

Enterprise sustainability metrics and reporting

William G. Russell

orcid.org/0000-0003-4563-0017

Gil Friend

orcid.org/0000-0002-2539-5032

Abstract

This chapter is about creating sustainability-aligned metrics and reporting systems that inform and monitor progress towards the “smart” sustainability-aligned Bridge strategy objectives presented in Chapter 3. Systems thinking is used to establish appropriate measurement boundaries and feedback signals. This requires establishing sustainability-aligned and stage appropriate S.M.A.R.T. goals. We introduce a multi-capital framework for measuring stock, flow and threshold performance. Sustainability is integral to the core business and so there is only one strategy and one integrated measurement and reporting systems that is enhanced and adapts as the enterprise strategy and performance progresses.

Measurement and reporting system design criteria, collaborations, tools and case examples are presented for each of the four smart Bridge strategy stages. **Doing** stage companies realize how much they are already doing. **Doing Well** is the stage most sustainability-engaged companies are at today. Their performance management and reporting systems showcase competitor differentiation and optimize financial performance and value. **Doing Well and Doing Good** stage companies are implementing all prior stage performance objectives, but cannot become complacent. Their systems need to progress to be more holistic and interconnected with societal goals. **Thriving** stage companies are pioneering science-based measurement systems and collaborating to devise context-based allocation schemes that are ethical and fair. These companies are starting to advance their enterprises and industries holistically to contribute to a thriving, flourishing society and world.

6

Enterprise sustainability metrics and reporting

Performance measurements for resilient strategic progress

William G. Russell and Gil Friend

Counting sounds easy until we actually attempt it, and then we quickly discover that often we cannot recognize what we ought to count. Numbers are no substitute for clear definitions, and not everything that can be counted counts.

William Bruce Cameron

This chapter is about creating sustainability-aligned metrics and reporting systems that inform and monitor progress towards the “smart” sustainability-aligned Bridge strategy objectives presented in Chapter 3. A sustainability-aligned measurement and reporting system will include: Creating stage appropriate S.M.A.R.T.ⁱ goals, identifying and implementing multi-capital stock, flow and threshold performance indicatorsⁱⁱ, and implementing continuously improving sustainability-aligned business management and reporting systems.

Our approach uses systems thinking to establish appropriate measurement boundaries and feedback signals. Systems thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within the context of larger systems. The systems thinking approach contrasts with traditional analysis, which studies systems by breaking them down into their separate elements.ⁱⁱⁱ Strategic choices for the future need to adapt to

the enterprise's current context and future-facing performance goals. Every enterprise's performance management system operates with its own uniquely appropriate feedback loop signals, based on those contexts and goals, and the multiple relationship and interrelationships that make up any business system. Those signals if well designed help the system learn and adapt to change. If poorly designed they can cause unintended consequences to itself or to other interconnected systems. There is no single tool or right way to measure performance; the challenge is learn the options available and select the most appropriate tools for your particular enterprise's context and purpose.

This chapter reviews some essential practices for defining and measuring sustainable enterprise system performance. We introduce multi-capital frameworks as a tool for more helpful measuring and analysis. Multi-capital accounting—valuing natural, human and social capital, as well as financial capital—has been rapidly gaining acceptance as a more robust and nuanced lens through which to assess, measure and report sustainability-aligned performance (McElroy, 2011, Gleeson-White, 2015). Multi-capital stocks, flows and thresholds integrated with purposes and outcomes framed through Daly's triangle (Meadows, 1998), (featured in Chapter 2 p. ff) bring complex global, local and sustainable enterprise systems into more holistic alignment and clear focus.

We build upon the Smart Strategy Bridge framework presented in Chapter 3 by presenting system criteria, collaborative approaches and best practices for sustainability metrics, as well as tools and case studies for each of four sustainability-aligned strategy stages.

The first Bridge progression stage is **Doing** and includes companies that are just starting up and/or beginning to align with sustainability practices. Companies begin by assessing what they already measure and initiatives they are already doing. Initial sustainability measurement systems expand performance indicators and goals beyond single-bottom-line financial capitals and performance indicators to include non-financial capital stock and flow measurements and peer and best practice benchmark goals. Sustainability-aligned versions of traditional value chain mapping and Balanced Scorecard tools are presented to minimize resistance to change and develop confidence as resiliency improves.

The second stage are companies that are **Doing Well**. These companies are primarily interested in measuring financial performance and non-financial information as needed to drive efficiency, reduce risks to cashflow and for preparing ESG-aligned sustainability reports. Tools presented include the ROI Workbook from Chapter 3, the World Economic Forum's Global Risks Report, and the Sustainability Accounting Standards Board (SASB) materiality maps. Four interconnected sustainability reporting initiatives are introduced: The Global Reporting Initiative (GRI), SASB, The International Integrated Reporting Council (IIRC), and the Reporting 3.0 initiative. Each are advancing important standards or guidance including how to assess materiality within this currently unstructured but rapidly evolving discipline. Efforts to monetize natural and social capitals are provided as critical interconnected perspectives that supplement the basic Doing Well insights.

The third Bridge stage are companies that are **Doing Well and Doing Good**. In addition to measuring prior stage performance objectives these companies must also add measurements pertaining to their contributions towards the UN Sustainable Development Goals (SDGs) and other socially beneficial outcomes. We review the World Business Council for Sustainable Development (WBCSD) SDG Compass tool and showcase BASF's efforts to measure social impacts. We share key questions increasingly being asked by long-term institutional investors. These questions backed by hundreds of influential investors (representing more than \$15 trillion of Assets Under Management (cite, 2018)) and CEOs of major international companies could trigger or accelerate a shift from companies focused only on Doing Well, pulling them into the Doing Well and Doing

Good strategic realm and beyond.

The fourth Bridge stage are companies that wish to **Thrive**. These companies seek to measure and apply context-based allocations of global planetary boundary risks, in order to operate within natural capital and ecosystem services carrying capacities. They also measure social impacts and contributions to societal wellbeing. The Thriving section introduces a mix of global scientific research collaborations, methods for assessing global environmental and social resiliency conditions, and methods to allocate limited resources and social obligations to individual enterprises. The Stockholm Resiliency Center and Future Earth are centers leading the scientific research needed to support carrying capacity performance measurements and allocation schemes. Many scientists are concerned that our ecosystems and planetary boundary thresholds have already been exceeded.

Some business leaders have heard this message and are collaborating to set science-based environmental goals. Initial applications are primarily emphasizing the more easily measured GHG emissions and climate change. Eventually they will need to integrate all of the planetary boundary risks. Simultaneously, other groups are collaborating to develop context-based allocation methods that allow individual industries and companies to evaluate their enterprise's value chain impacts and resource requirements. The Future-fit Business benchmarks and other tools are already available to help enterprises measure strong sustainability performance while not crashing into a vital capital constraints or strategic Bridge performance guardrails.

The four stages collectively measure all of the elements and interconnections included within the Daly Triangle and related science-based frameworks. Enterprise leaders and scientists don't know how strong sustainability goals will be met. Pioneering companies are already piloting innovations to transform efficiency and effectiveness expectations. These efforts coupled with developments with institutional investors indicate shifting norms to longer term (still only 3-5 years) strategic visions that stress both financial AND socially positive performance. CEOs have been put on notice. Complacent companies and industries will get disrupted. Leading companies delivering enhanced wellbeing for their stakeholders will be rewarded.

■ Sustainability performance measurement context

In the 21st century, I think the heroes will be the people who will improve the quality of life, fight poverty and introduce more sustainability”

Bertrand Piccard

We've come a long way since the first edition of this Fieldbook was published. We refer readers to the original metrics chapter as it contains a wealth of useful tools appropriate for how sustainability had been framed at that time **[Insert L]**. This sustainability metrics Chapter is substantially re-aligned and updated.

Today the world is more interconnected. No person, company or country can become sustainable alone. Some technological breakthroughs will help, but ultimate solutions will require compounding beneficial effects from a multitude of seemingly small, isolated actions. An enterprise's vision of sustainability is the holistic aggregation of the life experiences of its leaders, employees and stakeholders. It is shaped by their mental models for how they believe the world works. Their smart strategy vision is formed by: the lenses — purpose(s) they choose to pursue; the quality and quantity of the light (technical and qualitative data); unbiased, mindful, awareness of current conditions; and the degree of alignment along common goals. From this perspective, sustainability metrics provide

the lens that sees through the fog and presents a clear view of reality today and a clear vision of prospects for a thriving future.

Sustainability measurement leaders and foundational work [Insert L]

We want to acknowledge the foundational work of a few mentors who came before us, and highly recommend that all readers become familiar with it. First, Donella (Dana) Meadows, who passed away in 2001 at the age of 59, is acknowledged as one of the most influential thinkers of the 20th century. She was principal author of *The Limits to Growth* (1972), which sold more than 9 million copies. Her work is preserved by the Academy for Systems Change which she founded in 1996^{iv}. We specifically acknowledge her for her role as lead author of the 1998 report to the Balaton Group, Indicators and Information Systems for Sustainable Development and its influence on the authors of this chapter. (Meadows, 1998) That report has fondly been referred to as the “Bible” of sustainability indicators. (Baue, August 11, 2017) Another highly relevant core document that linked systems thinking and sustainability for transformational change was her provocative paper, “Leverage points: places to intervene in a system” (Meadows, 1999).

The United Nations and the World Bank sponsored many early reports and continue to contribute today through their leadership of the Sustainable Development Goals, Responsible Investing, Sustainability Education and more. Herman Daly has influenced our thinking and is acknowledged for creating the Daly laws and the Daly triangle introduced earlier in this book (Chapter 2, p. ff). Our learning from their work and the many others contained in the Chapter and more give us hope and a sense of optimism that we are headed in the right direction. We are not traveling alone. There are people who we know and some unknown who we are yet to meet as we connect and collaborate to build a bridge to the future we are in the process of creating.

Acknowledging “Limits to growth”

As sustainable development awareness was still emerging in the early 1970s, one group of researchers, commissioned by the Club of Rome, developed World3, an interactive computer model designed to simulate the consequences of interactions between the Earth and human systems. The Limits to Growth (Meadows, 1972) provided an initial preview of the consequences of a rapidly growing world population and finite natural resources. The model simulated the holistic interdependencies of technology innovation, economic markets and five risk factors: world population, industrialization, pollution, food production, and resource depletion. Three simulation scenarios were presented: a standard ‘business as usual’ scenario, a second ‘aggressive technology innovation’ scenario assumed the expansion of available resources, but no significant culture changes in human behaviors would occur; and a third ‘resource stabilizing policies’ scenario assumed we could alter human behaviors and manage to stabilize the consumption of limited resources. Both the ‘business as usual’ and ‘aggressive technology innovation’ simulations resulted in resource overshoots and significant catastrophic impacts to our quality of life.

At the time of its release, many prominent economists, scientists and political figures criticized the Limits to Growth. They attacked the methodology, the computer, the conclusions, the rhetoric and the people behind the project. In 2010, Professors Peet, Nørgård, and Ragnarsdóttir reflected again on this work and called the book a “pioneering report”, but said “unfortunately the report has been largely dismissed by critics as a doomsday prophecy (Norgard, 2010).”

The model continued to be updated and its results validated. The paper entitled “A Comparison of *The Limits to Growth with Thirty Years of Reality*” (Turner, 2008) examined the actual data in place

of the simulated model predictions made in 1972 and found that, over the three decades, the changes in industrial production, food production and pollution were all in line with the ‘business as usual’ predictions of economic and societal collapse in the 21st century as presented in *The Limits to Growth*.

While the business community was in the early stages of embracing eco-efficiency with the intention of Doing Well and improving profits, a parallel message of dire threats to human survival advanced and began driving an urgent intention for more transformational change. A small, but rapidly growing community of sustainability heroes and positive mavericks started to openly discuss limits to growth (planetary boundaries, carrying capacities, thresholds and context allocations discussed later in the Chapter). Today, many more sustainability practitioners are reflecting on the state of the planet and how to resiliently guide sustainable progress in our ultimate outcome(s) of human wellbeing. New business models including the circular economy and the doughnut economy introduced in this chapter and others discussed in Chapter 7 are examples of scientists and business people truly beginning to confront these limits.

Current focus for sustainability measurement systems

A decade ago, much of our measurements focus was on physical “stuff” We focused systems to measure resource efficiency and the physical “metabolism” of our organizations. Today, measuring stuff is still important and expected, but new lens of materiality and value have evolved. Other perspectives changed as well:

- Initially, we were very concerned with reporting. Today, we’re increasingly concerned with how reporting contributes to strategic insight.
- We focused on the metrics of the tangible, the physical resources and financial resources being reported separately within traditional financial reports. Today, we recognize the large and still rising value of the intangibles. Intangibles including reputational value of brands and risks from climate change or supply chain disruptions account for over 80% of the value of a typical publicly listed company today.
- We were working to think about natural capital alongside financial capital; now, we’re working to bring six capitals into the management equation.
- We were focused on the numbers themselves; now, we’re beginning to understand the critical importance of context and the power of science-based goals.
- Our conversation was on the fringes of the business world; now, it’s moved closer to the core strategies of enterprises (Friend, 2017).

The biggest competitive advantage this century will belong to those enterprises able to see through the fog and progress themselves resiliently across perilous chasms that the fog obscures for the unaware or unsuspecting competitor (Friend, 2017).

Ecological Footprint

The Ecological Footprint has emerged as one of the world’s leading measures of human demand on nature, and the ability of nature to ongoingly meet that demand. It allows us to calculate human pressure on the planet and come up with facts such as: If everyone lived the lifestyle of the average American, we would need 5 planets to support us. Conceived in 1990 by Mathis Wackernagel and William Rees at the University of British Columbia, the Ecological Footprint launched broader Footprint (Environmental impacts) and Handprint (Social impacts) measurement initiatives. The ecological footprint is an eloquent metric capable of communicating both a science-aligned measure of strong sustainability performance of the planet and society as a whole while also serving as a

context-allocated measure of strong sustainability performance for smaller community, company system boundaries and individual lifestyle impacts.

The Global Footprint Network^v

The Global Footprint Network (GFN), founded in 2003, is an international think tank that develops Ecological Footprint accounting tools and leverages its research to influence policy decisions in a resource-constrained world. They work collaboratively with local and national governments, investors, and opinion leaders to ensure all people live well, within the means of one planet. The Working Guidebook to the National Footprint Accounts (NFA) describes the methodology along with detailed descriptions of calculations and data sources. The Ecological Footprint Atlas explains the purpose behind Ecological Footprint accounting, addressing research questions and basic concepts, as well as the underlying science of the calculations. ERISC: A New Angle on Sovereign Credit Risk report describes the rationale and methodology used to substantiate the business case for financial institutions and ratings agencies to include ecological criteria as a key component of country risk analysis.

The ecological footprint quiz^{vi} [Insert A, T]

The Global Footprint Network has developed a remarkably effective “quiz” tool used by individuals, schools and enterprises throughout the world to measure their own unique context-allocated ecological footprint. How much land area does it take to support your lifestyle? In just a few minutes you can take this quiz to find out your Ecological Footprint, discover your biggest areas of resource consumption, and learn what you can do to tread more lightly on the earth. Figure 6.1 provides an example quiz result. This person’s lifestyle requires 3.7 Earths to support it. Overshoot Day for this person, the day they surpass their allocated share of biocapacity resources for the year, was April 10th.

[Insert: Figure 6.1 Footprint Quiz Overshoot & Earths]

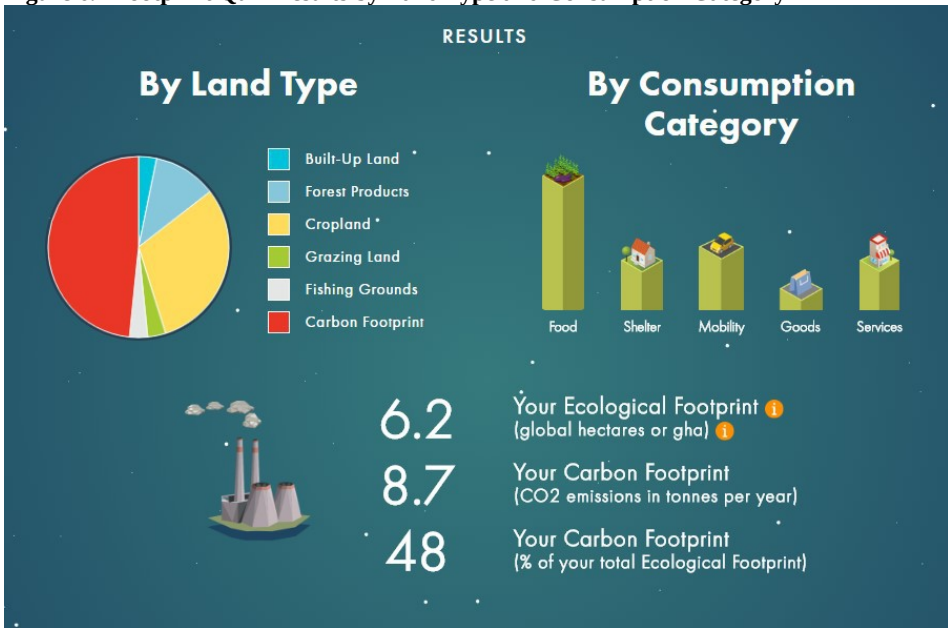
Figure 6.1 Footprint Quiz Results: Overshoot & Earths



Source: Ecological Footprint Calculator, Global Footprint Network, Date Performed, February 5, 2018, Published with permission.

[Insert: Figure 6.2 Footprint Quiz Results by Land Type and Consumption Category]

Figure 6.2 Footprint Quiz Results by Land Type and Consumption Category



Source: Ecological Footprint Calculator, Global Footprint Network, Date Performed, February 5, 2018, Published with permission.

Figure 6.2 shows the Land Type, Consumption Categories and relative contributions to the overall ecological footprint for this person’s lifestyle. Visit the endnote link to take the quiz and see the stories of others who have also taken this quiz and learned what actions they can take to reduce their footprints and responsibly journey across their bridge into the future.

We wanted you to have these different sustainability performance perspectives in your consciousness as you now proceed to review the remainder of the Chapter and book. No matter how well we think we are performing, we must appreciate that our resources are limited and that our personal lifestyles have a biocapacity requirement to sustain it. If we believe the environment is a common resource and all people have equal rights to its use, then all lifestyles that require more than 1 Earth to sustain them are exceeding a fair context share of the planet’s biological assets. We must collectively create transformational resource efficiency innovations and adapt our consumption habits and lifestyles before we surpass some currently unknown resiliency threshold and trigger a “Tragedy of the Commons” collapse.

■ Enterprise sustainability and systems measurement essentials

Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing ‘patterns of change’ rather than static ‘snapshots.’

Peter Senge

This section introduces a few essential sustainability performance measurement concepts, frameworks, system qualities, and technology trends. Whether you are a world leading expert or an enthusiastic beginner, this section establishes a common foundation of understanding before more contextualized topics, tools and initiatives are presented. Potential pitfalls of sustainability measurement are also presented for consideration as you establish or re-align and adapt your own system.

Business management systems with sustainability metrics are powerful tools to inform leaders, employees, and stakeholders throughout the company value chain and product and service lifecycles. These measurement systems, along with a common vision of the desired future state, are the critical ingredients for sustainable, even regenerative performance in a thriving world.

Enterprise system boundaries, mental models and feedback loops

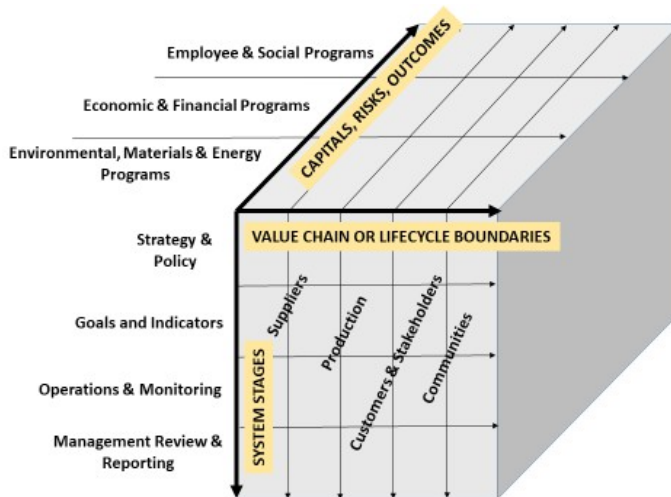
This section introduces a business management framework for designing and evaluating a sustainability-aligned enterprise performance management system. We also describe a few best practice system qualities and advancements in information technology. While sharing similar system model and framework components, each enterprise's measurement and reporting system is uniquely designed to serve and align with the enterprise's purpose, organizational structure, stakeholders, and the intermediary and ultimate ends it produces.

Sustainability-aligned business management system lenses and boundaries

Sustainability-aligned business management systems use value chain or life cycle boundaries. Figure 6.3 provides a business management framework with multi-dimensional lenses and strategic risk and opportunity perspectives. The x-axis shows the value chain or product lifecycle boundaries including upstream supply chains, operations, downstream customer use, and its ultimate community and global environmental, social, and economic outcomes. The y-axis shows the multi-capital resources and related triple-bottom-line risk and opportunity perspectives. The z-axis incorporates the aspects of a continuously improving system, including formulating the smart strategy, identifying policies and related rules the enterprise operates within, the goals and indicators identified to build resiliency and manage progress towards the goals, information needed to guide ongoing operations of the company, information used by management to monitor performance from an internal perspective, and reporting information used by management and external stakeholders.

[Insert: Figure 6.3 Enterprise sustainability-aligned business management framework]

Figure 6.3 Enterprise sustainability-aligned business management framework



Source: William G. Russell, with permission.

Each of the multi-dimensional perspectives in the sustainability business management system can reveal a range of relevant data points for enabling the enterprise to measure its efforts and outcomes. Once specified, these data points can help the organization uncover trends along both temporal (past, present, and future) and material (quantitative and qualitative) scales.

Integrated Thinking and Enterprise Risk Management Interconnections

Integrated thinking is an emerging skill set to help enterprises think more holistically about how the enterprise operates and how trans-functional coordination and trans-organizational collaborations can be improved. (For more on Integrated Thinking, see Chapter 8, p. fff) The Committee of Sponsoring Organizations of the Treadway Commission (COSO) and the World Business Council for Sustainable Development (WBCSD) are developing draft application guidance for using an enterprise risk management framework that includes environmental, social and governance-related (ESG) risks. That guidance is designed to supplement COSO's updated enterprise risk management (ERM) framework as presented in *Enterprise risk management - Integrating with strategy and performance* (COSO, June 2017).

COSO's ERM framework supports companies establishing ERM governance and processes to manage increasing volatility, complexity, and ambiguity of the business environment – internally and externally. The business management framework in Figure 6.3 is compatible with this objective. An ESG-inclusive management framework preserves value and reduces downside exposure. It also better interconnects risk management with strategy and operations decision-making while enhancing corporate performance (COSO & WBCSD, 2018).

Mental models and feedback loops [Insert A]

Each enterprise, industry and locality has certain norms that formulate the mental models and system archetypes it uses to guide strategic decisions. Here are some practices to keep in mind as the enterprise system is being reviewed and continuously improved (Friend, 2017):

- Open everything. Resist the automatic temptation to play your cards, whether Intellectual Property (IP) or performance data, close to the vest. The world is becoming more transparent and there is likely more value from shared learning than incremental value of control.
- Be inclusive and diverse. None of us is as smart as all of us.
- Find patterns without resorting to the easy escape of mechanistic reductionism.
- Don't obsess about the wrong things. Stay focused on what is relevant to the enterprise's stage strategy and outcome goals.
- Embrace and navigate uncertainty and nurture emergence.
- Ground uncertainty with science that underlies all we value and do. See the Thriving stage section for helpful resources and examples for aligning the enterprise around consensus science, shared commitments, big goals, and systematic action.

Every system operates with feedback loop signals. Those signals if well designed help the system learn and adapt to change. If poorly designed they can cause unintended consequences to the system itself or to other interconnected systems. When considering appropriate indicators for monitoring a system, the following perspectives are important:

- Are the signals or indicators lagging or leading the performance aspects they are measuring? What might be the lag or lead time delays of those signals? What delay periods exist between the indicator signals and expected impacts?
- Many systems collect historic, backwards looking results metrics. Is historic performance a relevant perspective for future performance? What assumptions are made that might be wrong when the time view is shifted towards the future?
- What insights are helpful for guiding us ahead with strategic decisions that must be made today? Data modelling and scenario analysis are the tools emerging to help assess indicators of future performance (United Nations, ESCAP, 2015).

Choosing the right measures

When indicators are poorly chosen they can cause serious malfunctions....The choice of indicators is a critical determinant of the behavior of a system.

Donella Meadows

Choosing the right performance measures is a critical aspect of designing a great sustainability-aligned performance management and reporting system. There are specific indicators that provide timely, reliable, and cost-efficient information on the current state of social, economic, and environmental elements of sustainability. These may include input, output, and outcome indicators. Those indicators may be aggregated into a compressed set of composite indicators (lifecycle assessment, ecological footprint, and the like). Composite indicators are useful in simplifying a long list of indicators to provide a visible indication of key trends.

There is no one set of agreed upon "rules" for what makes a good measure. Best practice shows that good measures typically are:

- **Useful:** The measure provides information that is valuable to the system being assessed, enterprise department or to decision-makers.
- **Self-evident/understandable:** The measure does not need a lot of explanation.
- **Evaluative:** The measure helps the reader evaluate something, not just describe something.

- **Instructive or important:** The measure tells the reader something significant or something that would not be known from other sources.
- **Valid, reliable, and economical:** The measure captures the intended information in an accurate and cost-effective manner (Meadows, 1998).

Performance measurement of a viable system has three measures of capacity producing three measures of achievement. The capacity components are:

- **Actuality:** "What we are managing to do now, with existing resources, under existing constraints."
- **Capability:** "This is what we could be doing (still right now) with existing resources, under existing constraints, if we really worked at it."
- **Potentiality:** "This is what we ought to be doing by developing our resources and removing constraints, although still operating within the bounds of what is already known to be feasible (Beer, 1972)."

The achievement components are:

- **Productivity:** is the ratio of actuality and capability;
- **Latency:** is the ratio of capability and potentiality;
- **Performance:** is the ratio of actuality and potentiality, and also the product of latency and productivity (Beer, 1972).

Selecting indicators that accurately reflect the system attributes we need to understand while avoiding data collection and indicators that distract us from what is important and relevant to measuring performance and purposeful outcomes is a key skill for designing a quality management systems. Like the smart strategy they inform, the metric system should be regularly reviewed and enhanced.

Multi-capitalism

The Daly Triangle presented in Chapter 2 and our systems-aligned Bridge strategies presented in Chapter 3 use a multi-capitals framework to categorize the Ultimate Means (natural capital) and other intermediate capital stocks. The triple-bottom-lines continue to be an effective view of aggregate sets of non-financial and financial topics and indicators. As the fields of ecological economics and integrated reporting progress, a multi-capital orientation of sustainability issues and indicators is gaining support (IIRC, 2003; Eccles, 2015).

Multi-capital frameworks provide a basis for understanding sustainable development in terms of the economic concept of wealth creation or "capital". Forum for the Future developed a Five Capitals approach in the 1990's. (Forum for the future, 2011) The model presented at that time described five capitals as:

- **Natural capital:** The natural resources (energy, environment and matter) and processes needed by organizations to produce their products and deliver their services. (Our ultimate means in the Daly Triangle)
- **Human capital:** Incorporates the health, knowledge, skills, intellectual outputs, motivation and capacity for relationships of the individual. (Intermediary means (labor) and intermediary ends (education, health, entertainment) in the Daly Triangle)
- **Social capital:** Any value added to the activities and economic outputs of an

- organization by human relationships, partnerships and co-operation.
- **Manufactured capital:** Refers to material goods and infrastructure owned, leased or controlled by an organization such as tools, technology, machines, buildings and all forms of infrastructure. (Intermediary means (Tools, equipment) and intermediary ends (Consumer products) in the Daly Triangle.)
- **Financial capital:** Reflects the productive power and value of the other four types of capital and includes those assets of an organization that exist in a form of currency that can be owned or traded.
- These definitions have continued to evolve. Intellectual capital is now a sixth capital that many organizations have adopted (IIRC, 2003; Reporting 3.0, 2018; United Nations, ESCAP, 2015). This capital's specific interpretation is still being debated. IIRC defines intellectual capital as organizational, knowledge-based intangibles, including:
 - Intellectual property, such as patents, copyrights, software, rights and licenses
 - “Organizational capital” such as tacit knowledge, systems, procedures and protocols.

Jane Gleeson-White noted that a revolution in accounting was taking place and urged enterprises to go beyond merely accounting for traditional financial and industrial capital and take account of the benefits and detriments to the natural world and society. Accounting should include four new categories of wealth: intellectual (such as intellectual property), human (skills, productivity, and health), social and relationship (shared norms and values), and natural (environment). She states that making them part of our financial statements and GDP figures may be the only way to address the many calamities we face (Gleeson-White, 2015).

The IIRC humbly notes that all organizations depend on various forms of capital for their success and that enterprises are not required to adopt this exact categorization. The capitals are stocks of value that are increased, decreased or transformed through the activities and outputs of the organization. The overall stock of capitals is not fixed over time. There is a constant flow between and within the capitals as they are increased, decreased or transformed. For example, when an organization improves its human capital through employee training, the related training costs reduce its financial capital. The effect is that financial capital has been transformed into human capital. The critical aspect of multi-capital accounting acknowledged within the Daly Triangle is that natural capital is a limited (and really the only limited) capital and described as our “ultimate means” (Meadows, 1998). All other capitals are intermediate means or intermediate ends of enterprise activities. Mark McElroy shows that there are no limits to social capital growth (McElroy, 2007), but also cautions that attempts to use traditional economics to value non-financial capitals can result in unintended consequences (McElroy, October, 2014). This reality will come up again when we discuss efforts to monetize natural and social capitals in an effort to correct current economic system value measurement flaws.

A multi-capital scorecard tool is presented later in the chapter (p. xxx) as a tool for assessing context-based enterprise sustainability performance. The living Fieldbook also contains more information on the background and applications of multi-capital accounting. **[Insert L]**

When selecting measurement topics and indicators for your enterprise performance management system, it is important to note that no theme and topic taxonomy is perfect and that to a certain extent, every theme and every topic has interdependencies with every other. Given the advancements in data collection technologies and tagging, multi-capital data tags appear to be useful to conducting insightful data analytics in support of a company's corporate strategy, sustainability vision and performance management and reporting system.

Setting goals and targets

We need to set, pursue and monitor progress towards individual, local, national and global goals that facilitate interconnected, equitable, and thriving quality of life for all human beings. This section introduces a framework, a tool and a case study for setting sustainability-aligned goals and targets.

S.M.A.R.T. Goals for “smart” sustainability-aligned strategies

We previously established our four progressive Bridges and adjustable or smart sustainability-aligned strategies. It seems appropriate to guide those strategies with S.M.A.R.T. goals. SMART goals are:

- Specific: Objectives should specify what they need to achieve. (Be clear if objectives are aggregates of multiple diverse system aspects.)
- Measurable: You should be able to measure if you’re meeting the objectives or not. (But remember, not all measures are numerical or linear.)
- Attainable: Are the objectives you set achievable or attainable? (See Interface case in strategy and NASA case Box 6.1 below for when impossible goals must be attained.)
- Relevant: It must support outcomes important to you and the organization’s success. (Note that many metrics are needed and relevant to support outcomes that are not direct outcome

Box 6.1 NASA and APOLLO Goals: Starting with the end.

Only the more courageous among us match the stretch goals standards of the Apollo mission. NASA realized that challenging technical achievements required for the moon mission would have to be supported by powerful social innovations. The first act of the Apollo project was to throw a victory party — at which the NASA organization celebrated the successful moon launch and return. After the party, they sat down and asked themselves, “How did we do it? What did we do at the end of the process that enabled us to fulfil this mission? What were the actions in the last year, and the year before that and the year before that?”

When the gap is big, and the pathway not clear, this reverse mental engineering can make it possible to see a path — from the goal to the start — that may be obscured by the dizzying permutations that exponentially multiply when looking from the start toward the goal, when the branching possibilities are too numerous to see clearly. (To deal with the challenge of apparent technical impossibility — or at least of large gaps between “need to” and “know how” — NASA created the department of “It Can’t Be Done,” which dispassionately turned impossible demands into design specifications that could be systematically invented and engineered into possibility.)

Most companies prefer to set reasonable goals that they are confident they will achieve. Others select aggressive and public goals that demand both technical innovation and organizational breakthroughs. A stretch sustainability goal — such as 100% renewable energy portfolio within ten years — may seem equally outlandish. “Can we do it?” some will ask. “Is it even possible?” On the other hand, the more useful question to ask, given that people will need to trend in that direction at some rate in any case, may be “what would it take to achieve that goal (and not at the expense of business goals)?” Radical efficiency gains? A new kind of deal with an energy provider? Something we haven’t thought of yet? It’s in the stretch beyond the goals already within reach that “invention” comes into play. Not “can we?” but “how can we?”

align
ows,
re and
realities
cant
ry to

ion-like
sily see
goals and
russed
ng

ether
achieve.
gets,
erate the

speed of adoption, the PivotGoals tool developers collected the goals of the Global Fortune 500 companies across 58 macro and micro-industries, categorized them, and made them easily searchable. In addition to searching by company name or industry, additional search categories include:

- Goal Type: Five descriptor categories such as Specific & Dated for goals with clear end dates. “We will cut our energy use across our operations 20% by 2015.” and Intentional for goals that are stated vaguely without numbers or dates, such as “we will reduce air emissions.”
- Value Chain: Categories such as Supply Chain, Product Use, End of life; and
- Absolute or Intensity: An absolute goal is one set for a numeric reduction, regardless of the growth of the business, such as “We will be zero waste by 2015” or “We will cut emissions 20% by 2020.” A relative/intensity goal is one with a denominator (per sales, employee, ton of product, etc.), such as “We will cut emissions 20% per car we produce.”
- The PivotGoals developers envisioned users and uses such as the following:
 - Benchmarking: Corporate managers and executives can compare their goals to others in their sectors and from a wider comparison pool.
 - Driving performance: Closely correlated to benchmarking, employees and managers can use the goals they’ve set, along with others their peers have posted, to create a sense of urgency for the organization to drive change in the organization.
 - Research: Students and academics studying how companies manage our mega-challenges can utilize the data as input to new research projects/publications on corporate sustainability.
 - Accountability: NGOs and other stakeholders can use this data to hold companies accountable to what they’ve publicly stated now or in the recent past.

Management system qualities and technology

Our world is experiencing significant transformational change. Amazing technological tools are streaming continuous information, multi-media stories, pictures and video clips. We are easily overwhelmed and numbed as events unfold before our eyes: natural disasters including earthquakes, hurricanes, and tsunamis, regime changes, terrorist attacks, and random, senseless shootings. Our irrational behavior, fear and ignorance is constantly exposed. We have the ability to ignore knowable feedback signals. Complacency and denial about government processes, healthcare, credit card debt or the mortgage markets have all been exposed as imperfect and ready for re-imagination and system change.

While there are obvious challenges in the world today, advancements in science and information technology combined with proven history of the human ability to adapt and innovate, provides a source for optimism. The opportunities and impacts of augmented reality and artificial intelligence are still emerging. We must reflect more deeply on what it means to be human as we are humbled when IBM’s Watson defeated our best humans on Jeopardy.

Management system qualities

A smart strategy supported by S.M.A.R.T. goals with appropriate metrics and a technology-enabled performance management and reporting system will:

- Provide a clear line of sight that connects smart strategy’s purpose, goals, actions, and

impacts for the enterprise value chain and your communities of interest, so everyone can see the impacts of their actions.

- Enable the risk management controls, responsibilities and accountabilities.
- Enable diverse teams to balance between autonomy and working as a coherent whole.
- Include the metrics that could reveal blind spots and disclose transformational opportunities and disruptions including those that could disrupt your metrics system itself (e.g., Big Data, Blockchain, Cyber security).

Management systems and technology

With advancement of business management systems and systems thinking, managing a business has become inextricably linked to data management and information technology. Today's business managers depend on real-time data and automated metrics management systems to inform their day-to-day operating decisions and long-term strategic plans.

Companies are deploying a variety of technology solutions such as PC-based spreadsheets and risk analysis software to collect data, calculate metrics, and generate reports. Enterprise resource planning (ERP) systems automate and improve manufacturing processes and resource management, and support input–output evaluations and material-flow cost accounting.

Enterprise databases, intranets, and web-based portals are supporting metrics management systems such as balanced scorecards, a variety of environmental and social indicators, and financial and sustainability reporting. As these systems become more interconnected with the suppliers and customers, a more holistic system with an enterprise's value chain as its boundary is emerging.

Other even more holistic measurement systems interconnect large scale government and other public data sets with enterprise data in order to analyze regional and social impacts. Traditional management systems were not designed for a balanced view of financial, environmental, and social metrics. They were developed to measure performance data for quality, risk, and cost control. Next generation systems integrating sustainability aspects with data analytics, graphics and augmented reality technologies promise clearer views of complex issues with more holistically-aligned functionality.

With the advancements in technology, big data analytics and process automation, we are also seeing the possibilities of, and progress toward, a future when more intelligent metrics systems will facilitate unconsciously competent behavior. People will prosper, flourish and thrive simply because it is how things work.

Sustainability Metrics Pitfalls

It ain't what you don't know that gets you in trouble. It's what you know for sure that just ain't so.

Mark Twain

Pro-actively contemplating potential metric pitfalls and unintended consequences is important when designing and implementing sustainability metrics and reporting systems. All measurement systems include estimates, inaccuracies, ambiguities, and are susceptible to cyber-attacks and fraud. At the enterprise level, people manage what they measure, but often measure what they have data for while not measuring what truly matters.

Examples of pitfalls for measuring sustainability performance include:

- Poorly presenting and managing uncertainty;
- Presuming balance and relevancy between measures or competing story arguments;
- Ignorance bias or believing that what you know for certain is right. The mortgage industry failure is one catastrophic example of this pitfall. The Gapminder Foundation’s Ignorance Project^{viii} (Box 6.2) provides more examples of this pitfall.
- Ignoring insights from behavioral economics and the effects that scarcity can have on a person’s ability to rationally interpret data and apply its signals to make decisions (Feinberg, 2015, May-June).

[Insert Box 6.2 Gapminder Ignorance Project] [Insert C]

Box 6.2 Gapminder Ignorance Project

The Gapminder Foundation started the Ignorance Project to investigate what the public knows and doesn’t know about basic global patterns and macro-trends. The project introduction draws upon observations that:

“Statistical facts don’t come to people naturally. Quite the opposite. Most people understand the world by generalizing personal experiences which are very biased. In the media the “news-worthy” events exaggerate the unusual and put the focus on swift changes. Slow and steady changes in major trends don’t get much attention.”

Source: Gapminder Ignorance Project

See the living fieldbook **[Insert L]** for more information on Pitfalls.^{ix}

■ Doing: Get started measuring sustainability performance

“Efficiency is doing things right; effectiveness is doing the right things
Peter Drucker

‘Doing stage’ enterprises include companies that are just starting up and/or beginning to align with sustainability practices. Over 500,000 companies are started in the US alone each month. There is a huge opportunity and need to catch them early and get them engaged. They need to be players on the field and in the game. They need to be taking steps on this first Bridge. They need to set up sustainability-aligned strategies and metrics systems that help them know the score from the start. The guidance and resources presented in this section can also be used by any enterprise that is re-imagining itself and is now integrating sustainability with its existing strategy and performance management and reporting systems. Companies farther along on their sustainability journey can also review the steps and tools presented here to avoid the pitfall of complacency and boost their confidence and resolve as they reflect on where they are and where they started from.

This section builds upon the purpose and system construct presented in Chapter 3 and the performance management essentials from the previous section. We first outline measurement and reporting system design criteria appropriate for supporting Bridge 1 Doing stage strategies and programs. We first review a six step sustainability measurement program implementation process. Sustainability-aligned versions of traditional value chain mapping and Balanced Scorecard tools are also presented. Tools that align traditional methods with sustainability help minimize resistance to change and develop confidence as resiliency improves. Note that the original metrics chapter available on the Living Fieldbook contained additional tools including the Natural Logic Business Metabolics methodology; the IMU Flow cost accounting methodology; US Green Building Council LEED criteria for measuring building performance and other helpful sustainability metric resources to help you get started. **[Insert L]**

Doing stage measurement and reporting system design criteria

The following are selected enterprise performance management and reporting system construct items most relevant for enterprises just getting started formulating sustainability-aligned strategies and metrics management systems for Bridge 1, Doing.

- **Get started, performance measurement purpose for Doing:** Enterprises in the Doing stage will range from startups with no prior measurement systems to smallholder farmers and family owned private businesses up through medium sized businesses that have operated for some time. They all share a purpose to define their sustainability-aligned purpose to serve customers and get to sufficiency or profitability. A smart sustainability-aligned strategy and enterprise will use metrics to guide them. A beginning system need not be overly complex. The tools that follow can help you leapfrog to a highly effective system quickly.
- **Take Inventory:** Getting started is mostly about the business management system's framing (Figure 6.3) and sustainability-alignment. Enterprises are already measuring many important items. They have bank accounts and keep track of expenses. You have time sheets and expense reports. Before advancing to any specific aspect of profitability modeling or reviewing sustainability reporting standards, take an inventory of what you already are doing and already measuring. That is the best place to start when identifying relevant activities to measure and improve. This step also provided confidence. You realize how much you already are **Doing**.
- **Time horizons:** Resilient thresholds and time periods for Bridge 1 enterprises are typically 2-years or less. Annual reporting will still be needed for tax purposes and provide a good moment for performance, strategy and systems reviews. Beginning measurement systems also need to balance data entry requirements and operating decision analytics. Vital operating equipment or product quality systems are likely to have existing and rigorous metrics associated with them. New data entry and metrics for sustainability objectives such as energy efficiency, waste minimization and most employee related performance can start with monthly data entry and indicator analytics.
- **Strategic Goals and Resiliency:** The urgent goal for companies starting up is to get to break even from a cash flow perspective while respecting environmental, social and employee relationships. An initial performance management system need not be expensive to implement. Excel or equivalent technology can work for many companies. Traditional measures pertaining to the cost of goods sold, product pricing and margins are the key performance indicators. Costs of selling, average sale amounts and sales cycle times are

additional key performance indicators for this stage.

- **Boundaries, interconnections:** The primary boundary of interest for Bridge 1 travelers is between the enterprise and the customers it is serving. Assuring its product or service enhances value to the customer's wellbeing in a differentiated way. Transparent, respectful, and collaborative relationships with employees, investors, and suppliers are also important. A formal sustainability report is not anticipated for companies at this stage of progression. That said, we believe a transparent strategy supported by relevant metrics and reporting systems enables good management and efficient and effective communications and engagement with these stakeholders.
- **Key performance indicators and priority capital stocks and flows:** Building upon the inventory of what you are already doing and already measuring, beginning stage enterprises can follow a 6 Step process for implementing a great initial sustainability-aligned performance management system. This process interconnects with the ROI Workbook tool previously introduced in Chapter 3. It allows you to get sufficient insights for each major lever that drives efficient and productive use of capitals, risks to cash flow, the intangible value of brands, and profitability.
- **Mental models:** Initial performance management systems begin with innocent and vital intentions to measure "what counts" for the enterprise's purpose in order that it can be managed. One unintended consequence of this practice that requires sensitive employee engagement is the negative reaction of employees as they emotionally believe that the system is intended to "control" their activities, and even find justifications to eliminate their roles all together. Advanced proactive engagement and training are important supplements to any actual metrics system being implemented.
- **Networks & Collaborations:** To keep up with sustainability trends and practices regardless of the industry, we recommend becoming active with Sustainable Brands^x and GreenBiz^{zi}. Industry and sustainability professional associations are also helpful resources to learn other relevant trends and best practices.

Beginners guide to implementing sustainability metrics

Fairleigh Dickinson University's Institute for Sustainable Enterprise (ISE) hosted a series of five roundtable meetings over a two-year period sharing developments and insights on implementing sustainability metrics programs. The roundtable participants were leaders in measuring sustainability performance and reporting their progress to diverse stakeholders. These leaders realized that more companies and especially their suppliers and small and medium businesses within their communities needed to be engaged and supported to start collecting data and reporting on their current performance and future progress. Ultimately sufficient data collection and reporting would enable analytics and performance management of entire value chains and communities.

Create a guide and share tools

It was determined that creating basic tools and an implementation guide could help unaware or stressed companies to shift from blind unconsciousness to purposeful actions. They are taking the first steps in a journey towards enhanced financial prosperity; efficient, responsible and regenerative environmental stewardship; engaged, productive and thriving employees; healthy and fulfilled customers; and flourishing virtual and physical communities. Sustainability-aligned metrics contribute to their business intelligence and inform day-to-day decision-making and long-term

strategic planning and performance reporting. Box 6.3 provides a six step process that beginning companies can follow to implement an initial sustainability-aligned metrics program. Measurement system boundaries can include company-controlled assets, employees and owned or leased facilities, and extend across entire value-chain of suppliers, customers and stakeholders.

[Insert Box 6.3 Beginner’s Steps for Implementing a Sustainability Metrics Program]

Box 6.3 Beginner’s Steps for Implementing a Sustainability Metrics Program

Step 1. Metrics program planning

- a. Define system purpose
- b. Schedule, budget, and skills
- c. System structure and components
- d. Program approach (e.g. Phased, Instant-on)

Step 2. Inventory current metrics practices and tools

- a. Review sustainability metrics and reporting standards
- b. Establish strategy-aligned metrics and reporting system vision and priorities.
 - i. Improving financial performance and profitability modeling
 - ii. Stakeholder business risk and materiality assessment
 - iii. Competitor, industry, customer goals
- c. Analyze the business case and establish budgets

Step 3. Profitability modeling

- a. Balance sheet inputs: Revenue, Cost of goods, Cost of labor, Profits
- b. Material and waste data and costs
- c. Labor data and costs
- d. Cash flow risk assumptions
- e. Model efficiency benchmarks and reduction goals

Step 4. Implement basic program

- a. Establish Goals
- b. Select metrics and targets
 - i. Existing Operational and Reporting Metrics in use
 - ii. Profitability model parameters
 - iii. SDG Compass tool list
- c. Create Data Collection & Tracking Systems
 - i. Natural capitals & Environmental data collection
 - Materials, Water, Water, Waste and recycling
 - GHG and Air emissions
 - ii. Manufactured capital & Operations data collection
 - Facilities, Capital equipment, Supplies and parts
 - iii. Human capital data collection
 - iv. Social capital data collection
 - v. Intellectual capital data collection
 - vi. Financial capital data collection

Step 5. Program Training

Box 6.4 10 Things You Need to Know about Your Value Stream

Be sure you understand these questions about your value stream:

1. Where is the money being made in your value stream?
2. Who's harvesting it?
3. Where's the sustainability impact—and opportunity?
4. Where are you leaking—instead of adding—value?
5. Where could someone else take value from you?
6. Where could you take value from them?
7. Where could you create more value together?
8. Where could you deliver more value to customers?
9. What would you need to know—and do—in order to do that?
10. With whom?

Sustainability balanced scorecard

The balanced scorecard process is an example of an enterprise-wide measurement system that has been successfully adapted to support sustainability-aligned metrics and business management systems (Möller, 2005). The purpose of the balanced scorecard is to help organizations manage results more effectively with a balance of measures in four categories: financial, customer, internal processes, and learning/growth. Once developed, a balanced scorecard becomes an instrument for aligning organizational performance with strategy.

Broadening balanced scorecard measures to include environmental and social issues creates an effective tool for measuring enterprise sustainability. In their paper “The Sustainability Balanced Scorecard,” Figge and colleagues provide a systematic approach for organizations to use when creating their own sustainability balanced scorecard (SBSC) (Figge, 2002).

The authors suggest three methods for creating an SBSC to fit an organization's needs:

- Integrating environmental and social into the four pillars of the balanced scorecard
- Addition of a nonmarket perspective into the balanced scorecard, and
- Deduction of a derived environmental and social standard (Figge, 2002 p. 8).

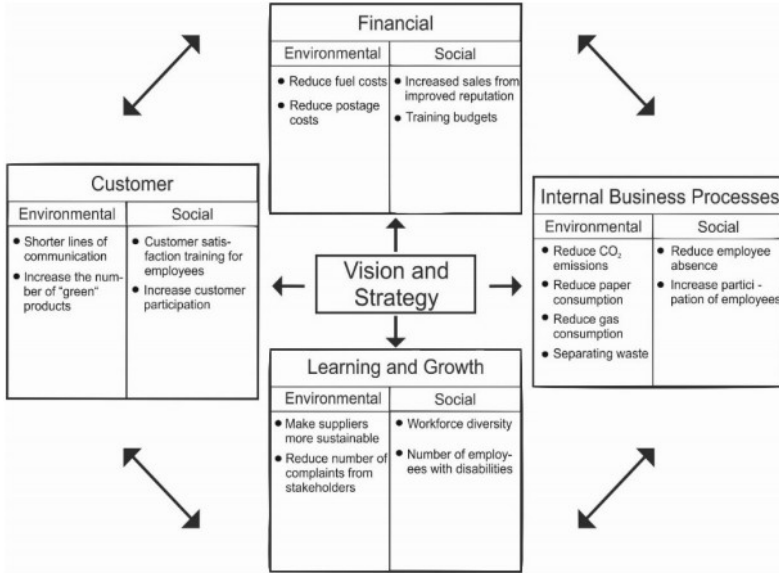
Case. Sustainability balanced scorecard: Rent a Plant **[Insert C]**

Rent a Plant was a participant in a research initiative conducted by Shanon Boerrigter at the University of Twente on the use of the Sustainability Balanced Scorecard Framework to measure the performance of the sustainability strategies for Dutch SMEs (Boerrigter, 2015). Rent a Plant provides and maintains interior landscaping throughout the Netherlands. Its emphasis is on the quality of the plants provided to the customer. The entire organization is designed towards

maintaining the highest level of customer service. Figure 6.4 shows the core part of the applied Sustainability Balanced Scorecard for the organization, across all five Balanced Scorecard perspectives.

[Insert Figure 6.4 Example sustainability balanced scorecard for Rent a Plant]

Figure 6.4 Example sustainability balanced scorecard for Rent a Plant



Source: Adapted from: Boerrigter, S. (2015).

The sustainability strategy of Rent a Plant is currently implemented by two executives. They stressed that integrating the strategy and scorecard outcome measures with all employees and all stakeholders is very important to the company, but that the company still has a lot to do. They see their customers as direct stakeholders and encourage them to implement better practices such as using emails to correspond instead of correspondence by post. The government is viewed as an indirect stakeholder with whom they had to work on initiatives such as the separation of waste.

■ Doing well: Financial and sustainability performance reporting

Money is not the thing ultimately or even actually aimed at. Money is not what really counts, though it must be counted.

Rhineland

Doing Well companies are already profitable, but do not yet have sufficient wealth to resiliently take potentially beneficial actions unless they have obvious and high probability positive financial returns. Many companies are stuck in this stage. They are not able to change their mental models of greed, self-interest, growth, or complacency in the capital market systems, and pursue short-term

profits. The sustainability mindset at this stage is often still not fully committed. This is the stage to exercise mindfulness and learn to harness sustainability-practices for enhanced profits and value. Learn to play the competitive game of sustainability-aligned business better. The good news is that sustainability-aligned strategies and performance have positive financial returns and correlate with better investor returns in the capital markets. Playing this stage of the progressive differentiated competition well prepares you for being a long-term winner.

This section builds upon the Doing Well purpose and system construct presented in Chapter 3, the performance management essentials and earlier stage strategy and performance management tools and insights. From that foundation, we outline measurement and reporting system design criteria and enhancements appropriate for supporting Bridge 2 Doing Well stage strategies. We provide helpful research sharing indicators and targets for Doing Well and demonstrating that sustainability-aligned investments have positive ROIs, improve profitability and reduce cash flow risks. We also review research that demonstrates sustainability-aligned enterprises outperform their peers in the capital markets. We share global risk insights and align those perspectives with environmental, social, and governance (ESG) risk ratings, sustainability-aligned reporting and materiality assessments. We close the chapter reviewing the perplexing paradox of monetizing natural and social capitals. The Living Fieldbook contains supplemental information pertaining to each of these headwind and tailwind forces influencing our desire to **Do Well**. **[Insert L]**.

Doing well stage measurement and reporting system design criteria

The following are selected enterprise performance management and reporting system construct items most relevant for enterprises formulating sustainability-aligned strategies for **Bridge 2, Doing Well**.

- **Performance management purpose for Doing Well:** Performance management systems for Doing Well are similar, but progressively more complex than those of Stage 1 enterprises. Additional supplier information for their needs and transparently sharing additional performance information needed by their investors are major adjustments. As resiliency and confidence are growing, more attention to non-linear disruptive risks, e.g. supply chains and intangible risks associated with brands and reputation, become important.
- **System and data inventory review:** Doing Well stage enterprises are expected to already be doing core data collection and performance management activities from Stage 1. Doing Well stage companies continue to be primarily focused on measuring financial performance and non-financial information as needed to drive efficiency, reduce risks to cash flow, and optimizing profit. That said, many of the companies within this stage are larger, relatively successful, and if already publicly traded, have more developed regulatory and financial reporting systems in place.

Internal project performance tracking becomes necessary as more and more projects are being implemented simultaneously. Adding key performance indicators in anticipation of ESG ratings and sustainability reporting will also be needed. Several system cycles and reviews will happen as the business management system settles in and becomes a powerful tool for guiding operations and strategic discussions and decisions for the future.

- **Time horizons:** Profitable enterprises cannot rest or become complacent. The ROI Workbook tools below suggest a 3-5 year time horizon for an enterprise to operate within this stage. Performance systems must support annual sustainability-aligned ratings and

reporting data requirements. The frequency of data collection and reporting remains similar to Stage 1 systems.

- **Strategic Goals and Resiliency:** At this stage of operations, best practice benchmark efficiencies and practices of both competitors and best in class non-competitors should be integrated into the performance metrics and data collection systems. For publicly traded companies picking priority GRI indicators and aligning data with selected ESG ratings questionnaires and analytics will be an exciting advancement. Preparing for and then issuing initial external reports are also progressive goals for this stage.
- **Boundaries, interconnections:** Reviewing Figure 6.3 will become a routine practice. Doing Well stage companies are not quite measuring and monitoring their complete value chains and product lifecycles. Tier 1 suppliers and investors are the next value chain stakeholders engaged in the strategy and included in systems measurements and performance monitoring. The risk axis will have all of the environmental, economic and social elements engaged, but there will be more complexity regarding the number of projects and initiatives.
- **Key performance indicators and priority capital stocks and flows:** Natural capital accounting is still early and focused on material, water, and energy efficiencies. This process interconnects with the ROI Workbook tool and additional project management software tools helpful as a portfolio of actions are simultaneously implemented. Monitoring requires flexibility to continue collecting discrete data at the smallest scale while also enhancing the ability to efficiently analyze and aggregate the data through multiple strategic lenses. Environmental, social and governance (ESG) risk topics and performance indicators are also added to initial key performance indicators.
- **Mental models:** This stage of strategy is a period for mental model transitioning. We accept that the financial and stock market performance enhancements are achieved by leaning into leadership and investor greed impulses and short term thinking. The key is not to believe that is how the world works, but to be mindful and as you complete initial low hanging fruit wins, gain confidence and resiliency, start shifting perspectives toward stakeholder service and longer term risks and opportunities.
- **Networks & Collaborations:** Peer best practice sharing networks can be added to the sustainability awareness and practices networks. Industry and accounting associations are also active advancing the practices introduced within this stage of progression.

Measuring performance for profits, risk and value

Performance management systems support both the internal and external communication of enterprise's sustainability performance. Operations equipment has its pressure and temperature gauges, smart meters measure energy consumption, and metrics software delivers its analytics through spreadsheet files, customized dashboards, websites, and more.

The following tools and research provide helpful benchmarks and calculators for measuring performance and demonstrating that sustainability-aligned investments have positive ROIs, improve profitability and reduce cash flow risks.

Shift Platform: Best practice tools and collaborating community^{xiii}

SHIFT is an online platform that allows you to search an extensive collection of sustainability tools greatly accelerating your strategic path and progress. SHIFT was developed by a cross-sector collaboration led by the Sustainability Initiative at MIT Sloan and Valutus. SHIFT is also a community of practitioners working together to review tools based on their own experiences. The SHIFT community includes corporate sustainability practitioners, sustainability-oriented entrepreneurs, impact investors, and more. Over 400 companies have contributed tools to the platform. Tools are searchable and can also be viewed using Sector, ESG Issues, Job Function and Free or Pay filters. We support this collaboration with respect to tools for assessing profitability; there were 20 Tools (Including our favorite ROI Workbook from Bob Willard) included on the platform.

Sustainability Advantage and The ROI Workbook

Bob Willard, a long-time leader in expressing the business case for sustainability, developed a Sustainability Opportunity Model in his book “*The New Sustainability Advantage*” that blends actual corporate data and industry results benchmarks to quantify eight areas of sustainability-aligned enterprise investment opportunities. Chapter 3 introduced his open source ROI Workbook tool for quantifying sustainability-aligned ROIs. For companies in the Doing and Doing Well strategic stages, the original spreadsheet tool is a great place to begin. **[Insert T, L]** On average the model conservatively indicates that companies can increase profits over a 3-5 year period between 50-80%, while reducing risks to future cash flows between 16-32%. (Willard, 2012).

Project ROI: Competitive and financial advantages of sustainability

Research sponsored by Verizon and Campbell’s quantified potential financial returns on investment from corporate responsibility (CR) actions for large, publicly traded companies. The report, *Project ROI: Defining the competitive and financial advantages of corporate responsibility and sustainability*, showed positive financial results across several different financial performance categories (Rochlin et al, 2015). Box 6.5 shows a summary of the Project ROI positive research findings.

[Insert Box 6.5 Project ROI Research Findings Summary]

Box 6.5 Project ROI Research Findings Summary

CR's potential value for marketing, sales, and brand/reputation

- Increase revenue by up to 20%
- Increase price premium by up to 20%
- Increase customer commitment in:
 - A core segment of 1-20%
 - The total segment of 60%
- Establish CR brand and reputation value as 11% of the total value of the company
- Avoid revenue losses of up to 7% of the firm's market value

CR's potential value for Human Resources

- Reduce the company's staff turnover rate by up to 50%
- Save per additional retained employee 90-200% of the employee's annual salary
- Improvements in CR performance has the same effect on retention as an increase in annual salary of \$3,700/year
- Workers willingness to accept variability in pay 5% pay cut
- Increase productivity by up to 13%
- Increase employee engagement up to: 7.5%

CR's potential value for market value, share price, and risk reduction

- Increase market value by up to 4-6%
- Over a 15 year period, increase shareholder value by USD \$1.28 billion
- Increase valuation for companies with strong stakeholder relationships 40-80%
- Reduce the cost of equity by 1%
- Reduce share price volatility 2-10%
- Avoid market losses from crises USD \$378 million
- Reduce systematic risk by 4%
- Reduce the cost of debt by 40% or more.

Source: Adapted from Project ROI

Evidence continues to mount demonstrating that corporate social-environmental performance is

strongly associated with financial and marketplace success. There is still a “knowing-doing” gap at play which this book helps address. In addition to direct profit and shareholder value benefits, another major potential advance which can help close this gap is that sustainability can be seen as a key driver of innovation. A study done by Deloitte found that sustainability provides a different ‘lens’ for thinking and unlocking innovative potential and tapping into new ideas.” (Aronson, 2013, p. 3).

Sustainability investing and capital markets

Capitalism does not permit an even flow of economic resources. With this system, a small privileged few are rich beyond conscience, and almost all others are doomed to be poor at some level. That's the way the system works. And since we know that the system will not change the rules, we are going to have to change the system.

Martin Luther King, Jr.

Sustainability can drive outperformance

Arabesque Asset Management and The University of Oxford published a meta-study *From the Stockholder to the Stakeholder: How Sustainability Can Drive Outperformance* categorizing more than 200 different sources (Clark, 2015). They report positive correlations between diligent sustainability business practices and economic performance. Part one reports that 88% of reviewed sources showed that companies with robust sustainability practices demonstrate better operational performance, which ultimately translates into cash flows. Part two reports that 80% of the reviewed studies indicate that prudent sustainability practices have a positive influence on investment performance.

The Arabesque reports along with many others ultimately demonstrate that sustainability, responsibility, and profitability are not incompatible or tradeoffs, but in fact wholly complementary. Every company large or small, manufacturing or services can create financial value by strategically implementing a portfolio of sustainability-aligned actions. Strategies are adapted to the current financial resources available and the enterprise’s unique competitive and market context.

Capitalism Transformation

Capital market systems and rules establish value, facilitate global trade, and orchestrate the allocation of other interconnected natural, built, social and human capitals. These systems directly or indirectly contributed to global risks such as asset bubbles; inflation and deflation; financial market technology infrastructure; unemployment and underemployment and wealth and income gaps (World Economic Forum, 2018). New emergent financial system technologies are restructuring the industries’ value chain and disrupting entrenched stakeholder roles. While the trends and results appear positive, are they sufficient? Many people are anticipating more profound changes to the mental models, systems and rules of capitalism itself. For example, Table 6.1 provides a summary of features for what Bob Willard calls Capitalism 2.0.

[Insert Table 6.1 Capitalism 2.0]

Table 6.1 Capitalism 2.0

Characteristic	Capitalism 1.0	Capitalism 2.0
<i>Purpose of the Firm</i>	Maximize shareholder value; Short-term	Maximizing stakeholder value; Short- and long-term
<i>Legitimate capitals</i>	Financial	Financial, Natural, Social, Human, Manufactured & Intellectual
<i>Bottom lines</i>	Profit	Profit, Planet, People
<i>Strategic focus</i>	Growth; Consumption	Stakeholder well-being
<i>Source of financial capital</i>	Stock market & big financial institutions	Co-ops; Communities; Credit unions; Crowd-sourcing
<i>Market focus</i>	Global	More local
<i>Powered by ...</i>	Fossil Fuels	Renewable energy
<i>Negative impacts</i>	Externalized	Internalized
<i>Accountability</i>	The firm	The firm's value chain
<i>Transparency</i>	As little as possible	Naked; fair taxes
<i>Business model</i>	Sell products; Linear; Take-Make-Waste	Sell services; Circular; Borrow-Use-Return

Source: Adapted from Bob Willard, Creative commons no permission required.

Monitoring ESG Risks and Ratings

Businesses are facing an evolving landscape of emerging environmental, social, and governance (ESG)-related risks that can impact a publicly traded company's profitability, credit rating, capital market performance, and even long-term survival. Investors have also expressed increased interest in ESG performance and a desire to understand how companies are managing a selection of long-term risks such as climate change and water scarcity. A survey of 320 institutional investors conducted in 2017 revealed that more than 80% agreed: that CEOs should lay out long-term board-reviewed strategies each year; that companies have not considered environmental and social issues as core to their business for far too long; that generating sustainable returns over time requires a sharper focus on ESG factors; and that ESG issues have real and quantifiable impacts over the long term (Nelson, 2017).

Serious money is lining up behind sustainability-aligned investing. Advancements in data collection, analytics and emerging innovative insights are influencing investment strategies and shifts in capital allocations, markets, and the financing of urgently needed sustainable goods and services. The ESG and ratings companies have evolved and consolidated since the original Fieldbook was published. Previously, we had showcased Innovest, KLD and TruCost. Innovest and KLD along with RiskMetrics and GMI were all acquired by MSCI. TruCost— another ratings and valuation company — was acquired by Dow Jones Indexes. Today MSCI, Dow Jones Sustainability Index, and still many others are advancing and developing new sets of metrics to quantify the quality, diversity, governance, carbon, social practices, and most any other risk factor you can think of, to analyze ESG risks. They share a common objective to use these metrics to identify and select leading companies for investment purposes.

The reinforcing performance results of sustainability-aligned investment strategies, and greater production and insightful analytics from enhanced financial and non-financial performance metrics, are helping sustainability-aligned investing to grow rapidly (over 60% between 2012-2014). These strategies are outperforming traditional investment strategies, increasingly capturing market share of investor dollars, and rapidly approaching mainstream tipping points (Esty, N.D.). The Living Fieldbook provides additional elaboration on this segment of the capital markets industry, and the diversification of investing strategies it has spawned. [\[Insert L\]](#)

Although positive results such as those noted above are beginning to convince CEOs and boards that profitability and sustainability can go hand in hand, some words of caution are warranted. Quantifying sustainability performance is a tricky business and the indices of MSCI, Dow Jones, Goldman Sachs and others are still works in progress. In addition, sustainability-aligned investment research/analysis by its nature is not proactive. They are specifically designed to assist investors to “pick” the few stocks with the best sustainability-driven return on investment. They make no attempt at raising capital markets overall to a level where all companies are efficient and sustainable.

It is also worth noting that the statistics linking sustainability to performance were achieved even though the current market does not explicitly recognize value chain-wide risks, or external costs and benefits related to an enterprise’s more holistic sustainable performance. As resources become more scarce (and expensive), and external ecosystem service values (e.g., climate change) become more internalized or at least appreciated by shareholders, the stock performance gaps between good and bad sustainability performers may well widen.

Sustainability-aligned Reporting, Materiality and Assurance

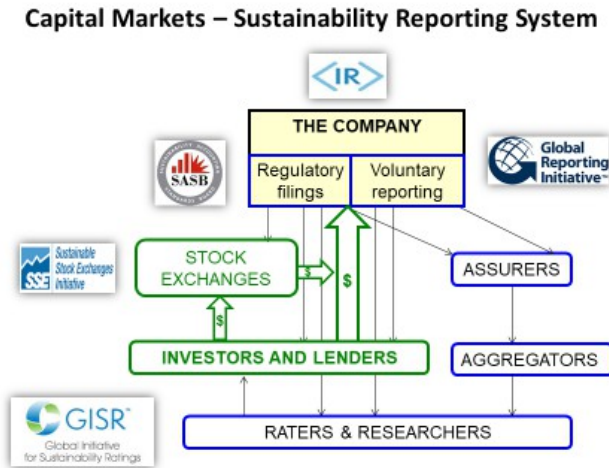
How do you use your sustainability metrics and reports — as a rearview mirror displaying past performance, or as a radar system illuminating the path ahead? As a box you need to check, or as a tool to help your people and partners be smarter?

Gil Friend

Figure 6.5 Provides an overview of the Capital Markets sustainability reporting ecosystem. It depicts how companies must understand and manage financial and regulatory reporting requirements, and voluntary reporting requirements. Both of those report types have different assurance requirements. There are initiatives to develop standards for ESG reporting across various global Stock Exchanges including the Sustainable Stock Exchange Initiative and Global Initiative for Sustainable Ratings (GISR).

[\[Insert figure 6.5 Capital Markets – Sustainability Reporting System\]](#)

Figure 6.5 Capital Markets – Sustainability Reporting System



Source: Bob Willard, Creative Commons, no permission required.

Three interconnected sustainability reporting initiatives are introduced and presented in more detail below: The Global Reporting Initiative (GRI), The Sustainability Accounting Standards Board (SASB), and The International Integrated Reporting Council (IIRC). A fourth initiative, Reporting 3.0 is another reporting initiative. That initiative is presented in the final Thriving section as its approach more explicitly requires using a science-based and context-allocated approach to strong sustainability performance. All of these initiatives are advancing important standards or guidance to this currently unstructured but rapidly evolving discipline.

Raising the Bar

The United Nations Environment Programme (UNEP) developed an excellent summary of the state of environmental disclosures in sustainability reporting. It analyzes what the key and most common environmental disclosure items are, and provides practical recommendations for companies and other reporting organizations on how these items should be measured and reported. That document also made recommendations on how sustainability reporting could be improved in the future (UNEP, 2015). Some aspects of the field— including ESG ratings and rankings— continued to fragment, while other aspects, such as how to determine materiality and stakeholder engagement processes, were maturing and standardizing. The World Business Council for Sustainable Development (WBCSD) has created a tool that organized these standards (WBCSD, 2018). The Sustainable Stock Exchange Initiative and the Global Initiative for Sustainability Ratings (GISR) are additional examples of efforts to bring more standards and structure to this emerging discipline.

The Global Reporting Initiative (GRI)^{xiii}

The Global Reporting Initiative (GRI) is the most widely used standard for reporting sustainability performance to stakeholders. The initiative was launched by former CERES Executive Director, Dr. Robert Massie and Dr. Allen White of the Tellus Institute in 1997. In 2013, GRI released the fourth generation of its Guidelines, G4. The standards include Reporting Principles, Standard Disclosures

and an Implementation Manual for the preparation of sustainability reports by organizations of any size or sector. The standards provide guidance on the format and content of the reports as well as providing assistance on how to normalize and verify data. They contain a comprehensive set of organizational, management system, and performance parameters relating to a company's economic, social, and environmental performance. The guidelines encourage companies to set targets and commitments, and then to report on the extent to which these are being met, and providing reasons for any gaps or failures. The GRI strongly encourages the adoption of a stakeholder engagement process, with the aim of reporting on those issues of greatest relevance to stakeholders. GRI maintains a sustainability report disclosure database of over 9,000 organizations.

Tim Mohin, the current CEO of GRI acknowledges that the reporting landscape is increasingly crowded, and that there is an alphabet soup of different standards. He lists along with GRI, IIRC, and CDP, SASB, and newest on the block, the TCFD (Task Force on Climate-Related Financial Disclosure), which applies to financial, rather than sustainability reporting. He believes that confusion among standards is overblown, but is also a leader in reaching out to all of these and fostering greater collaboration (Slavin, T., February 4, 2018)

The Sustainability Accounting Standards Board (SASB)^{xiv} **[Insert T]**

The Sustainability Accounting Standards Board (SASB) was founded in 2011 to develop and disseminate sustainability accounting standards that help public corporations disclose material, decision-useful sustainability information to investors in mandatory SEC filings, such as the Form 10-K and 20-F. SASB uses a legal definition for materiality. They feel that when certain risks have been determined to be material ones, then companies are legally required to include disclosures about those risks in their regulatory filings. They could also include disclosures within a sustainability or integrated report, but the first disclosure would have been a required one. Through 2016 SASB has developed sustainability accounting standards, materiality maps and metrics for more than 80 industries in 10 sectors.

The International Integrated Reporting Initiative (IIRC)^{xv}

The International Integrated Reporting Council (IIRC), founded in 2011, is a global coalition of regulators, investors, companies, standard setters, the accounting profession and NGOs. The coalition is promoting communication about value creation as the next step in the evolution of corporate reporting. The IIRC's vision is to align capital allocation and corporate behavior to wider goals of financial stability and sustainable development through the cycle of integrated reporting and thinking. The IIRC has been a major advocate for a multi-capital accounting approach which has brought that concept to the attention of the mainstream accounting associations, institutes, and societies.

Global Initiative for Sustainability Ratings (GISR)^{xvi} **[Insert T]**

As an impartial, multi-stakeholder initiative, GISR will advance excellence in ESG ratings, rankings and indices for measuring corporate sustainability performance. By advancing standards of excellence for financial market ratings, GISR aims to accelerate the integration of environmental, social and governance factors in corporate and investment decision-making. Elevating usage of ESG factors in company and investment decision-making will contribute to long-term positive change on social and environmental issues. GISR maintains a research hub of ratings methods and best practices. They also have developed 12 principles that guides the process and content of sustainability report aspects. They informs the selection of Issues and Indicators, and signals to financial markets, companies, consumers and the public at-large that ratings practices are credible

(GISR, n.d.)

Reporting Exchange Tool^{xvii} **[Insert T]**

In 2017, the WBCSD, in partnership with the Climate Disclosure Standards Board (CDSB) and Ecodesk, launched the Reporting Exchange. This is a free, online platform for navigating the complex provisions and requirements of sustainability reporting. Key research findings for just the United States and Canada revealed 290 reporting provisions and 156 reporting requirements. It was also telling that even among the WBCSD member companies—who are the global leaders in reporting and disclosures—that 24% of those companies in the US and Canada show no alignment between the issues highlighted as “material” in their sustainability report, and the risks in the financial filing. (WBCSD,CDESB,Ecodesk, 2018)

Materiality

Each of the reporting initiatives above has differing definitions and interpretations of what is material and how to assess materiality. The following are the different definitions:

American Institute of Certified Public Accountants, AICPA SAB 99

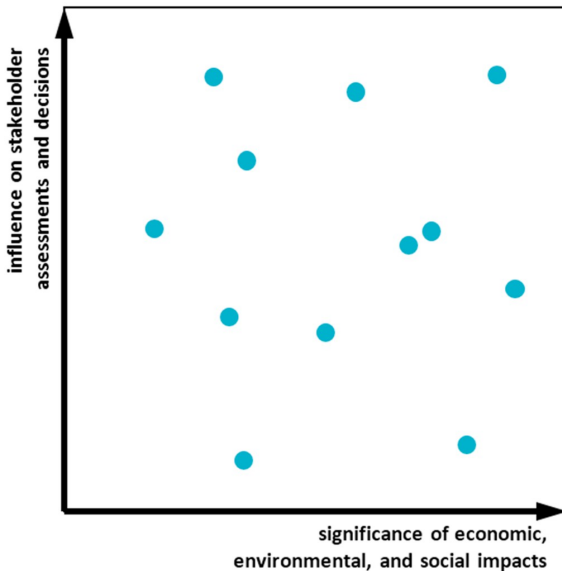
Information is material if its omission or misstatement could influence the economic decisions of users taken on the basis of the financial statements. Materiality depends on the size of the item or error judged in the particular circumstances of its omission or misstatement. Thus, materiality provides a threshold or cut-off point rather than being a primary qualitative characteristic that information must have if it is to be useful (SEC, August 12, 1999).

GRI: Materiality Principle

The GRI didn’t provide an explicit definition for materiality, but developed a very helpful principle with more detailed guidance about how to apply and test materiality.^{xviii} Their principal is: “The report should cover Aspects that: Reflect the organization’s significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders.” (GRI-G4, 2013) Figure 6.6 depicts a materiality matrix that aligns with the GRI-G4 principle. The dots represent environmental, social, or governance materiality aspects objectively identified and positioned on the x-axis by the enterprise. The y-axis positioning of the aspects is not well defined and must deal with the issue of how to reconcile different assessments from different stakeholder groups.

[Insert Figure 6.6 GRI-G4 Materiality Matrix]

Figure 6.6 GRI-G4 Materiality Matrix



Source: Bellantuono, 2016, Creative commons, no permission required.

GRI in partnership with RobocoSAM reviewed materiality from multiple stakeholder perspectives in *Defining Materiality: What Matters to Reporters and Investors* (GRI, RobecoSAM, 2015). Bellantuono and colleagues conducted further research regarding both the qualitative and quantitative methods being used to assess materiality. They successfully piloted a multi-attribute group decision making approach that was relatively simple. This approach is helpful as it makes the process available to small and medium enterprises who otherwise didn't have the resources to conduct these reviews (Bellantuono, 2016).

Accounting and assurance

Both US and international accounting standards boards and their respective CPA authorities are all waking up to the realization that their current principles, standards and rules are in need of adaptation in order to deal with weaknesses and integrate new tools and technology relevant to identifying, assessing and integrating sustainability risks and opportunities within traditional accounting and assurance practices. Collaborations and efforts to bring alignment among the diverse and somewhat competitive professional associations and standards initiatives will be a welcome element toward improving sustainability performance management systems and reporting for the future.

Jane Gleeson-White thinks that accountants will become the leaders of a new sustainability revolution. She saw 2012 as the sea-change year with the forming of IIRC and an international movement to transform how corporate accounting is calculated and the rise of incorporating the effects on the environment to the accounting of national and global economies. She sees multi-capital accounting as only the second revolution in accounting since double-entry bookkeeping began. She sees the shift as being of seismic proportions and that it was driven by the 2008 financial crash and our ongoing environmental crisis. That these changes are profound and far-reaching, transforming the way the world does business, and the nature of capitalism (Gleeson-White, 2015).

Natural and Social Capital Accounting

Expanding our boundaries for financial measures will be an important advancement for making better sustainability-aligned economic choices. This broader mindset is becoming possible through recent methodology and indicator advancements for financially quantifying intangible value, the value of natural capital, and ecosystem services. Monetization efforts are one helpful step towards progressing ‘Doing Well and Doing Good’ strategies.

We appreciate that there are potential pitfalls from monetizing selected capital stocks and flows. They are subject to assumptions that are still relatively immature and difficult to calibrate. They have large confidence ranges. (See ecosystem services valuation example.) Natural and social capital systems also may not lend themselves to economic supply and demand responses. That said, they can help provide a compelling sustainability frame for current accounting systems.

The Natural Protocol Toolkit^{xix}

The WBCSD and the Natural Capital Coalition launched the *Natural Capital Protocol Toolkit*. The protocol is a standardized framework for measuring business impacts and dependencies on nature. The Protocol and Toolkit help businesses address natural capital depletion by improving understanding, measurement, and decision-making. The Toolkit is a free and interactive database with over 50 tools for businesses to use in exploring, experimenting with, and carrying out natural capital assessments across their operations. The toolkit will help any enterprise to better measure and assess broader financial risks and opportunities associated with natural capital and ecosystem services. Over time, the Toolkit will evolve and provide important data about which tools are the most commonly used by business.

TEEB Report: Natural Capital at Risk

The Natural Capital Coalition (TEEB) commissioned TruCost to apply their Guide to Corporate Ecosystem Valuation to estimate in monetary terms the financial risk from unpriced natural capital inputs to production, across business sectors at a regional level. TruCost used an environmentally extended input-output model (EEIO), to develop those estimates and at a high level, how these may flow through global supply chains to producers of consumer goods. It showed that some business activities do not generate sufficient profit to cover their natural resource use and pollution costs (TruCost, 2013).

The primary production and primary processing sectors analyzed in this study were estimated to have unpriced natural capital costs totaling US\$7.3 trillion, which equated to 13% of global economic output in 2009. The majority of unpriced natural capital costs are from greenhouse gas emissions (38%) followed by water use (25%); land use (24%); air pollution (7%), land and water pollution (5%) and waste (1%) (TruCost, 2013).

Environmental Profit & Loss^{xx}

The Environmental Profit and Loss analysis was conceived by PUMA Chairman, Jochen Zeitz and first conducted in 2010. The associated methodology were developed with the support of PricewaterhouseCoopers LLP and Trucost (Confino, 2011, May 16). Kering, the parent company for

Puma, has released its Environmental Profit and Loss Accounting methodology in an open source mode (Kering, N.D.). Kering has also made the methodology part of the Natural Capital Coalition's Toolbox resources. Because the methodology has continued to evolve since its launch, the results between Puma's original assessment and today's holistic assessment of the Kering value chain from extraction all the way through disposal. Kering publishes our Group EP&L on an annual basis. The EP&L is used as a day-to-day decision-making tool and is fully embedded into the business. The EP&L revealed that 93% of Kering's impacts lie in the supply chain and, in particular, from the production and processing of raw materials which represent 72% of the total. Their operations represent only 7% of the impacts. Kering focuses on solutions and leveraging change along the supply chain while avoiding high impact sources. Kering is currently expanding their natural capital accounting work to assess biodiversity and also linking natural capital accounting to Planetary Boundaries (WBCSD, N.D.). More information on the EP&L is available on the Living Fieldbook **[Insert L]**.

Revised global ecosystem services value measurement: US\$125 trillion per year

The Fieldbook 1st edition reviewed a 1997 study by world-leading ecological economist Robert Costanza and his colleagues (Costanza, 1997). That study said services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life-support system. They contribute to human welfare, both directly and indirectly, and represent part of the total economic value of the planet. Costanza and colleagues revised their study in 2014. They adjusted the two values for inflation and used 2007 US\$ to compare the revised estimate to the original. The 1997 estimate becomes \$46 Trillion when adjusted for inflation. The 1997 economy was also valued at about \$46 Trillion. The 2011 revised value of ecosystem services was \$125 Trillion and the entire global economy in 2011 was only \$75 Trillion. In the updated analysis, the value of ecosystem services (on which the entire global economy depends) was estimated to be two-thirds larger than the global economy itself. They also noted that between 1997 and 2007, there was between \$4.3 Trillion and \$20.2 Trillion loss of ecosystem services per year due to development and declines in productive lands. We'd suggest that's material. Very material..

The Living Fieldbook contains additional reference, case studies, and tools **[Insert L]**.

■ **Doing well and doing good: Measuring financial and social performance**

Even if we can never quantify [satisfaction or happiness]... as precisely as we currently quantify GNP... perhaps it is better to be vaguely right than precisely wrong.

Herman Daly

Doing Well and Doing Good companies are ready to break through in their performance. They are wealthy enough to resiliently take on more risk and responsibility. They have the freedom to move beyond the inhibiting beliefs of greed and welcome new opportunities to serve their stakeholders. Stage 3 companies have played the game well, but now see the need to change the rules of the game, or possibly play a different game altogether that better aligns innovative business models with sustainability-aligned outcomes and values. Performance success indicators expand their boundaries, and include measuring actions and performance towards mitigating global risks, and pursuing new opportunities aligned with societal goals.

This section again builds upon the strategic purpose and system construct presented in Chapter 3, the

performance management essentials, and each earlier stage strategy and performance management tools and insights. We build on these and outline measurement and reporting system design criteria and enhancements appropriate for supporting Bridge 3 Doing Well and Doing Good stage strategies. State 3 strategies are more holistic and interconnect with global risk insights. We introduce the World Economic Forum global risks report series as a tool for monitoring enterprise risks and assessing materiality. We share key questions now being asked by long-term institutional investors.

These questions backed by hundreds of influential investors and CEOs could trigger an accelerated shift from companies focused only on Doing Well pulling them into the Doing Well and Doing Good strategic realm. We also introduce the WBCSD's SDG Compass tool, and BASF's efforts to measure social impacts as best practices measuring business and social performance together. We close this section by calling out a few potential pitfalls of our current economic system whose feedback signals are known, but continue to cause headwinds with unintended consequences as we scale efforts to achieve the SDGs. See the Living Fieldbook for supplemental information. **[Insert L]**

Doing well and doing good measurement and reporting design criteria

The following are selected enterprise performance management and reporting system criteria construct items most relevant for enterprises formulating sustainability-aligned strategies for **Bridge 3, Doing Well and Doing Good**.

- **Performance management for Doing Well and Doing Good:** Their performance management systems interconnect and track external performance across their value chain and with the communities with whom they interact. In addition to measuring and reporting on all prior stage performance objectives, they are guided from a long-term triple-bottom-line global system context. Enterprises progressing at this level see their purpose as responsibly and synergistically contributing to the needs and wellbeing of customers and society.
- **System and data inventory review:** Stage 3 enterprises are already doing core data collection and performance management activities from all prior stages. The metrics and reporting systems appropriate for this stage of performance will likely interconnect with external “big data” sources, and include more complex product and service lifecycle impact assessments and full cost financial modeling.
- **Time horizons:** The SDGs are using 2030 or about 10-years as their horizon for Doing Well and Doing Good. Some thresholds, especially those interdependent with cash flow or the capital markets, may still be shorter. Environmental thresholds and climate change may have longer time horizons. The performance management systems however are now likely going to integrate with more real time artificial intelligence and automated decision tools—large big data collection technologies—that have the potential to disrupt current practices and enable transformational efficiencies and monitoring capabilities.
- **Strategic Goals and Resiliency:** Business goals and societal goals will converge. Climate change is a dominant common environmental risk with the goal of keeping temperature rise to less than 2 degrees. Closing the income and wealth gap is another commonly held goal. The entire set of 17 SDGs will be aggressively advanced over the next decade. They represent both risks and opportunities for resilient, synergistic, performance breakthroughs.
- **Boundaries, interconnections:** The boundaries of Bridge 3 travelers are expanding their

focus to include their holistic value chains and lifecycle impacts. The risk dimension of 6.3 is also holistically covered such that the entire business management system interconnects with global environmental, economic, and social systems.

- **Key performance indicators and priority capital stocks and flows:** Multi-capital accounting will be an evolving practice for all enterprises already following Bridge 3 strategies or which are going to be pulled onto this Bridge by institutional investors. Social performance criteria will be developed and monitored. More natural capital flows will be tracked across entire value chains.
- **Mental models:** Companies crossing the chasm of the tragedy of the commons must spend sufficient time determining their own historic exploitation of the commons and accept responsibility to end unjust, unequal, and overly privatized solutions. When they suspect system flaws they proactively engage, and take actions to improve and fix them. They take their perspectives to broader and longer-term visions that reveal synergistic and transformational opportunities.
- **Networks & Collaborations:** For Doing Well and Doing Good travelers, collaborative solutions are essential. No company and No Government can thrive alone. As such, innovative and large scale public, private partnerships will emerge. Avoiding the tragedy of the commons pitfalls that accompany most current privatization solutions— that exacerbate wealth divides and restrict access to the commons to the poor and middle class people— will be critical.

The World Economic Forum and enterprise risk assessment^{xxi}

Each year the World Economic Forum (WEF) conducts an assessment of the most significant global risks to business as determined by the business community itself. These reports are released in conjunction with the annual WEF gatherings in Davos, Switzerland. Reports include extremely insightful observations and trends gleaned from tracking global risks for over a decade. Over the past decade, the prevalence of ESG-related risks has steadily increased while the more traditional economic, geopolitical, or technological risks are less dominant. The 2008 Global Risk Report only included one societal risk — pandemics —in the top five risks in terms of impact. Ten years later, in the Global Risks Report 2018, four of the top five risks were societal or environmental, including extreme weather events, water crises, natural disasters, and failure of climate change mitigation and adaptation. These reports also highlight the interconnectedness that exists between the risks themselves — such as water crises and involuntary migration, and their interconnections to more aggregate global topics and trends.

The Global Risks Report 2018 is published at a time of global growth. The WEF members are business CEOs that view economic growth as being a good thing, but many also appreciate that there are many other potentially known and unknown consequences of growth that will need monitoring as well. (See the next section for more on macroeconomic indicators.) They say that any breathing space provided because of the current growth should not be squandered. They acknowledge an urgent need to face up to systemic challenges that have intensified over the past year amid proliferating signs of uncertainty, instability and fragility.

These WEF Global Risk reports should be used by enterprises that are thinking more strategically and holistically about global risks and opportunities as a frame and context within which their own strategies and performance can be formulated and gauged. It is not necessary that an enterprise measure all risks. Rather companies should use the list of potential risks for discussions, and to

assert that all the WEF risks were qualitatively reviewed. Then they can cite that only selected risks were determined to be of sufficient importance to include with their strategies and report disclosures.

The 2018 report covers more risks than ever, but focuses in particular on four key areas: environmental degradation, cybersecurity breaches, economic strains, and geopolitical tensions. They also released a new series called “Future Shocks”, cautioning against complacency, and emphasizing the need to prepare for sudden and dramatic disruptions (World Economic Forum, 2018). All of these perspectives will help shape resilient strategic plans and risk monitoring processes of enterprises with the purpose to Do Well and Do Good.

The Sustainable Development Goals (SDGs) and opportunity

The scale and ambition of the United Nations Agenda 2030 was expressed through the Sustainable Development Goals (SDGs) previously introduced in Chapter 3, and discussed throughout this book. The SDGs define global sustainable development priorities and aspirations for 2030 and seek to mobilize global efforts around a common set of 17 goals and 169 targets. The SDGs call for worldwide action among governments, business, and civil society to end poverty and create a life of dignity and opportunity for all, *within the boundaries of the planet* (www.17goals.org^{xxii}).

Like the WEF Global Risk Reports, the SDGs expand the challenges that must be addressed to eliminate poverty, and embrace a wide range of interconnected topics across the economic, social, and environmental dimensions of sustainable development. While they primarily target governments, the SDGs are designed to rally a wide range of organizations, and shape priorities and aspirations for sustainable development efforts around this common framework with shared goals.

As with all sustainability-aligned measurement systems, some precautionary thinking and acknowledgments of potential pitfalls is prudent. The United Nations has made economic growth a vital element of achieving several of the interconnected goals. The rates required for the goals are likely unrealistically high. We also note in the next section how economic growth measures are imperfect— and if used without proper context— can result in unintended, but knowable negative long-term consequences. We also note in the next section that growth does not necessarily lead to the desired outcome of reduced poverty.

The SDG Compass^{xxiii} [Insert T]

One extremely helpful resource, the SDG Compass, was developed by GRI, the Global Compact and the WBCSD. It is a knowledge-base to explain how the SDGs affect a business and provides tools to integrate the SDGs into a corporate strategy. The SDG Compass includes a pragmatic guidance document on how companies can align their strategies and implement the SDGs as well as measure and manage their contribution to the realization of the SDGs. The web resource features information for each SDG, including the role of business, and illustrative examples of business solutions, indicators and tools.

The SDG Compass guide presents five steps that assist companies in maximizing their contribution to the SDGs. The five steps rest on recognition of the responsibility of all companies to comply with all relevant legislation, respect international minimum standards, and address all negative human rights impacts. The SDG Compass is developed with a focus on large multinational enterprises. Small and medium enterprises and other organizations are also encouraged to use it as a source of inspiration, and adapt as necessary. The SDG Compass is designed for use at the entity level, but may be applied at product, site, divisional, or regional level as appropriate.

The five steps of the SDG Compass guide are:

1. Understanding the SDGs
2. Defining priorities to seize the most important business opportunities
3. Setting goals to help foster shared priorities and better performance across the organization
4. Integrating sustainability into the core business and governance, and embedding sustainable development targets across all functions
5. Reporting and communicating sustainable development performance to stakeholders using common indicators and shared set of priorities.

Measuring and Motivating Doing Well and Doing Good

Rank does not confer privilege or give power. It imposes responsibility”
Peter Drucker

We have introduced tools and perspectives about what the most critical global risks and global goals are for business. These can feel overwhelming or too removed from the day-to-day operations of a struggling small or medium sized company. As such, guidance developed by future thinking organizations and case examples of what leading companies are doing can help reduce this reaction and help any company continue to progress with its sustainability journey.

BASF: Integrating SDGs and measuring social impacts^{xxiv}

[Insert C]

BASF has developed a core corporate strategy that integrates sustainability risks and opportunities and is aligned with the UN SDGs. They have developed a “Value-to-Society” approach that provides a more comprehensive picture of BASF’s impacts along their value chain and demonstrates how chemistry is enabling sustainable growth. They see reducing their impact as being key to keeping and strengthening their license to operate (Wirtenberg, 2014).

The CEO Force for Good (CECP)^{xxv}: Encouraging companies to Do Well and Do Good

CECP is a CEO led coalition that believes that a company’s social strategy — how it engages with key stakeholders including employees, communities, investors, and customers — determines company success. Founded in 1999 by actor and philanthropist Paul Newman and other business leaders to create a better world through business, CECP has grown to a movement of more than 200 of the world’s largest companies that represent \$7 trillion in revenues, \$18.6 billion in societal investment, 13 million employees, and \$15 trillion in assets under management. CECP helps companies transform their social strategy by providing customized connections and networking, counsel and support, benchmarking and trends, and awareness building and recognition.

The explicit endorsement of Doing Good and Doing well that this network makes is a much needed pull to jolt all business leaders into a new reality. This new reality will have enterprises take more necessary risks and develop strategies to cross the chasm of the tragedy of the commons and guide them through the paradox of high returns and high anxiety to Do Well and Do Good.

Doing Good and Doing Well Precautions and Pitfalls

The tailwinds accelerating a transition from merely Doing Well and working within the constraints of our current economy and Doing Well and Doing Good are strong. However, the chasm of the tragedy of the commons and other headwinds associated with our current economy are also strong. The transition may get turbulent. We must remind ourselves of a few of these headwind measures that warrant continuous feedback signal monitoring as we simultaneously adapt our global economy, capital markets, employment and lifestyle /consumption mindsets to support a new way of being.

The Fieldbook 1st edition discussed GDP as a measure of economic performance, and introduced the Genuine Performance Indicator (GPI) as a more sustainability-aligned alternative. Additional macroeconomic indicators that enterprise must monitor include interest rates (Kosse, V. 2002), unemployment rates (Dixon, 2016, November 22), and income inequality (DeSilver, 2015, September 22) among others. We continue to raise awareness about the potential pitfalls behind the improper use and misunderstanding of the context behind each.

More information on each of these topics is provided on the living Fieldbook [\[Insert L\]](#).

■ **Thriving: Enlightened leaders establishing thresholds and context allocation methods**

The best way to predict the future is to create it.
Peter Drucker

Thriving is where the company is at once: accomplishing its purpose for its customers; having no net decline in natural capital; creating value; all while improving the wellbeing of its employees, customers and stakeholders. This Bridge completes the holistic arc of our journey. Enterprises achieving this level of performance are Thriving within their system’s context responsibility.

Companies operating with the strategic goals of Thriving will first and foremost be committed to science-based, strong sustainability business model constraints. Unlike all of the prior stage strategies, these companies realize that sustainable, Thriving, performance is not a competitive game being played by businesses. It is a long-term requirement for humans to continue to live on the planet. The Daly Triangle reminds us that natural capital is our ultimate means for sustaining life and enhancing human wellbeing. It is integral to every enterprise’s ability to preserve its license to operate in the long term. Some business and investment leaders are already working hard to design and pilot more enlightened economic and governance systems to support thriving companies.

Hundreds of leading companies have heard this message and are collaborating to set science-based environmental goals. At this time most companies are embracing science-based goals for GHG emissions and climate change. Simultaneously, other groups are collaborating to develop context-based allocation methods that allow individual industries and companies to evaluate their enterprise’s value chain impacts and resource requirements. The Future-fit Business benchmark initiative introduced in Chapter 3 and other tools are already available to help enterprises measure strong sustainability performance while avoiding crashing into vital capital constraints.

Thriving stage measurement and reporting system design criteria

The following are selected enterprise performance management and reporting system construct items most relevant for enterprises ready to take bold risks in order to explore the unknown frontiers of the fourth strategic Bridge stage of **Thriving**:

- **The purpose for Thriving:** Progressing the enterprises' natural capital impact to 0 or positive regenerative performance while sustaining or enhancing the wellbeing of its employees, customers and community stakeholders today without compromising the ability of future generations to Thrive.
- **Inventory practices:** Assess performance management practices for each of the multi-capital stocks and flows and carrying capacity thresholds where available.
- **Multi-capital accounting of vital stocks with most vulnerable threshold flows and/or greatest flow volatility.** Thriving companies will have performance management systems holistically-aligned with a multi-capital accounting framework that monitors the stocks, flows and thresholds of all the capitals.
- **Time horizons:** 2050 or longer for this mission. But as the WEF recommends our systems must be resilient and expect to adapt to “future shocks” that are unknown.
- **Strategic Goals and Resiliency:** At this stage, the Thriving goal for a resilient enterprise is for that enterprise to operate within the context-allocated planetary boundary environmental conditions, and be safely above all of the context-allocated social floor conditions. See the doughnut economics section for more specific environmental and social risk items.
- **Boundaries, interconnections:** The boundaries of Bridge 4 travelers are highly fluid. For the purpose of business management, we see the boundaries as being the entire enterprises value chain and lifecycle stages and all of the environmental, economic, and social issues or multi-capital risks at all cascading levels between the enterprise and the planetary systems.
- **Mental models:** Companies are still crossing the chasm of unknowns. They must learn to work productively in unstructured environments and make decisions with ambiguous criteria and incomplete information.
- **Networks & Collaborations:** At this stage our networks are inclusive. Adding networks such as the Future-fit Business Benchmark and Reporting 3.0 communities will be helpful for setting and monitoring threshold limits.

Science and strong sustainability

The Brundtland definition^{xxvi} is noble, but not testable; where's the target? Sustainability frameworks including The GRI, IIRC and SASB Sustainability Reporting initiatives and the aspirational UN SDGs help define, measure and monitor sustainability performance. That said, each perpetuates embedded mindset biases, or is beholden to a stubborn allegiance to a single bottom line, self-interest first, growth dependent, economic system. These frameworks are all alarming people who are disconnected from science-based insights regarding global realities and risks.

Social, science, and capital market transformation initiatives are already in progress now to define and produce powerful science-aligned sustainability performance measures and market mechanisms. These efforts are fragmented and have competing governance, stakeholder and scientific

perspectives, and are in different stages of design and application. Each also must acknowledge and manage significant uncertainties associated with foundational science-based thresholds, ethical and economic allocation approaches, and leave open the question of how aggressively to pursue them.

Strong versus weak sustainability

The concept of strong sustainability is based on the scientific fact that all human life and activity occurs within the limitations of planet Earth, or the 'biosphere' where human, plants, and other animals live. Without a functioning biosphere there can be no society, and without society there can be no societal functions, including an economy. The notion of the triple-bottom-line as normally presented using overlapping circles represents a weak sustainability oriented system.

Weak sustainability systems assume that natural capital can be substituted by other capitals and that there are no differences between the kinds of well-being they create. The economy's goal is growth through capital accumulation, and that the total value of the aggregate stock of capital should be at least maintained or ideally increased for the sake of future generations (Pelenc, 2015).

Strong sustainability systems believe that natural capital is more than a mere stock of resources. Rather, natural capital is a set of complex systems consisting of evolving biotic and abiotic elements that interact in ways that determine the ecosystem's capacity to provide human society directly and/or indirectly with a wide array of functions and services (Noël and O'Connor, 1998; Ekins et al., 2003; De Groot et al., 2003; Brand, 2009, Pelenc, 2015).

Table 6.2 Summarizes the main differences between weak and strong sustainability. In terms of scientific methodology, strong sustainability is greatly preferred as the perspective for establishing sustainability goals and performance metrics. Managing natural capital as the "critical" non-substitutable capital resource providing ecosystem services and sustaining human life itself should be embedded within societal beliefs and human behaviors.

[Insert Table 6-2 Weak versus Strong Sustainability]

Table 6.2: Weak Versus Strong Sustainability		
	Weak Sustainability	Strong Sustainability
Capitals Substitutability	Natural and other capitals are perfectly substitutable	Substitutability of Natural Capital is severely limited
Consequences	Technical innovation and monetary compensation for environmental degradation	Human actions can entail irreversible consequences

Sustainability Issue	Total value of aggregate stock of capitals should be maintained or ideally increased for future generations	Conserving irreplaceable stocks of vital natural capital for the sake of future generations
Key concept	Optimal allocation of scarce resources	Critical natural capital
Thresholds and environmental norms	Instrumental Rationality <i>(Technical and scientific approach for determining threshold)</i>	Procedural rationality <i>(Scientific knowledge as input for public deliberation)</i>
Source: Adapted from Pelenc, 2015		

Science and its role driving technological innovations will be an important element in achieving development goals and strong sustainability conditions. Eradicating poverty and hunger has been helped through new high-yielding varieties of rice that can withstand drought in Africa and flooding in Asia. Science is also helping African farmers, who lose as much as half of what they produce to pest infections, through new technologies for better biological pest control. Another area of scientific progress is in reducing childbirth mortality, thanks to the discovery of magnesium sulphate given to mothers immediately after birth, which is drastically reducing maternal deaths. (Naicker, 2015) Technological innovation that solves one— or even synergistically improves several of the world’s sustainability problems—also represents the biggest business opportunities of our time.

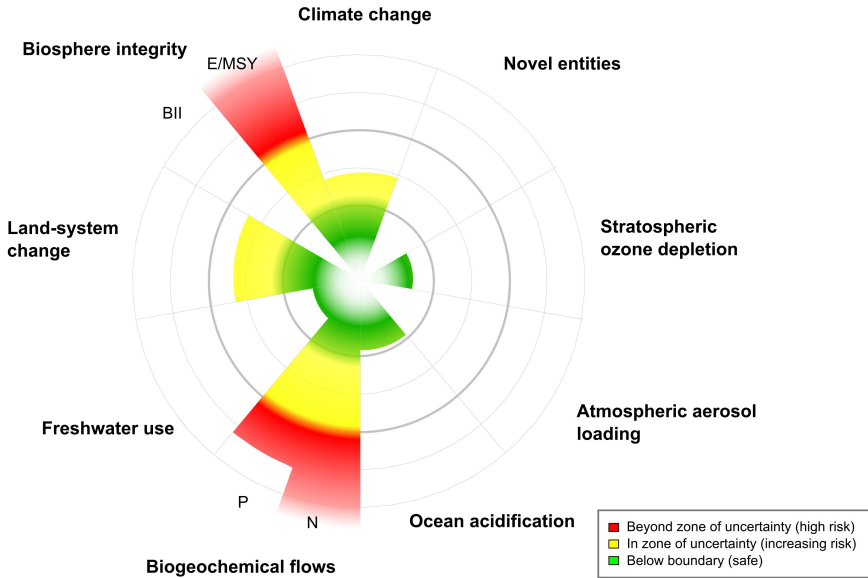
Planetary boundaries and The Stockholm Resiliency Center^{xxvii}

Stockholm Resilience Centre is a leader conducting transdisciplinary research. It advances the understanding of complex social-ecological systems to improve ecosystem management practices and long-term sustainability. Their research on Planetary Boundaries (PB) is the seminal work connecting strong sustainability ecosystem service risks and science-based goals with performance measures. The PB framework was first introduced in 2009, when a group of 28 internationally renowned scientists identified and quantified the first set of nine planetary boundaries.

Figure 6.7 depicts the most recent PB state. Four of nine planetary boundaries have already been crossed as a result of human activity (Steffen, 2015, February 13). The four are: climate change, loss of biosphere integrity, land-system change, and altered biogeochemical cycles (phosphorus and nitrogen). Two of these, climate change and biosphere integrity, are what the scientists call "core boundaries." Significantly altering either of these "core boundaries" would "drive the Earth System into a new state". Transgressing a boundary increases the risk that human activities could inadvertently drive the Earth System into a much less hospitable state, damaging efforts to reduce poverty and leading to a deterioration of human wellbeing in many parts of the world, including wealthy countries (Steffen, 2015, February 13).

[Insert Figure 6.7 Planetary Boundaries]

Figure 6. 7 Planetary Boundaries



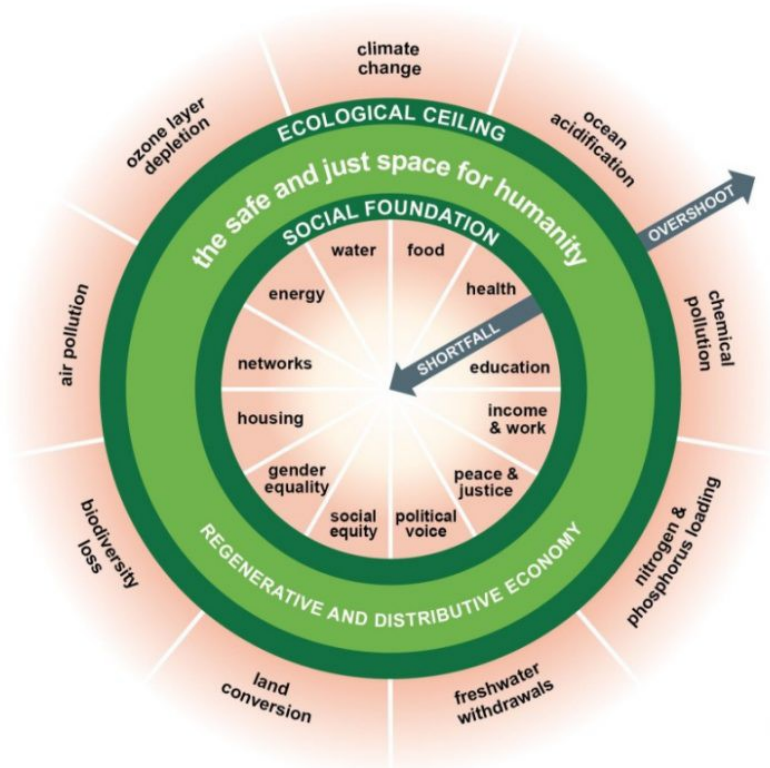
Source: Will Steffen, Senior Fellow, Stockholm Resilience Centre, with permission.

Social performance and Doughnut Economics

Kate Raworth, an economist and Senior Visiting Research Associate at the Environmental Change Institute of Oxford University, has developed a visualization of conditions that make a zone habitable for humanity. Raworth shows the zone where humanity thrives as a doughnut sandwiched between the environmental ceiling of planetary boundaries and the social foundation of governance and accessed ecosystem services. Figure 6.8 provides this Doughnut Economy visualization.

[Insert Figure 6.8 The Doughnut Economy]

Figure 6.8 The Doughnut Economy



Source: Raworth, K (2017) *Doughnut Economics: seven ways to think like a 21st century economist*, London: Penguin Random House., with permission

The inner circle contains the 11 dimensions of human deprivation, from Rio + 20 submissions. Social foundations of safety and justice are constructed on and with the availability of these 11.

The outer layer represents critical planetary boundaries. The safety zone for human prosperity is within the doughnut that lies between the environmental ceiling and the social foundation. It is within this doughnut that we make sustainable livelihoods and work “to eradicate poverty and inequity for all, within the means of the planet’s limited resources. (Raworth, 2017)

Future Earth: Scientists in service of sustainability^{xxviii}

Future Earth is a consortium based in five countries that came together between 2012 and 2015 to coordinate and steward several vital global scientific data collection and research initiatives necessary to assess the health of the planet. Future Earth builds on more than three decades of global environmental change research through the World Climate Research Program (WCRP), the International Geosphere-Biosphere Program (IGBP), DIVERSITAS and the International Human Dimensions Program on Global Environmental Change (IHDP). This is just one example of the type of scientific community collaborations that will be needed as we advance our understanding of planetary boundaries, natural capital carrying capacities and other interconnected global systems health monitoring.

Context-based Enterprise Goals and Indicators

Context-Based Sustainability (CBS)^{xxix} is an approach to enterprise sustainability accounting (and target setting) that takes social, economic, and environmental thresholds and limits in the world (upper and lower ones pertaining to vital resources or capitals) explicitly into account. It then allocates fair, just and proportionate shares of either the available capitals or the shared burden to maintain them to a specific enterprise (including its unique value chain system) in order to assess the sustainability (and at this point we are looking for Thriving) performance of enterprises. Mark McElroy and Bill Baue have been heroes leading both multicapitalism and CBS to better measure and assess strong sustainability performance (McElroy, March 10, 2011, Baue, 2017). Their efforts and a broader network of practitioners have been lobbying the GRI to more explicitly require context-based performance assessments by the users of that standard (McElroy, 2017). Like with materiality, GRI has developed a principle with guidance and a process for testing context when developing sustainability reports.^{xxx}

MultiCapital Scorecard™ (MCS)^{xxxi}

The IIRC framework and the GISR Ratings Standard endorse CBS and multicapital accounting, but are also only principles-based and non-prescriptive in this regard. Enterprises have been left to their own devices as to how to operationalize these principles. Operationalizing CBS principles and multicapitalism metrics raises some basic questions. What does it mean, for example, to assess performance in terms of multiple capitals and how might one do so in a formal or structured way? What exactly is the capital theory of performance and what are its practice implications? The MultiCapital Scorecard™ was created as an open source methodology and tool to answer these questions (McElroy, 2015).

In 2013, Thomas & McElroy LLC (T&M) was formed when Mark McElroy joined forces with Martin Thomas, a 30-year veteran of Unilever, with the express intent of developing a more complete, Triple Bottom Line implementation of Context-Based Sustainability (CBS). Ben & Jerry's had been an initial pilot company for applying CBS methods. It later became the first company in which the MultiCapital Scorecard™ was piloted. This tool is the first context- and multicapital-based integrated measurement, management, and reporting system. In practice, the MultiCapital Scorecard™ follows a three-step process:

1. Scoping and Materiality
2. Areas of Impact (AOI) Development, and
3. Scorecard Implementation

We have previously discussed scoping (the Business Management System (BMS) framework) and materiality assessments. Once a material set or portfolio of AOIs (A selected group of enterprise system aspects of the BMS) has been identified each of the associated AOIs must be further researched and developed in preparation for the role it will play in measurement and reporting. The MultiCapital Scorecard™ methodology does this in two parts. First is the specification of sustainability norms or goals and second is the development of an associated data collection protocol. They define Sustainability Norms (SNs) as standards of performance for what an organization's impacts on vital capitals must be in order to be sufficient, sustainable and supportive of stakeholder well-being. Sometimes, the SNs identified by an organization for particular AOIs will not be achievable anytime soon, in which case the MultiCapital Scorecard™ allows for the

specification of Trajectory Targets (TTs) as interim goals. (See the science based targets section next for examples of goal setting.) As with our smart bridge strategy from Chapter 3, this tool acknowledges that most organizations are not resilient enough to achieve Thriving performance all at once. It suggests that TTs be defined in a way that provides a transition pathway, or trajectory, from some current state of affairs to the target state represented by an SN.

Once SNs and TTs have been defined for individual AOIs, data collection protocols for each must be developed. A data collection protocol is a system for gathering the data required to describe an organization's impacts and populate a MultiCapital Scorecard™. Their data collection protocol includes people, process and technology dimensions. The people dimension will identify the parties responsible for gathering the data; the process dimension will determine when and how the data should be collected; and the technology dimension will specify the role of technology, if any, in capturing, computing and reporting the data required (McElroy 2015).

Operationalizing the MultiCapital Scorecard™ required a refinement to the definition of economic capitals from that of the IIRC and others presented earlier. Using their refined capitals definitions, the tool used another innovation to enable a performance scoring. They developed a 7-Point scoring schema in the MCS to assess performance towards achieving Sustainability Norms (SNs) and Trajectory Targets (TTs) (McElroy, 2015). These are exactly the kinds of pioneering efforts that help our entire universe of companies and ultimately the economy itself evolve to the next greener iteration.

Finally, there is nothing in the design of the MultiCapital Scorecard™ that calls for the monetization of impacts on capitals other than for financial capital itself. Instead, it calls for the identification of capital limits and thresholds in their own terms (e.g., gallons of water, tons of greenhouse gas emissions, product safety levels, conformance to ethical standards, etc.). Whether or not the use of natural capital is occurring at a sustainable rate, for example, may not necessarily be reflected in the price we put on it and instead will have everything to do with biophysical limits. The same is true for the other capitals and their own stocks and flows (McElroy, 2015). The Living Fieldbook also contains more information on the background and applications of the MultiCapital Scorecard™.

[Insert L]

Frameworks and collaborations advance thriving metrics

Accepting the sustainability challenge is daunting to many. It requires embracing and simultaneously coping with multiple 'wicked' problems with complex system boundary overlaps. Solving wicked problems requires system change and changing systems cannot be accomplished alone. Multi-disciplinary, multi-national and multi-generational collaboration between diverse stakeholders arriving at the table with different ethical, economic, and political philosophies is required. Add to that significant amounts of distrust, ignorance, short-term thinking and expectations of immediate and gratifying results, and we are challenged as never before.

Science Based Targets (SBTs) **[Insert T, C]**

The Science Based Targets^{xxxii} initiative introduced in Chapter 3 is a helpful collaboration advancing both the importance of respecting scientific trends and their respective environmental and social impact risks, and developing fair and relevant allocation schemes so that enterprises can set meaningful targets. There are several science-based target setting methods that fall under three main approaches. The first two are related to the 'carbon budget' – the remaining amount of carbon that can be emitted into the atmosphere to limit global temperature rises to well below 2 degrees Celsius.

- Sector-based approach: This divides the carbon budget by sector and then allocates it to companies in that sector.
- Absolute-based approach: This assigns to companies the same percentage of absolute emission reductions as is required globally – i.e. 49% by 2050 from 2010 levels.
- Economic-based approach: The carbon budget is equated to global GDP and a company's share is determined by its gross profit.

These approaches are similar to those being advanced by other initiatives developing context allocation schemes. We chose to showcase Mars as the case example here specifically because they saw science as being more than just carbon, and used the planetary boundaries as their framework for assessing risks and strategic actions.

Mars: Making an impact with operations and value chain^{xxxiii} **[Insert C]**

Mars is a family owned business with diverse products and brands including Milky Way, M&Ms and more. Mars wanted to help build a planet that is healthy and thriving and build a sustainable business. They are investing in renewable energy, improving conditions in their supply chains, and speaking out about climate change. Among other things, they make sure that the people they rely on — from smallholder farmers to suppliers — benefit from the growth of their business.

They acknowledge that they need to protect the earth so that there are fewer impacts for the people that live on it. To do so, they have chosen to focus their efforts using the “Planetary Boundaries” and set science-based targets to help them prioritize and decide what to do. With the Planetary Boundaries as their guide, they used internal information and public, accepted data, and were able to identify three broad areas in which they could make the biggest difference. They identified greenhouse gas emissions, impacts of water use, and impacts of land use. Over time, Mars has progressed and improved sourcing processes for palm oil, paper and pulp, beef, soy, rice, mint, fish, tea, coffee, and other raw materials.

Enterprises commit to thriving and Future-fit Business Benchmark^{xxxiv} **[Insert T]**

The Future-fit Business Benchmark Framework (FFBM), also introduced in Chapter 3, is one of the groups leading collaborations to establish enterprise goals and performance indicators that are science-based and also identify human wellbeing conditions. The FFBM framework was developed by scientists and used the Natural Step principles as its foundation. It is collaborating to co-create and refine an academically rigorous, systems-based framework to guide progress toward a flourishing and thriving future. Future-fit companies add value to the holistic system ensuring that business in no way hinders, and ideally contributes to, society's progress toward future-fitness. The Benchmarks help business measure – and manage – the gap between what they are doing today and what science tells us they will need to do tomorrow. The FFBM community is collaborating with the Reporting 3.0 community presented next and many others as well.

Reporting 3.0^{xxxv}

Reporting 3.0 is a global good initiative serving as a global platform to scout out and accelerate reporting innovations and help bring the global economy onto an inclusive, sustainable path. Like the other initiatives working to advance sustainability reporting, it sees a need for consolidation and convergence in the fragmented sustainability reporting market.

Global Thresholds & Allocations Council

Reporting 3.0 held a multi-stakeholder event in the first quarter of 2018 to initiate the Global Thresholds & Allocations Council (GTAC). The mission of this council is to establish an authoritative approach to reporting economic, environmental, and social performance in relation to generally accepted boundaries and limits. GTAC will operate as a partnership between leading organizations and individuals from science, business, investment, government, and civil society, focused on assessing and validating methodologies for allocating fair shares of responsibility to organizations for their impacts on the stocks and flows of capitals – natural, human, social, and other resources – within their carrying capacities. Building on related efforts to establish science-based targets, GTAC will be working to accelerate progress toward contextualizing company disclosures commensurate with the ecological, social, and economic urgencies facing societies and companies alike in the coming decades (Reporting 3.0., n.d.).

The Daly Hourglass

As part of their work developing a series of blueprints that advance distinct aspects of sustainability management and reporting, The Reporting 3.0 community did a virtual dialogue review of the Daly Triangle which was introduced in Chapter 2 and has been a guiding tool for this metrics and reporting chapter. They did not feel a triangle shape effectively visualized the thresholds concept. Their reassessment of the Daly Triangle resulted in the following three tweaks:

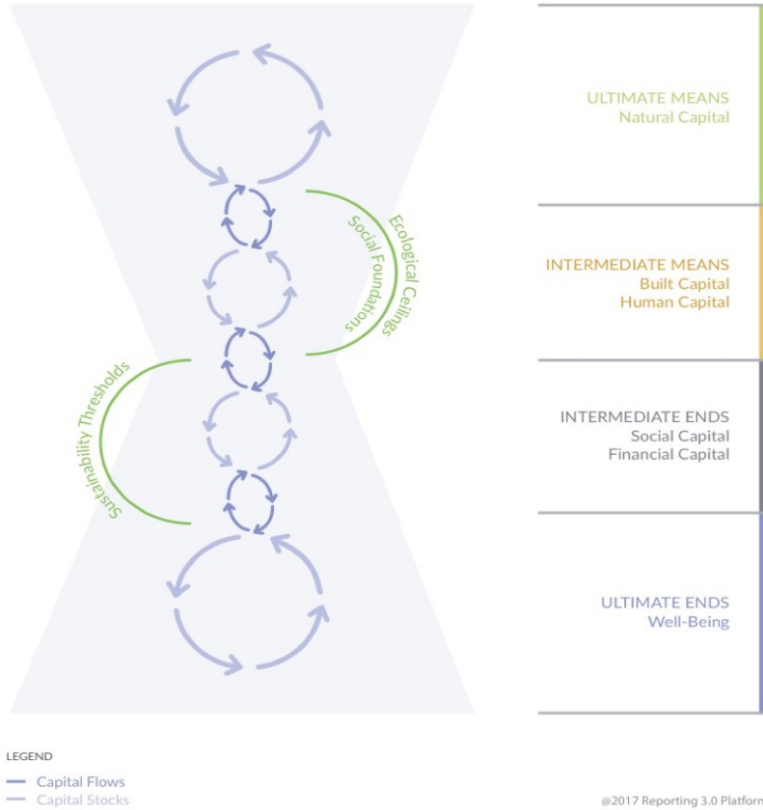
- They equalized their representation of the Ultimate Means (natural capital) and Ultimate Ends (well-being) by placing two triangles side-by-side and fusing them together to form an hourglass shape.
- They flipped the progression, with natural capital atop as the “sands” of capital resources that flow through the hourglass (which introduced a missing element of “time”).
- Finally, they introduced the sustainability thresholds using the ecological ceilings and social foundations established by Kate Raworth in Doughnut Economics.

They called the resulting graphic (Figure 6.9) the Daly Hourglass. Its highly significant meanings now underpins the advocacy for a design document (R3 Data Blueprint), a holistic integral information system which the Reporting 3.0 and collaborating community of partners is now hard at work creating (Baue, 2017).

[Insert Figure 6.9 The Daly Hourglass]

Figure 6.9 The Daly Hourglass

DALY HOURGLASS



Source: “Daly Hourglass,” Bill Baue, Blueprint 3. Data Integration, Contextualization & Activation for Multicapital Accounting, Reporting 3.0, 2017, with permission.

■ **Conclusion: *Measure what matters and manage it.***

Welcome to the still unstructured world of sustainability performance measurement and reporting. Numbers alone cannot capture the deepest meanings of sustainability. Yet we have little choice but to relentlessly pursue, and rely on, those quantitative and qualitative measures that will empower us to preserve that which is beyond measurement.

We have attempted to provide some context to impress upon you that measuring sustainability performance is good for your enterprise and vital to society. We know from experience with clients in every sector that the right metrics properly applied can help enterprises improve performance and align with the SDGs and strong sustainability goals. These topics, tools, and case stories present an initial system overview to get you started on your journey. Implementing and trusting technology-

enabled, sustainability-aligned performance management systems, even knowing their limitations and weaknesses, present our best understanding of current reality and help identify and prioritize the most desirable pathways ahead.

Executives managing change have long acknowledged the importance of metrics to assess baseline conditions and progress toward goals. Stage-appropriate measurement system criteria and implementation resources were presented for each of the four purposeful enterprise strategy Bridges. Beginners are comforted to see how much they were already doing and can fill in a few gaps to help see strengths and weaknesses and enhance material, energy, employee, customer, and financial performance.

For those already on this journey, this information helps you check your bearings. Do you feel better prepared to re-imagine your next destination and begin re-orienting your measurement and reporting systems? Tools such as the PivotGoals and SDG Compass are powerful and allow you to rapidly innovate, surpassing competitor performance, and delivering meaningful value to customers and society. We also have introduced networks of enterprises collaborating to advance the methods and standards for measuring and reporting sustainability progress.

We introduced the work of the Stockholm Resiliency Center, Future Earth, and the Global Thresholds & Allocations Council (GTAC) all working to measure and monitor planetary boundaries and carrying capacities. The Global Footprint Network's Ecological Footprint and its quiz showed us the gap between our current lifestyles and the capacity of the earth to regenerate the biocapacity resources required to support it. These science-based initiatives present alarming realities. The magnitude of the challenge and the ultimate performance gaps to be closed are substantial.

We also included comments alerting us to potential pitfalls associated with metrics systems generally and measuring sustainability performance specifically. We must acknowledge that metrics systems are subject to frauds and how much is simply unknowable. This is especially so when setting science-based goals, social service floors, and fair and equitable context allocations of resources and performance obligations.

Sustainability is an ever-changing end state in an unknowable future. The still limited monitoring of the resiliency of our planetary boundaries indicates that we are currently not responsibly caring for fragile life supporting ecosystems. The ecological footprint reminds us that we only have one planet Earth and we must preserve and regenerate its biocapacity while adapting our lifestyles to live within one planet biocapacity constraints. We can build upon the experience of NASA's Apollo mission and establish next "departments of it can't be done". Let's throw a victory party and then get busy reverse engineering the pathways to accomplish the SDGs and turn today's seemingly impossible environmental, social, and economic conditions into strategic opportunities and design specifications. Let's be optimistic, despite all the challenges we face, and be inspired by nature's resiliency and humanity's innovation as we systematically invent the future we want.

People are fond of counting their troubles, but they do not count their joys. If they counted them up as they ought to, they would see that every lot has enough.

Fyodor Dostoevsky

■ References

- Aronson, D. (2013): Sustainability Driven Innovation: Harnessing sustainability's ability to spark innovation. Deloitte
- Bellantuono, N., Pontrandolfo, P., & Scozzi, B. (2016). Capturing the Stakeholders' View in Sustainability Reporting: A Novel Approach. *Sustainability*, 8(12), 379. doi:10.3390/su8040379
- Baue, B. (2017): *Blueprint 3. Data Integration, Contextualization & Activation for Multicapital Accounting*. Reporting 3.0.
- Baue, B., Thurm, R. (August 11, 2017). How to Transform Today's 'Senseless' ESG Data into Tomorrow's Actionable Knowledge, Sustainable Brands
- Beer, S., & Lane, A. (1972). *Brain of the firm: the managerial cybernetics of organization*. London: The Penguin Press.
- Boerrigter, S. (2015). The use of the Sustainability Balanced Scorecard Framework for Dutch SMEs as a tool for measuring the performance of their sustainability strategy, 5th IBA Bachelor Thesis Conference, July 2, 2015, Enschede, The Netherlands. University of Twente.
- Brand, F. (2009). Critical natural capital revisited: Ecological resilience and sustainable development. *Ecological Economics*, 68, 605–612.
- Clark, G. L., Feiner, A., Viehs, M. (March, 2015) *From Stockholder to the Stakeholder: How sustainability can drive financial outperformance*. Arabesque Partners, Oxford University. Retrieved from: https://arabesque.com/research/From_the_stockholder_to_the_stakeholder_web.pdf
- Confino, J. (2011, May 16). *Puma world's first major company to put a value on its environmental impact*. The Guardian. Retrieved February 19, 2018, from <https://www.theguardian.com/sustainable-business/puma-value-environmental-impact-biodiversity>
- COSO, June 2017. *Enterprise risk management - Integrating with strategy and performance*, COSO.
- COSO, & WBCSD (2018). *Forthcoming draft application guidance: Enterprise risk management framework: Applying enterprise risk management to environmental, social and governance-related risks*, COSO, WBCSD.
- Costanza, R., d'Arge, R., de Groot, R., Farberk, S., Grasso, M., Hannon, B., et al. (1997, May 15). The value of the world's ecosystem services and natural capital. *Nature*, 387, 253-260.
- Costanza, R., Erickson, J., Fligger, K., Adams, A., Adams, C., Altschuler, B., et al. (2004). Estimates of the Genuine Progress Indicator (GPI) for Vermont, Chittenden County and Burlington, from 1950 to 2000. *Ecological Economics*, 51, 139-155.
- De Groot, R., Van der Perk, J., Chiesa, A., van Vliet, A. (2003). Importance and threat as determining factors for criticality of natural capital', *Ecological Economics*, 44, 187–204.
- DeSilver, D. (2015, September 22). The many ways to measure economic inequality. Retrieved February 19, 2018, from <http://www.pewresearch.org/fact-tank/.../the-many-ways-to-measure->

economic-inequality/

Dixon, A. (2016, November 22). Top 5 Problems With the Unemployment Rate. Retrieved February 14, 2018, from <https://smartasset.com/career/problems-with-the-unemployment-rate>

Eccles, R. and Krzus, M. (2015), *The Integrated Reporting Movement*, John Wiley and Sons, Inc., Hoboken, New Jersey.

Ekins, P., Simon, S., Deutsch, L., Folke, C., De Groot, R., 2003. A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecological Economics*, 44, 165–185.

Esty, D. C., Cort, T. (N. D.). *Corporate Sustainability Metrics: What Investors Need and Don't Get*. Yale.

Feinberg, C. (2015, May-June). The Science of Scarcity, *Harvard Magazine*, <http://harvardmagazine.com/2015/05/the-science-of-scarcity>

Figge, F., Hahn, T., Schaltegger, S. & Wagner, M. (2002). The sustainability balanced scorecard: Theory and application of a tool for value-based sustainability management. Presented at Greening of Industry Network Conference, Gothenburg, Germany.

Forum for the future (2011). The Five Capitals Model – a framework for sustainability, Brooklyn: Forum for the future.

Friend, G. (2008). EcoMetrics: Integrating direct and indirect environmental costs and benefits into management information systems. *Environmental Quality Management*, Volume 7, Issue 3 Spring 1998 Pages 19–30

Friend, G. (2004, June 30). How high the moon: The challenge of “sufficient” goals. *New Bottom Line*, 13(3). Retrieved January 29, 2008, from www.natlogic.com/new-bottom-line/v13/25-v13/194-new-bottom-line-volume-13-3.

Friend, G. (2012.). Is Your Value Stream Leaking? <http://natlogic.com/is-your-value-stream-leaking/>

Friend, G. (2017, December 21). Counting What Counts: The Evolution of New Metrics. *Sustainable Brands*. http://www.sustainablebrands.com/news_and_views/new_metrics/gil_friend/learning_count_what_counts_evolution_new_metrics

Gleeson-White, J. (2015). *Six Capitals, or Can Accountants Save the Planet?* W. W. Norton & Company

GISR (n.d.). Principles. GISR. Retrieved February 19, 2018, from <http://ratesustainability.org/core/principles/>

GRI-G4, (2013). Sustainability Reporting Guidelines — Reporting Principles and Standard Disclosures. <http://www.globalreporting.org/resourcelibrary/GRIG4-Part2-Implementation-Manual.pdf> (accessed on February 19, 2018).

GRI, RobecoSAM (2015). *Defining Materiality: What Matters to Reporters and Investors*, GRI,

RobecoSAM

IIRC, (2008). *The International IR Framework 2.1* p. 11, 12. IIRC.

Kering, (N. D.). Kering Environmental Profit & Loss (EP&L) Methodology & 2013 Results. Kering. Retrieved on February 20, 2018 from http://www.kering.com/sites/default/files/document/kering_epl_methodology_and_2013_group_results_0.pdf#page=24

Kosse, V. (2002). *Interest rates and their role in the economy during transition. The problem of high interest rates in the case of Ukraine*. The National University of Kyiv Mohyla Academy.

McElroy, M., Jorna, R., and Engelen, J. (2007). "Sustainability Quotients and the Social Footprint." Corporate Social Responsibility and Environmental Management, 2007. John Wiley and Sons Ltd.

McElroy, M. (March 10, 2011). Key Issues in Sustainability Metrics and Indicators, Presentation at Sustainability Leadership Forum Chicago, IL Center for Sustainable Business

McElroy, M. W. (October, 2014). Context-Based Monetization Curves: A Sustainability Model for Assigning Monetary Values to Organizational Impacts on Vital Capitals V1.4, Center for Sustainable Organizations.

McElroy, M. W., & Thomas, M. P. (2015). The MultiCapital Scorecard. *Sustainability Accounting, Management and Policy Journal*, 6(3), 425-438. doi:10.1108/sampj-04-2015-0025

McElroy, M. (November 7, 2017). *Is It Possible That GRI Has Never Really Been About Sustainability Reporting at All?* Sustainable Brands.

Meadows, D. H., Meadows, D. L., Meadows, J. R., and Behrens, W. W. (1972). *The Limits to Growth*. New York, NY: Universe Books.

Meadows, D. H. (1998). Indicators and Information Systems for Sustainable Development, Balaton Group

Meadows, D. H. (1999). Leverage points: places to intervene in a system. Hartland Four Corners, VT: Sustainability Institute.

Möller, A., & Schaltegger, S. (2005). The Sustainability Balanced Scorecard as a Framework for Eco-efficiency Analysis. *Journal of Industrial Ecology*, 9(4), 73-83. doi:10.1162/108819805775247927

Naicker I. (2015, May 24). The role of science in reaching development goals. Retrieved February 15, 2018, from <http://theconversation.com/the-role-of-science-in-reaching-development-goals-42071>

Nelson, M. (April 25, 2017). The Importance of Nonfinancial Performance to Investors, EY.

Noël, J-F., O'connor, M. (1998). Strong Sustainability and Critical Natural Capital. In: Faucheux, S., O'Connor, M., (Eds.), *Valuation for Sustainable Development: Methods and Policy Indicators*. Cheltenham, Edward Elgar Publisher, pp. 75–99.

Norgard, J., Peet, J., Ragnarsdottir, K., (February, 26, 2010) "The History of The Limits to Growth",

The Solutions Journal.

Pelenc, J., Ballet, J., & Dedeurwaerdere, T. (2015). Weak Sustainability versus Strong Sustainability . GSDR . Retrieved from <https://sustainabledevelopment.un.org/content/documents/6569122-Pelenc-Weak%20Sustainability%20versus%20Strong%20Sustainability.pdf>.

Rayworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist*. London: Random House Business.

Reporting 3.0. (n.d.). Global Thresholds & Allocations Council [Press release]. Retrieved February 14, 2018, from <https://reporting3.org/wp-content/uploads/2018/01/GTAC-ConceptNote-Final.pdf>

Rochlin, S., Bliss, R., Jordan, S., Yaffe Kiser, C. (2015). *Project ROI: Defining the Competitive and Financial Advantages of Corporate Responsibility and Sustainability*, IO Sustainability.

SEC (August 12, 1999). SEC Staff Accounting Bulletin: No. 99 - Materiality. Retrieved February 19, 2018, from <https://www.sec.gov/interps/account/sab99.htm>

Slavin, T. (February 4, 2018). Tim Mohin: 'The world doesn't need more CSR reports', <http://www.ethicalcorp.com/tim-mohin-world-doesnt-need-more-csr-reports>, Viewed on 020818

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M. Sörlin, S. (2015, February 13). Planetary boundaries: Guiding human development on a changing planet. Retrieved February 15, 2018, from <http://science.sciencemag.org/content/347/6223/1259855>

TruCost, (2013). *Natural Capital at Risk: The Top 100 Externalities of Business*, TEEB, WBCSD

Turner, Graham, (2008). "A Comparison of `The Limits to Growth` with Thirty Years of Reality". Commonwealth Scientific and Industrial Research Organization (CSIRO).

UNEP (2015). Raising the Bar: Advancing Environmental Disclosure in Sustainability Reporting, UNEP

United Nations, ESCAP. (2015). Integrating the three dimensions of sustainable development (Greening of Economic Growth). United Nations.

WBCSD. (n.d.). Retrieved February 20, 2018, from <http://www.wbcsd.org/Clusters/Natural-Capital-and-Ecosystems/Business-Examples/Kering-Environmental-Profit-and-Loss-EP-L-accounting>

WBCSD, CDSB, Ecodesk. (2018). *Corporate Reporting in the United States and Canada*, WBCSD, CDSB, Ecodesk.

Willard, B. (2012). *The New Sustainability Advantage: Seven Business Case Benefits of a Triple Bottom Line*, Gabriola Island, BC, Canada: New Society Publishers.

Wirtenberg, J. (2014). Building a Culture for Sustainability: People, Planet & Profits in a New Green Economy. Santa Barbara, Ca.: Praeger.

World Economic Forum. (2018). World Economic Forum 2018 Global Risks Report. Geneva: World Economic Forum.

■ Endnotes

- i SMART= Specific, Measurable, Attainable, Relevant, and Time-Bound
- ii The concept of multi-capitals was introduced with the Daly Triangle and stocks, flows and threshold performance were elements of systems. Both were previously introduced in Chapter 2 p. ff
- iii <http://searchcio.techtarget.com/definition/systems-thinking>
- iv <http://www.academyforchange.org/>
- v <http://www.footprintnetwork.org>
- vi <http://www.footprintcalculator.org/>
- vii <http://www.pivotgoals.com>
- viii <https://www.gapminder.org/ignorance/>
- ix The living Fieldbook includes twenty articles on the Pitfalls of Metrics by Matt Polsky et.al.
- x <http://www.sustainablebrands.com/>
- xi <https://www.greenbiz.com/>
- xii <https://shift.tools/>
- xiii www.globalreporting.org
- xiv www.sasb.org
- xv <http://integratedreporting.org/>
- xvi <http://ratesustainability.org/>
- xvii <https://www.reportingexchange.com/>
- xviii <https://g4.globalreporting.org/how-you-should-report/reporting-principles/principles-for-defining-report-content/materiality/Pages/default.aspx>
- xix <http://naturalcapitalcoalition.org/>
- xx <http://www.kering.com/en/sustainability/epl>
- xxi <https://www.weforum.org/reports/the-global-risks-report-2018>
- xxii <http://17goals.org/>
- xxiii <https://sdgcompass.org/>
- xxiv <https://www.basf.com/en/company/sustainability.html>

xxv <http://cecp.co/>

xxvi The Brundtland Commission, in a report often considered the beginning of the global dialogue on sustainability, recognized sustainable development as “a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs” (World Commission on Environment and Development, 1987 p. 25)

xxvii <http://www.stockholmresilience.org>

xxviii <http://www.futureearth.org/>

xxix <http://www.sustainableorganizations.org/>

xxx <https://g4.globalreporting.org/how-you-should-report/reporting-principles/principles-for-defining-report-content/sustainability-context/Pages/default.aspx>

xxxi <http://www.multicapitalscorecard.com/>

xxxii <http://sciencebasedtargets.org/about-the-science-based-targets-initiative/>

xxxiii <http://www.mars.com/global/sustainable-in-a-generation/our-approach-to-sustainability/planning-and-measurement>

xxxiv <http://futurefitbusiness.org/>

xxxv <https://reporting3.org/>