October 2013, www.sasb.org/wp-content/uploads/2013/10/SASB-Conceptual-Framework-Final-Formatted-10-22-13.pdf.

[5] Sustainable Stock Exchanges (SSE), "About the SSE," 2009, www.sseinitiative.org/about.

Numerous not-for-profit organizations advocate increased and more formal disclosures of sustainability performance by corporations and governmental entities, and several provide reporting frameworks, data aggregation, and performance ratings that facilitate benchmarking and allow stakeholders to compare and evaluate sustainability performance. The Global Reporting Initiative's Sustainability Reporting Guidelines are the most widely adopted voluntary-reporting framework.[6] Other organizations providing sustainability reporting frameworks or guidelines include the Greenhouse Gas (GHG) Protocol, United Nations Global Compact, Carbon Disclosure Project, World Business Council for Sustainable Development, AccountAbility, and Carbon Trust.[7]

The International Integrated Reporting Council (IIRC), whose efforts are supported by the American Institute of Certified Public Accountants (AICPA) and the International Federation of Accountants (IFAC), advocates a reporting framework that integrates the reporting of all material aspects of corporate performance in a single document, combining financial and nonfinancial performance.[8] The movement to Integrated Reporting is a natural outgrowth of the growing practice of embedding sustainability management in all corporate functions.[9] IMA's Research Foundation report, "Managing Social, Environmental, and Financial Performance Simultaneously," provides a look at how leading corporations are successfully integrating the management of financial, sustainability, and social performance.[10]

A Frontier for Accountants

The increasing stakeholder demands for social and environmental performance reporting present opportunities and challenges to the accounting profession. Historically, the accounting profession has left the measurement and reporting of social and sustainability performance to others outside the profession. The exception is measuring the cost, or cost savings, of activities related to sustainability improvements. For example, IFAC has described the role of accountants in measuring "eco-efficiency," linking costs with physical sustainability measurements. There were academic and business advocates for "social accounting and

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[6] Global Reporting Initiative (GRI), *G4 Sustainability Reporting Guidelines*, 2013, www.globalreporting.org/reporting/g4/Pages/default.aspx.

[7] The Greenhouse Gas (GHG) Protocol, *Corporate Accounting and Reporting Standard (revised edition)*, World Business Council for Sustainable Development and World Resources Institute, 2014, www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf; United Nations, "Global Compact: Communication of Progress, March 2013-March 2014," 2014, www.unglobalcompact.org/COP/index.html; Carbon Disclosure Project, "Strategic plan 2014-16," 2014, www.cdp.net/Documents/CDP-strategic-plan-2014-2016.pdf; World Business Council for Sustainable Development and the International Finance Corporation, *Measuring Impact Framework Methodology: Understanding the Business Contribution to Society*, April 2008, www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=205&nosearchcontextkey=true; AccountAbility, AA1000 *AccountAbility Principles Standard* 2008, 2008, www.accountability.org/standards/aa1000aps.html; and Carbon Trust, "Footprint Measurement," www.carbontrust.com/client-services/footprinting/footprint-measurement.

[8] International Integrated Reporting Council (IIRC), *The International <IR> Framework*, December 2013, www.theiirc.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf.

[9] AccountAbility, "Leading in a 'Material World' – The Sustainability Outlook 2013 Survey," February 2013, www.accountability.org/about-us/news/accountability-1/leading-in-a-material-world.html.

[10] Mark J. Epstein, Adriana Rejc Buhovac, and Kristi Yuthas, "Managing Social, Environmental, and Financial Performance Simultaneously: What Can We Learn From Corporate Best Practices?" IMA® (Institute of Management Accountants), 2009.

auditing" in the 1960s and 1970s, but they failed to influence accounting practice.[11] Frameworks such as Kaplan and Norton's balanced scorecard and Elkington's triple bottom line provided the first conceptual foundations for broadening internal performance measurement and external reporting beyond financial measurements.[12] These frameworks have been adopted by many corporations even though they lack specific guidance on the characteristics of the performance data that should be reported. While academic accountants have advocated greater engagement in environmental and social performance measurement through the use of the balanced scorecard and triple-bottom-line reporting, practicing accountants have remained on the sidelines, allowing professionals in environmental, engineering, and social fields to develop the necessary measurement and reporting frameworks.

In the sustainability literature, "aspect" is the term commonly used for a sustainability variable. For example, greenhouse gas emissions, water consumed, and wastes generated are all aspects of sustainability. We use the term "aspect" rather than the term "variable," which is commonly used in the financial literature.

There has been only limited study of how companies operationalize their sustainability and social performance measurements. A cursory examination of Corporate Responsibility Reports reveals a complete lack of consistency in reporting, although most companies follow some elements of the reporting guidelines of international sustainability organizations, such as the Global Reporting Initiative, the Carbon Disclosure Project, and the GHG Protocol. These organizations recommend that KPIs for sustainability aspects (the sustainability variables of interest) take two forms: absolute quantities and intensity (efficiency) measures. Intensity measures normalize absolute quantities for changes in the scale of operations (e.g., ratios such as cubic meters of water consumed per ton of material produced and terajoules of energy consumed per million dollars of revenue). Although "intensity" is the most common terminology in the sustainability literature, it is often used interchangeably with "efficiency." The GHG Protocol is an exception, defining "efficiency" as the inverse of intensity (e.g., millions of dollars of revenue per terajoule of energy consumed), but the concept is clearly the same.

Absolute quantities of sustainability aspects are the most commonly recommended measures because they reflect the direct impacts of a company's sustainability aspects on the environmental ecosystem, and they are the basis of many other sustainability performance measures. The guidelines of most sustainability organizations also recommend the disclosure of intensity measures. Measures of intensity and its change over time are intended to provide the best indication of a company's sustainability performance. A best practice is for companies to set annual and multiyear improvement targets that require comparisons of current performance for each sustainability aspect to a base year. This should be done using both absolute and intensity measures for every important sustainability aspect. Most companies also provide aggregate measures of each aspect for the entire company, although some companies report only disaggregated measures for each business unit or product line.

[11] Raymond A. Bauer and Dan H. Fenn, Jr., "What Is a Corporate Social Audit?" *Harvard Business Review*, January/February 1973, pp.42-43; and American Institute of Certified Public Accountants (AICPA), *The Measurement of Corporate Social Performance*, New York, N.Y., AICPA, 1977.

[12] Robert S. Kaplan and David P. Norton, "The Balanced Scorecard – Measures that Drive Performance," *Harvard Business Review*, January/February 1992, pp.71-79; and John Elkington, "Towards Sustainable Corporation: Win-win Business Strategies for Sustainable Development," *California Management Review*, Winter 1994, pp. 90-100.

The current practice for measuring the percentage change since the base year of the intensity of a sustainability-aspect KPI has significant limitations for measuring the improvement in a company's efficiency relative to a sustainability aspect. Specifically, widespread current practice does not adjust the change in intensity of a KPI that occurred since the base year for any changes in relative volume of activity among business units, product lines, or differing configurations of product lines. In the financial literature, these are commonly labeled "product mix" changes. The failure to adjust for product mix changes produces the most serious measurement error at the aggregate level when an aspect's intensity KPI is summed across product lines and business units to obtain a total for the company. The error does not occur if the sustainability aspect is produced by only one uniform product line or if its intensity does not vary across product lines and business units, but this is not the typical situation for most companies.

The measurement error introduced by the failure to normalize for product mix changes has remained largely unrecognized in the sustainability literature and in companies' sustainability reports. When we examined the sustainability reports of the top 50 companies in *Newsweek's* "Green Rankings 2012: U.S. Companies"—a ranking of the 500 largest publicly traded U.S. companies—we found that none mentioned the impact of changes in product mix.[13] A measurement methodology developed by Bacardi Limited produces measures of intensity improvement that accurately reflect changes in efficiency. It is based on the same logic that management accountants routinely apply in flexible budgeting calculations, and it demonstrates one of the ways that management accountants can assume a more significant role in sustainability measurements and reporting.

Of the frameworks and guidelines currently available for sustainability measurements, the GHG Protocol provides the most extensive discussion and guidance for multiyear comparisons of sustainability measurements. The GHG Protocol explicitly calls for recalculating base-year absolute quantities to reflect structural changes that have occurred (e.g., acquisitions, dispositions, out-sourcing, and in-sourcing), but it indicates that such adjustments are rarely necessary for the measurement of changes in intensity. The GHG Protocol does recognize that when the normalizing activity variable (denominator of the intensity ratio) is dollars of revenue, there is potential for the distortion of intensity improvement measurements because of changes in product prices and product mix. The GHG Protocol states that a restatement is necessary in this circumstance, but no guidance is provided as to how to determine the restatement. To date, the fact that changes in product mix can cause material distortion in measures of efficiency improvement irrespective of the normalizing variable has not been recognized in any of the formal sustainability measurement guidelines.

In much of the sustainability literature and in Corporate Responsibility Reports, the terms "intensity" and "efficiency" are used interchangeably. A reduction of aspect intensity (e.g., lower water consumption per unit of activity) is an increase in efficiency. In the context of sustainability, "efficiency" is almost always used in relation to measures of intensity of physical aspects, not financial efficiency, although IFAC does apply the term "eco-efficiency" to the simultaneous reduction of environmental impacts and costs. Changes in the intensity of the sustainability aspect as currently measured will almost always fail to accurately measure the change in technological efficiency, and the measurement error is greatest at the aggregate level (company-wide measures of the change in intensity). As a result, the term "efficiency" will be used only in relation to the improved measurements of change in intensity.

[13] "Green Rankings 2012: U.S. Companies," *Newsweek*, October 2012, www.newsweek.com/2012/10/22/newsweek-green-rankings-2012-u-s-500-list.html.

The accounting profession has been comfortable making traditional cost measurements related to environmental and social activities, but a critical challenge is for the profession to apply its measurement and reporting skills to nonfinancial aspects such as energy consumption, water consumption, waste production, and greenhouse gas emissions. The profession possesses relevant expertise that can be applied to sustainability reporting, and greater engagement in the measurement and reporting of sustainability performance will enable sustainability reporting to grow and claim a more informative role in meeting society's needs. Accountants' skills may not apply directly to making the physical measurements of nonfinancial aspects; this is the realm of environmental engineers and social scientists. The opportunities lie in applying accounting rigor and methodologies to the aggregation, analysis, and reporting of the physical data. Stakeholder demand for corporate responsibility reporting makes it clear that the failure of the accounting profession to expand its scope beyond traditional financial measurement and reporting represents a lost opportunity for growth and renders the profession less relevant to stakeholders' needs.

Leading accounting organizations recognize the challenge and the opportunities presented by the growing demand for nonfinancial data and are calling for the profession to embrace sustainability accounting and reporting.[14] Bacardi Limited has applied sophisticated, but routine management accounting methods to improve sustainability performance measurements and reporting.

Overview of Research Study

Privately held Bacardi Limited is headquartered in Hamilton, Bermuda, with a U.S. headquarters in Coral Gables, Fla. The company has more than 6,000 employees and operates 28 production facilities in 15 countries, generating annual revenues in excess of $4.4 billion. Major spirits brands produced by the company include Dewar's, Grey Goose, Martini, Bombay Sapphire, and Eristoff, in addition to Bacardi. Bacardi Limited is an active member of the Beverage Industry Environmental Roundtable (BIER), a global consortium of beverage companies and suppliers focused on resource protection, energy efficiency, and climate change mitigation. Since 2009, Bacardi Limited has been the only major spirits company to hold certifications for all worldwide production facilities to the International Organization for Standardization (ISO) 9001, ISO 14001, and the Occupational, Health, and Safety Assessment Specification (OHSAS) 18001.

Our research is based on a four-year case study of Bacardi Limited's Corporate Responsibility Initiative conducted by faculty members in the Department of Accounting at North Carolina State University. Developed by Stephen Harvey, Bacardi's global director of Environment, Health, and Safety, the performance metric measures changes in efficiency. The innovative performance measurement method, currently called the Bacardi Environmental Sustainability Tracking (BEST) method, is a direct application

[14] IMA (Institute of Management Accountants), *Implementing Corporate Environmental Strategies*, Montvale, N.J., 1995, www.imanet.org/docs/default-source/thought_leadership/management_control_systems/implementing_corporate_environmental_strategies.pdf?sfvrsn=2; IMA, *The Evolution of Accountability – Sustainability Reporting for Accountants*, Montvale, N.J., 2008, www.imanet.org/docs/default-source/research/sma/the-evolution-of-accountability.pdf?sfvrsn=2; International Federation of Accountants (IFAC), *Environmental Management Accounting*, August 2005, www.ifac.org/publications-resources/international-guidance-document-environmental-management-accounting; and IFAC, *Sustainability Framework 2.0*, March 2011, www.ifac.org/publications-resources/ifac-sustainability-framework-20.

of flexible budgeting and demonstrates that management accountants can play an important role in sustainability measurement and reporting. The BEST method eliminates distortions in sustainability measurements of intensity improvement that occur when a company aggregates intensity measures across product lines or business units to measure the company-wide improvement in efficiency. Bacardi Limited's first public reporting of the initial version of this metric was in its fiscal 2008 Corporate Responsibility Report.[15] The 2013 Corporate Responsibility Report included BEST-method efficiency metrics for water use, energy use, and greenhouse gas emissions.[16]

In 2011, Bacardi Limited was unable to identify any other company using an efficiency metric in its Corporate Responsibility Report that resembled the BEST method. As a result, the company approached us and requested an independent examination of the efficacy of its new metric for measuring efficiency improvement. We were immediately interested because the metric was based on data normalization adjustments analogous to those applied in flexible budgeting. This was the beginning of our examination into Bacardi Limited's experience with sustainability measurements, emphasizing its novel efficiency improvement metric. In order to provide greater context, the research was ultimately expanded to examine Bacardi Limited's entire corporate responsibility program.

Our examination of Bacardi Limited's program included site visits; open-ended, structured interviews; and the examination of both public and internal documents. The carefully structured interview questions were varied based on the organization level and job description of each interviewee, and the questions were approved by the North Carolina State University Institutional Review Board. All individual responses were confidential. A total of 16 individuals in line-management and staff positions were formally interviewed, including the CEO and other global managers, regional managers, managers, and other personnel at the plant level. Informal meetings and conversations occurred with a larger number of employees. Subjects were located in Canada, Europe, Latin America, and the United States. Most interviews were conducted in person, and some were conducted by live video. During the course of this study, we collaborated with Bacardi Limited to identify refinements that could be made in the BEST-method metric.

Corporate Responsibility at Bacardi Limited

During the past 20 years, Bacardi Limited expanded dramatically from its base as the world's largest distiller of rum. By acquiring other spirits companies, it created diversity in its product lines and a global footprint. This change led to the recognition that its customers and other stakeholders expected greater attention to the management and reporting of corporate responsibility performance, including environmental sustainability. Bacardi Limited's board of directors responded by requiring management to place greater emphasis on corporate responsibility management and reporting; this resulted in the launch of the company's Corporate Responsibility Initiative. The Bacardi family and the company have a long history of positive engagement with their employees and local communities, and this history created a culture that supports the increased emphasis on corporate responsibility performance.

[15] Bacardi Limited, "Corporate Responsibility Report 2008," 2008, www.bacardilimited.com/corporate-responsibility/about-this-report/downloads.

[16] Bacardi Limited, "2013 Corporate Responsibility Report: Our Spirit Is Clear," 2014, www.bacardilimited.com/Content/uploads/corporate/responsible/pdf/corp_resp_report_2013.pdf.

Bacardi Limited's goal is to become the "best-in-class in corporate responsibility in the spirits industry." During the past decade, the company began setting five-year and annual-operating goals for quality, environmental impact, and health and safety. Management control systems were put in place at all sites, and KPIs were identified for tracking improvements in sustainability aspects. For external reporting, fiscal 2006 was selected as the initial base year for measurements, and the first Corporate Responsibility Report was published for fiscal 2008. Subsequently, the base year for some KPIs was changed to fiscal 2009 and 2010 due to boundary changes and more inclusive measurements. Bacardi Limited's most recent reports are aligned with the principles of the United Nations Global Compact, and the company adheres to the Global Reporting Initiative's *G3 Guidelines* at a self-declared application level B. Its Corporate Responsibility Reports are currently published online. Prior to fiscal 2012, printed versions were published as well.

Overall responsibility for the Corporate Responsibility Initiative rests with the CEO, who reports annually to the board of directors. A Corporate Responsibility Leadership Team (CRLT) composed of senior managers from various functions and business units sets strategy and goals, coordinates the management of corporate responsibility activities, and is responsible for reporting to the CEO and the Bacardi Global Leadership Team on a regular basis. Initially, management of the Corporate Responsibility Initiative was organized around five business functions: Marketplace; Environment, Health, and Safety; Responsible Sourcing; People; and Philanthropy and Community Development. In fiscal 2013, Responsible Sourcing was combined with Environment, Health, and Safety to better align and manage operations with upstream activities and downstream impacts. The combined functions are known as the Bacardi Sustainability Program. Global managers and specialized staff are responsible for each corporate responsibility function (e.g., the Global Technical Director is responsible for the Bacardi Sustainability Program, with staff support provided by the Director of Sustainability).

Initially, corporate responsibility was managed independently of other operations, but the company is gradually integrating operations, with the goal of completely embedding corporate responsibility within core operations. A new Global Performance Management System was introduced in 2011, providing stronger processes and controls that align employee performance, objective setting, talent management, compensation, and development with Bacardi Limited's vision and values. Currently, businessunit and facility managers have corporate responsibility KPI targets, and their compensation is linked to annual achievement.

The company has initiated a variety of activities designed to increase employee engagement in the Corporate Responsibility Initiative. In 2010, the ONE Bacardi program was launched to announce and embed corporate responsibility into the company culture. A launch event attended by 230 senior managers was followed by communication to all employees. The ONE Bacardi intranet was introduced to provide regular communication with employees regarding corporate responsibility. The company sponsored a "Corporate Responsibility Week," now expanded to a month, to encourage employee volunteerism in support of the company's philanthropy and community engagement goals. In 2012, the company conducted a Global Employee Engagement Survey, which will be repeated later this year (2015).

The dramatic expansion of detailed reporting at Bacardi Limited reflects the rapid progress of the Corporate Responsibility Initiative. The fiscal year 2013 Corporate Responsibility Report contained 173 pages compared to the 32 pages in the 2008 report. When the initiative was launched, data collection for tracking performance was decentralized and ad hoc for some functions. For example, sustainability performance data was collected and aggregated outside the normal management information system using spreadsheets. Data collection was rapidly formalized, and a new Global Performance Management System incorporates sustainability data with the objective of improving data aggregation and communication within the company.

Since the launch of the initiative, the number of KPIs tracked has increased rapidly. In fiscal years 2008 and 2009, sustainability performance measurement and goals focused on the company's direct environmental impacts. Subsequently, the scope of the company's sustainability efforts was expanded to include the entire value chain considering both upstream and downstream impacts.

Initially, corporate responsibility goals and specific KPI targets were established with little external input. In 2010, Bacardi Limited began gathering information about consumer priorities for corporate responsibility activities. In 2012, the company took a more structured approach to establishing corporate responsibility priorities by sponsoring independent stakeholder research conducted via one-on-one interviews.

The relative ranking of stakeholder priorities was combined with management's evaluation of business impacts to establish a priority ranking of corporate responsibility improvement initiatives. Marketplace performance (e.g., responsible marketing, responsible drinking, and product responsibility) was identified as the most material. It was followed closely by direct environmental impacts and sustainable agriculture and sourcing. This information is being used to allocate management's attention and resources more efficiently. Management processes to support the achievement of corporate responsibility goals have been made much more focused through the development of specific plans for how the company will achieve its KPI targets.

The results of Bacardi Limited's Corporate Responsibility Initiative can be seen in its 2013 Corporate Responsibility Report.[17] Looking at the improvement since 2006 in sustainability KPIs, total water usage decreased 54%, water efficiency improved 45.1%, nonrenewable energy efficiency improved 25.3%, and total GHG emissions decreased 31.3%, representing a 26.4% improvement in efficiency.

Bacardi Limited Discovers a Distortion in the Prevailing Practice for Calculating Changes in Sustainability Aspect Intensity (Efficiency)

Bacardi Limited followed the common practice of reporting both absolute quantities of environmental aspects and intensity measures that are normalized for changes in activity level. When the company also began measuring KPIs such as total greenhouse gas emissions and greenhouse gas emissions per liter of spirits produced, it quickly discovered a measurement problem when the aspect intensity measures were aggregated for the whole company and compared to the base-year aggregate intensity. For certain

[17] Bacardi Limited, "2013 Corporate Responsibility Report: Our Spirit Is Clear," 2014, www.bacardilimited.com/Content/uploads/corporate/responsible/pdf/corp_resp_report_2013.pdf.

sustainability aspects, the intensity measurements at all business units indicated improvement (lower levels) from the base year. When the measurements were combined for the whole company, however, the aggregate intensity measure increased. Upon investigation, Bacardi Limited discovered that changes in its product mix were the source of the measurement distortion. It determined that in a multiproduct environment, the change in aggregate intensity failed to accurately measure the aggregate change in efficiency whenever there was a change in product mix. This understanding led directly to the development of the BEST method for measuring changes in sustainability aspect efficiency.

We constructed two simple cases to demonstrate why comparing the aggregate intensity of a sustainability aspect to its intensity in a prior period will almost always fail to provide a meaningful measurement of the change in efficiency for the aspect. In both cases, a hypothetical company is measuring a single sustainability aspect: energy consumption. It is producing two products, A and B, and the total production of A and B remains constant at 200 units. In Case 1, the intensity of energy consumption for both products is held constant. In Case 2, the intensity of energy consumption decreases for both A and B (i.e., efficiency increases).

Case 1: Changes in the Aggregate Absolute Quantity and Intensity Measures with No Change in Efficiency

Base Year Information:
Product A: 1 unit of energy required to produce 1 unit of Product A
Product B: 2 units of energy required to produce 1 unit of Product B
Actual production: 100 units of Product A and 100 units of Product B

In Scenario 1, there is a shift in product mix from the lower energy-intensive Product A to the more energy-intensive Product B in Year X relative to the base year. This impacts both the aggregate absolute quantity of energy used (17% increase) and the aggregate intensity measure (17% increase)—even though the intensity of energy use (efficiency) does not change in the production of either A or B. Clearly, neither the percentage change in the absolute quantity nor the change in intensity is a measure of the actual change in efficiency at the aggregate level. There is none. Note that the change in intensity is an accurate measure of the change in efficiency only at the individual product level (i.e., for Product A or Product B in isolation).

Scenario 1

	Base Year			Year X		
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Intensity**
Product A	100	100	1.0	50	50	1.0
Product B	100	200	2.0	150	300	2.0
Total	200	300	1.5	200	350	1.75

Change in Absolute Total Energy Used	**50**	
% Change in Absolute Total Energy Used	**17%**	= (350-300) / 300
Change in Intensity		**17%**

Scenario 2

	Base Year			Year Y		
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Intensity**
Product A	100	100	1.0	150	150	1.0
Product B	100	200	2.0	50	100	2.0
Total	200	300	1.5	200	250	1.25

Change in Absolute Total Energy Used	**-50**	
% Change in Absolute Total Energy Used	**-17%**	= -50 / 300
Change in Intensity		**17%** = (350-300) / 300

In Scenario 2, total production remains constant at 200 units, but there is a shift in product mix in the opposite direction in Year Y relative to the base year. The product mix shifts from Product B, which is more energy-intensive, to Product A, which is less energy-intensive. Like the measures for Year X, the change in product mix impacts both the absolute aggregate measure (17% decrease in units of energy used) and the aggregate intensity measure (17% decrease) even though the efficiency of using energy does not change in the production of either A or B.

Energy intensity does not change at the product level in either scenario. Therefore, there is no change in energy efficiency. The change in energy intensity measured at the aggregate level correctly indicates that the company became more energy intensive by the end of Period X (Scenario 1) and less the end of Period Y (Scenario 2). These changes in aggregate intensity clearly do not measure the aggregate change in efficiency because there is no change in efficiency for either Product A or Product B.

Case 2: Changes in Aggregate Absolute and Intensity Measures Including the Effects of Changes in Efficiency

In Case 2, the production of Products A and B in both scenarios is the same as in Case 1. In the first scenario, the product mix shifts from the less energy-intensive Product A to the more energy-intensive Product B. In the second scenario, the product mix shifts from the more energy-intensive Product B to the less energy-intensive Product A. In addition, energy intensity (efficiency) improves 20% for Product A and 10% for Product B in both scenarios.

In Scenario 1, both total energy used and the intensity of energy used increase 3% by the end of Year R. In Scenario 2, both the total energy used and the intensity of energy used decrease 30% by the end of Year S. It is readily apparent, however, that these percentage changes do not represent the changes in aggregate energy efficiency. For the individual products, there is an intensity (efficiency) improvement of 20% for Product A (intensity reduced from 1.0 to 0.8) and 10% for Product B (intensity reduced from 2.0 to 1.8). Therefore, we would expect the aggregate efficiency improvement to be between 10% and 20%. Clearly, the changes in aggregate intensity for Year R and Year S do not provide decision-useful guidance regarding the actual change in aggregate efficiency because the 3% increase in Scenario 1 and the 30% decrease in Scenario 2 lie outside

the expected range. In both scenarios, there is a confounding of the effects of the shifts in mix and the changes in energy intensity of the two products.

Scenario 1

	Base Year			Year R		
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Intensity**
Product A	100	100	1.0	50	40	0.8
Product B	100	200	2.0	150	270	1.8
Total	200	300	1.5	200	310	1.55

Change in Absolute Total Energy Used	**10**	
% Change in Absolute Total Energy Used	**3%**	= (310-300) / 300

Change in Intensity	**3%**	= (1.55-1.5) / 1.5

Scenario 2

	Base Year			Year S		
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Intensity**
Product A	100	100	1.0	150	120	0.8
Product B	100	200	2.0	50	90	1.8
Total	200	300	1.5	200	210	1.05

Change in Absolute Total Energy Used	**-90**	
% Change in Absolute Total Energy Used	**-30%**	= (210-300) / 300

Change in Intensity	**30%**	= (1.05-1.5) / 1.5

The BEST Method

Given that current guidance for sustainability measurements does not provide a method to isolate aggregate efficiency changes, the Environment, Health, and Safety staff at Bacardi Limited set out to develop their own method. The method they originally developed was a weighted average of the efficiency changes at the product level (e.g., rum, scotch, vodka, etc.). After we were invited to work with Bacardi Limited, we streamlined its mathematical approach by converting it to an application of the flexible budgeting methodology commonly used by management accountants. This application of flexible budgeting to measure efficiency changes for sustainability aspects is called the Bacardi Environmental Sustainability Tracking (BEST) method. (See Case 2.1 for an example of how to use the BEST method.)

The BEST method not only improves the measurement of efficiency changes for sustainability aspects, but it also solves the problem of how to aggregate efficiency measurements across business units that have differing measures of activity (e.g., tons of carbon emissions per unit of production and tons of carbon emissions per mile traveled). Current sustainability reporting guidance attempts to resolve the

aggregation problem by suggesting the use of revenues as a common activity measure. Yet the relationship between revenues and sustainability aspects is so tenuous that revenue-based sustainability measures of intensity are virtually unintelligible.

Case 2.1: Applying the BEST Method

Case 2.1 demonstrates that the application of flexible budgeting provides meaningful measurements of changes in a company's aggregate efficiency for sustainability aspects. All physical measurements, production quantities, and energy intensities are identical to Case 2.

In Scenario 1, a flexible budget approach calculates the quantity of energy, "flexible budget quantity," that would be used in Year R if the energy intensities (efficiency) of Products A and B remain unchanged from the base year (i.e., the actual quantities of Products A and B produced in Year R are multiplied by their base-year energy intensities). Those quantities are 50 units of energy (50 × 1.0) for Product A and 300 units of energy (150 × 2.0) for Product B. The BEST method calculates an efficiency index by dividing the actual energy used in Year R by the flexible budget quantity of energy for Year R, multiplied by 100. Using Product A as an example, the index is 80 ((40/50) × 100) in Year R. The interpretation is straightforward: The energy used in Year R is only 80% of the flexible budget quantity, indicating a 20% improvement in efficiency.

Scenario 1

	Basic Year			Year R			
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Flexible Budget**	**BEST Index**
Product A	100	100	1.0	50	40	**50**	**0.8**
Product B	100	200	2.0	150	270	**300**	**0.9**
Total	200	300	1.5	200	310	**350**	**0.89**

Overall Improvement in Efficiency	**11%**
	Efficiency Improvement

Scenario 2

	Basic Year			Year S			
Product	**Production**	**Energy Used**	**Intensity**	**Production**	**Energy Used**	**Flexible Budget**	**BEST Index**
Product A	100	100	1.0	150	120	**150**	**0.8**
Product B	100	200	2.0	50	90	**100**	**0.9**
Total	200	300	1.5	200	210	**250**	**0.84**

Overall Improvement in Efficiency	**16%**
	Efficiency Improvement

The significant breakthrough made by the staff at Bacardi Limited is applying the logic of flexible budgeting to aggregate the energy efficiencies of the A and B product lines. In Year R, the actual quantity of energy used (310) is compared to the flexible budget quantity (350) that would be used if the energy intensity of Products A and B remain unchanged from the base year. Calculating the index at the

aggregate level yields 89 ((310/350) × 100), indicating an 11% efficiency improvement. As we intuitively expect for Year R, the overall 11% improvement in efficiency relative to the base year is within the 10% to 20% range of Products A and B, and it is closer to the 10% improvement in Product B (the higher-volume product). Scenario 2 continues with the flexible budget method applied in Year S. The overall improvement in efficiency relative to the base year is 16%, which is within the 10% to 20% range of Products A and B and is closer to the 20% improvement in Product A (the higher-volume product).

The BEST Method Applied to Business Units with Differing Activity Measures

An important advantage of the BEST method is that the efficiency index can be aggregated across business units having differing measures of business activity. This solves the problem of not being able to aggregate intensity measures across business units with differing activities without using revenues as the common activity measure.

Case 3 is a hypothetical illustration of Bacardi Limited's innovative application of flexible budgeting to sustainability performance measures for a business with a more realistic diversity among product lines and other business units. In this example, the company is aggregating carbon equivalent (CO_2e) emissions for six business units: distilling scotch whisky, distilling rum, bottling scotch, bottling rum, administrative offices, and transportation. And the business units use differing measures of their respective activity levels.

Case 3: The BEST Method: Using Flexible Budgeting to Measure the Aggregate Change in a Sustainability KPI (CO_2e emissions) for All Business Units in a Company

		Base Year			Current Year		Flexible Budget	
Business Unit	**Activity Measure**	**Activity**	**Actual CO_2e**	**Efficiency Rate**	**Activity**	**Actual CO_2e**	**CO_2e**	**Efficiency Index**
Rum Distillery	K-LPA	**10,500**	**25,200**	2.40	17,400	**42,200**	41,760	101
Scotch Whisky Distillery	K-LPA	**36,000**	**63,000**	1.75	39,900	**67,325**	69,825	96
Rum Bottling	K-Cases	**7,500**	**3,600**	0.48	9,900	**4,620**	4,752	97
Scotch Whisky Bottling	K-Cases	**12,000**	**4,800**	0.40	12,300	**5,492**	4,920	112
Transportation	Mtons	4,000	34,800	8.70	4,500	**37,240**	39,150	95
Offices	No. of People	8,000	9,000	1.13	8,200	**8,947**	9,225	97
			140,400			**165,824**	**169,632**	**98**

Production	**Actual CO_2e**	**Intensity**	**Production**	**Actual CO_2e**	**Intensity**	**Intensity Index**
19,500	140,400	**7.2**	22,200	165,824	**7.47**	104

For each business unit, our hypothetical company begins by measuring the relationship between the physical quantity of a sustainability aspect's KPI in the base year relative to the activity level in a base year. For this example, it measures CO_2e emissions at a rum distillery in the base year and finds that the distillery produced 10,500 thousand liters of pure alcohol (K-LPA) while emitting 25,200 units of CO_2e

emissions. Thus, the base-year rate of emissions is 2.40 units of CO_2e emissions for each thousand liters of pure alcohol. In the current year, the actual level of rum distilling activity is 17,400 K-LPA. The resulting flexible budget quantity for the current year is 41,760 units of CO_2e emissions (2.40 units × 17,400 K-LPA). This means that if there were no change in efficiency, 41,760 units of CO_2e would be the expected emissions at the higher level of activity.

The company compares the actual quantity of CO_2e emitted during the current year (42,200 units) to the flexible budget quantity (41,760 units). In accounting, the difference of 440 CO_2e emissions (42,200 – 41,760) would be identified as an unfavorable flexible budget variance. The BEST method extends that analysis by converting the variance to an index number. The resulting index for the current year is 101 (100 × 42,200/41,760). The interpretation is that there has been a 1% decrease in the efficiency of CO_2e emissions at the rum distillery. This analysis is applied to the other five business units.

A challenge that Bacardi Limited faced was how to provide a meaningful aggregation of a sustainability KPI across its business units with differing activity measures (e.g., thousands of liters of pure alcohol for rum production vs. the number of administrative personnel for administrative facilities). This was resolved by continuing with the flexible budgeting approach. For example, the quantities of CO_2e emissions projected by the flexible budget for the current year are summed to a total of 169,632 units to obtain the total emissions expected for all business units, assuming no efficiency improvement relative to the base year. The actual quantity of total emissions across all business units for the current year is 165,824 units. An aggregate index is calculated by taking the ratio of 165,824 units to 169,632 units and multiplying by 100, yielding an index of 98. The resulting interpretation is that, aggregating over all business units, there has been a 2% improvement in the efficiency of CO_2e emissions even though carbon intensity increased 4% and the absolute quantity of CO_2e emissions increased unfavorably from 140,400 units to 165,824 units.

The BEST method eliminates the inherent error in the common practice of treating the change in aggregate intensity as a measure of the change in efficiency, and it provides a meaningful measure of the change in aggregate efficiency when the index is rolled up for business units with differing activity measures.

The BEST Method Modified to Incorporate Multiple Variable Drivers of Sustainability Aspects and a Fixed Component

Case 3 illustrates Bacardi Limited's current process for measuring the efficiency improvement for a sustainability aspect's KPI. A potential limitation is that the approach treats sustainability KPIs as entirely variable. This is the case because the derivation of the method used by Bacardi Limited is based on the cost accounting method for financial reporting purposes, where fixed manufacturing costs are absorbed into unit product cost (i.e., all costs are treated as variable). When a sustainability aspect is assumed to vary directly with activity, the budgeted quantity of the sustainability KPI for the current year is overstated/understated if there is a material fixed source of the KPI and the level of activity increases/decreases. The error in budgeted quantity causes an error in the flexible budget measure of efficiency.

Case 4 applies flexible budgeting concepts to illustrate how the BEST method can be adapted to include both fixed and variable components of a sustainability KPI to yield a more exact measure of the change in efficiency. For simplicity, Case 4 considers only two product lines, rum distilling and rum bottling. In the distillery and bottling operation, production is the variable driver of electricity consumption. Additionally, both have a fixed component caused by general lighting. The bottling unit has an additional variable driver of electricity consumption and heating, ventilation, and air conditioning (HVAC).

Case 4: Analysis of the Variable and Fixed Sources of Energy Consumption

		Base Year			Current Year		Flexible Budget	
Product Category	**Unit**	**Activity Level**	**Electricity**	**Efficiency Rate**	**Activity Level**	**Electricity**	**Electricity**	**Index**
Rum Distillery – Fixed comp.	K-LPA		4,000				4,000	
Rum Distillery – Variable comp. Production	K-LPA	30,000	53,000	1.77	39,000		69,030	
Rum Distillery – Total	K-LPA		57,000			73,500	73,030	101
Rum Bottling – Fixed comp.	K-Cases		3,000				3,000	
Rum Bottling – Variable comp. Production	K-Cases	10,000	32,000	3.20	15,000		48,000	
Rum Bottling – Variable comp. HVAC	HVAC	4,000	23,000	5.75	5,000		28,750	
Rum Bottling – Total	K-Cases		58,000			72,500	79,750	91
			115,000			**146,000**	**152,780**	**95.6**
Aggregate Intensity			**11.50**	← →		**9.73**		
			=(115,000/10,000)			**= (146,000/15,000)**		
			15% reduction in intensity (11.5–9.73) / 11.5)					

In the rum distilling unit, the fixed component is 4,000 units of electricity. Rum distilling has a variable rate of 1.77 units of electricity per thousand liters of pure alcohol (K-LPA) distilled. In the current year, activity increases to 39,000 K-LPA. Multiplying 39,000 by the rate of 1.77 yields the flexible budget quantity of 69,030 for the variable component. Adding this to the fixed quantity of 4,000 yields a total flexible budget quantity of 73,030 units of electricity. Actual electricity usage increases to 73,500 units, 470 more than the flexible budget quantity of 73,030. The resulting index is 101, reflecting a decline in efficiency of 1% relative to the base year.

In the rum bottling unit, the fixed component is 3,000 units of electricity. The variable rate is 3.20 units of electricity per 1,000 cases of rum bottled (K-Cases) and 5.75 per unit of HVAC. In the current year, the production increases to 15,000 K-Cases and the number of units (e.g., temperature degree days) of HVAC increases to 5,000. The flexible budget quantities for the variable component are 48,000 units and 28,750 units of electricity. These two quantities added to the fixed component yield a total flexible budget quantity of 79,750. When compared to the actual quantity of electricity used (72,500 units), the resulting index is 91, reflecting an improvement in efficiency of 9% since the base year for bottling.

Summing the flexible budget quantities for both rum distilling and bottling yields a total of 152,780 units. The actual consumption is 146,000 units. This results in an efficiency index of 95.6 ((146,000/152,780) × 100), reflecting an aggregate efficiency improvement of 4.4%, which is significantly

less than the 15% reduction in aggregate intensity. Note that the source of the efficiency improvement can be either, or both, the fixed and variable drivers of the sustainability aspect.

Case 5 illustrates the distortion that would occur for the rum distillery in Case 4 when the fixed component is ignored. By incorrectly treating electricity as a variable, the efficiency index becomes 99, an apparent 1% improvement, instead of the actual reduction in efficiency of 1% indicated by an index of 101 based on fixed and variable components.

Case 5: Distortion on Rum Distillery If Assuming Everything Is Variable

		Base Year			Current Year		Flexible Budget	
Product Category	Unit	Activity Level	Electricity	Efficiency Rate	Activity Level	Electricity	Electricity	Index
Rum Distillery – Fixed comp.	K-LPA		4,000				4,000	
Rum Distillery – Variable comp. Production	K-LPA	30,000	53,000	1.77	39,000		68,900	
Rum Distillery – Total	K-LPA	30,000	57,000	1.90	39,000	73,500	74,100	99

In general, ignoring the fixed component introduces a predictable bias in the efficiency measure. The efficiency improvement is overstated when activity increases and understated when activity decreases. If the fixed component is relatively small, the bias will be immaterial.

This analysis demonstrates that separate measurement and analysis of the fixed and variable drivers of sustainability aspects may reveal opportunities for more effective management of the aspects in addition to improving the measurement efficiency changes.[18] Bacardi Limited is currently examining the fixed and variable drivers of its sustainability KPIs to determine if additional refinements in the BEST method are needed.

Management's Response to the BEST Method

In 2009, Bacardi Limited replaced percentage changes in intensity KPIs with the BEST method indices of efficiency. This change was necessary to ensure the published measures of efficiency improvement accurately reflected progress toward the company's long-run targets for improvement in aggregate efficiency. In addition, the indices overcame the problem of how to aggregate intensity measures requiring more than one activity metric (e.g., tons of greenhouse gas emissions per liter, tons of greenhouse gas emissions per mile traveled, and tons of greenhouse gas per person).

Management's performance evaluations and compensation at the regional and global levels, but not at the plant level, were modified to include the new efficiency metric beginning in 2009. We examined managers' perceptions of the new, more complex metric. Global, regional, and individual plant managers all expressed confidence that the BEST method represents an improvement and that it corrects distortions in the previous intensity improvement metrics.

[18] For a more detailed discussion, see Jon Bartley, Frank Buckless, Y.S. Al Chen, Stephen K. Harvey, D. Scott Showalter, and Gilroy Zuckerman, "Flexible Budgeting Meets Sustainability at Bacardi Limited," *Strategic Finance*, December 2012, pp. 29-34.

Because the BEST method facilitates better decision making and improved performance evaluation and compensation administration, some plant managers expressed a desire for the method to be applied at their sites, similar to the way it is applied to aggregate all sites within the company. Bacardi Limited, however, currently lacks sufficiently detailed data to fully leverage the BEST method within individual plant sites.

If a single site contains a mix of activities that have differing intensities for sustainability aspects (e.g., multiple sizes of bottles or both distilling operations and administration), application of the BEST method at that site requires more detailed aspect and activity measurements than are currently available. Consider a production plant site that also includes a large visitor center and a large administrative office.

Without separate measurements of activity levels and the aspect for the production operation, the visitor center, and administrative office, it is not possible to adjust for changes in activity mix. Bacardi Limited introduced the BEST method at one plant site and is evaluating the cost and benefits of obtaining activity and aspect measurements at a level of detail that would allow the BEST method to be applied at other sites.

Although managers expressed confidence in the BEST method measurements, several expressed uncertainty about the detailed calculations and their ability to verify the resulting measurements. For example, some plant managers identified specific circumstances beyond their full control that impact the efficiency of their operations, and they were uncertain whether the BEST-method metrics adjusted for those circumstances. This finding emphasizes the importance of engaging key employees in developing new metrics and adequate training of key employees who use a performance metric and are evaluated based on that metric. To some extent, managers' uncertainty about the BEST method metrics may have resulted from the fact that they were generated by spreadsheet analyses in the Environment, Health, and Safety department rather than in the company's enterprise resource planning (ERP) system.

Best practice will almost always integrate new performance metrics into existing ERP systems as quickly as practicable, and Bacardi Limited recently completed this process. The company customized its Environment, Health, and Safety management software to include sustainability aspect KPIs. This component of the ERP system facilitates data entry at the plant level and provides automated aggregation and reporting at the corporate level, including calculations of the BEST-method metrics. The new process improves the timeliness of sustainability reporting and provides greater assurance of data accuracy.

Manager and Employee Response to the Corporate Sustainability Initiative

Based on employee survey responses, Bacardi Limited has been successful in communicating its Corporate Responsibility Initiative throughout the company. This success is the result of a strong program of communication, training, and performance evaluation tied to the company's sustainability objectives. When Bacardi Limited instituted a new set of uniform management practices at all facilities, sustainability management practices were fully integrated, providing greater assurance that managers and employees will take the necessary actions to achieve the company's goals.

In our research interviews, managers reported that there was geographic variation in the level of employee buy-in for the five business functions included in the Corporate Responsibility Initiative. Overall support for the initiative was greatest in Europe, followed by the United States, and it was least in Latin America and Asia. Yet support for the five business functions in the Corporate Responsibility Initiative varied within regions as well. With respect to sustainability (environmental) aspects, support was greatest in Europe, even though some European facilities lagged in implementing improvements. Facilities in Latin America were proactive in achieving reductions of water usage, energy consumption, and pollution, but they displayed less support for other aspects of the Corporate Responsibility Initiative.

These differences did not appear to result from variations in management support, which appeared to be consistently high. We speculate that cultural differences or country-specific environmental challenges are a partial explanation. These findings suggest that companies need to tailor their communications and incentives for achieving sustainability objectives to fit differing environments within their organizations.

Although Bacardi Limited's plant managers were consistently supportive of the Corporate Responsibility Initiative, several expressed reservations about their ability to meet current targets for sustainability KPIs. It was clear that managers' concerns were based on the fact that they had already exploited the low-hanging fruit to improve performance and that further progress was likely to be much more difficult. In the first six years of the Corporate Responsibility Initiative, water usage was reduced by nearly half, energy usage was reduced by one-quarter, and greenhouse gas emissions were reduced by one-third.

The 2014 targets established by the Corporate Responsibility Leadership Team reflect this reality. For example, corporate targets for reduction in water volume usage and the increase in nonrenewable energy consumption are both 1%. At the beginning of the Corporate Responsibility Initiative, annual targets for most sustainability aspects were in the 5% to 10% range. There were many opportunities for low-cost improvements in sustainability performance, and it was easy to achieve aggregate targets based on both absolute volumes and on the BEST-method efficiency metrics. As efficiency improvements were made and incremental progress became more challenging, plant managers became concerned about the difficulty of meeting their targets. This resulted in more difficult negotiations between individual plant managers and corporate management regarding targets for sustainability KPIs.

Furthermore, our interviews suggested there was a lack of a consistent process for establishing the priority of sustainability expenditures in the capital budgeting process. A common perception of plant managers was that the capital budgeting process did not make adequate allowance for the level of investment required to meet sustainability targets. Their concern became more acute because most of the sustainability projects that produced large cost savings were completed, leaving only projects that did not perform well in the standard payback analysis.

Plant managers' concerns about the capital budgeting process were in contrast to upper management's expressed support for longer payback periods and adequate funding of sustainability projects. Analyzing sustainability investments was difficult given Bacardi Limited's heavy reliance on payback analysis in its capital budgeting process. Even though managers were encouraged to submit sustainability projects with much longer payback periods than for other projects, there were no consistent criteria

for making the tradeoff between sustainability projects with long payback periods and the company's financial performance objectives.

The issue of how to best make capital budgeting decisions for sustainability projects is a challenge for all companies because of the difficulty of estimating the financial benefits of improved sustainability performance and of balancing the nonfinancial benefits with the financial benefits and costs. These problems raise the question of whether capital budget analysis based on payback periods or present value calculations is even appropriate for many sustainability projects. Many companies struggle with the need to rank sustainability capital projects. Some organizations require the same criteria for all projects while others extend the payback period for the sustainability-oriented projects. There is much variability in practice.

To address the challenge of balancing capital budgets with sustainability improvement targets, Bacardi Limited adopted the practice of setting low annual improvement targets in the 1% to 2% range that do not vary by operational site. Significantly higher aggregate targets are adopted for multiyear improvement in each sustainability aspect at the corporate level. For example, its 2017 target is to reduce greenhouse gas emissions by 50% from the 2006 baseline.

Plant managers are expected to achieve the 1% to 2% improvement targets through incremental changes in operations that do not require significant capital investment. To achieve the higher multiyear targets at the corporate level, major projects are identified that can provide large step improvements in specific sustainability KPIs, and the necessary investments are included in the capital budget. The selection of specific sustainability projects is made at the corporate level based on an analysis of each project's potential to improve sustainability performance. This facilitates the maximization of incremental improvement in sustainability KPIs for each dollar invested. While the new process will result in better decisions, the tension between sustainability performance and financial performance remains unresolved.

Involving Accountants in Corporate Responsibility Reporting

Corporate Responsibility Reports that include sustainability performance data are rapidly becoming a de facto requirement for corporations responding to increased stakeholder demands for greater disclosure of social and environmental performance. While social scientists and environmental engineers have the necessary expertise to measure social and environmental performance, there is an opportunity for management accountants to play a significant role in corporate responsibility reporting beyond simply measuring costs. Professional organizations such as IMA and AICPA recognize this opportunity and are encouraging professionals to become more engaged in corporate responsibility reporting.[19] Nevertheless, practicing accountants have shown little inclination to engage in this emerging area, and, as a result, there is a risk that the profession will suffer a decline in its relevance to stakeholders.

[19] American Institute of Certified Public Accountants (AICPA), Sustainability Reporting and Assurance website, www.aicpa.org/interestareas/businessindustryandgovernment/resources/sustainability/pages/sustainability%20accounting,%20reporting,%20assurance%20and%20other%20services.aspx.

Bacardi Limited uses a novel application of flexible budgeting concepts to physical measures of sustainability aspects such as water and electricity consumption and greenhouse gas emissions. Bacardi Limited developed this measurement methodology in response to material errors that the company discovered in its measures of improvement in its technical efficiency for sustainability aspects. These errors were the result of large shifts in the company's product mix, and they occurred even though the company was following a globally accepted methodology for measuring changes in efficiency of sustainability aspects.

The Environmental, Health, and Safety staff at Bacardi Limited developed the solution through trial and error and without the assistance of accounting personnel. Members of our research team recognized that Bacardi Limited's efficiency improvement measurements represented a new application of flexible budgeting concepts and were able to assist in the refinement of the BEST method.

The BEST method corrects for a measurement error that is present in the guidance of the leading global sustainability organizations and is potentially present in virtually every company's reported measurements of efficiency improvement. As such, it is a major step forward in sustainability reporting. The early engagement of the management accounting profession in sustainability measurement and reporting could have prevented the widespread adoption of a flawed methodology.

The opportunity for management accountants to apply well-established accounting methodologies is only increasing with the rapid growth of corporate responsibility reporting. For example, the BEST method could be applied in incentivizing and evaluating efficiency improvements throughout the value chain, in expanding factors considered in the outsourcing decision, and in evaluating acquisitions and divestitures. The challenge for accountants today is to engage with sustainability organizations and with corporate personnel who are developing and processing corporate responsibility performance data to
apply our expertise and rigor to the aggregation, analysis, and reporting of nonfinancial performance data.

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