Material ESG Outcomes and SDG Externalities:
Evaluating the Health Care Sector’s Contribution to the SDGs

Costanza Consolandi(1), Himani Phadke(2), Jim Hawley* and Robert G. Eccles(3)

(1) Department of Business and Law, University of Siena (Italy)
(2) Senior Product Manager, TruValue Labs, San Francisco, CA
(3) Said Business School, University of Oxford, Oxford (UK)

*Corresponding Author, Jim Hawley, Head Applied Research, TruValue Labs, San Francisco, CA; Professor Emeritus, Saint Mary’s College of California.

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Abstract

The 17 United Nations Sustainable Development Goals (SDGs) have created a framework for environmental and social impacts, which many large institutional investors and an increasing number of corporations are using to guide their resource allocation decisions or highlight those already in place. In this paper, we argue that the SDGs have clarified certain elements that have been predominantly missing (or implicit) in many ESG (Environmental, Social, and Governance) standards and metrics, specifically focusing on the environmental and social externalities (social costs) created by companies.

Using a methodological framework that maps the SDGs and their targets to the 30 generic issues developed by the Sustainability Accounting Standard Board (SASB), this paper focuses on health care as a case to evaluate the contribution of companies in this sector to the SDGs for which their material issues, as defined by SASB, are relevant. Issues not considered material by SASB are also evaluated. In doing so, we highlight where private sector firms can be (and have been) contributing to SDG impacts. Where that is either not occurring or perhaps not possible, the paper points to the need for public sector activities.
Introduction

Amid the global profusion of ESG standards and metrics, the 17 United Nations Sustainable Development Goals (SDGs) have created a high-level framework for environmental and social impacts, which many large institutional investors and an increasing number of public companies state they are using to guide resource allocation decisions or highlight those already in place. Firms and investors are increasingly mapping what they do to the SDGs.

In this paper, we argue that the SDGs have clarified certain elements that have been predominantly missing (or implicit) in many ESG (Environmental, Social, and Governance) standards and metrics, focusing on the environmental and social externalities (social costs) created by companies. More specifically, the SDGs shed light on the social impacts (both positive and negative) created by corporate behavior, while also clarifying areas that remain unaddressed (whether or not those are due to secondary or tertiary effects of such behavior). Additionally, where externalities are absent, these gaps are highlighted by some of the SDGs as well. At the same time, SDGs have made the evaluation of the existing profusion of ESG standards and metrics more complex. One way of evaluating different standards and metrics from an impact point of view is to measure the impact of SDGs in relation to firm-specific performance. To this end, we observe how well the 169 SDG targets (or sub-goals) of the 17 SDGs map to the SASB (Sustainability Accounting Standards Board) ESG categories, specifically considering the case of the health care sector. We then use data from TruValue Labs’ 11-year database of the Russell 3000 companies to measure related ESG performance.
This enables both companies and investors to determine if environmental and social outcomes of a company’s operations and products are creating positive or negative externalities, or where there may exist specific gaps.

This paper shows that the ESG standards developed by SASB for the 79 industries (aggregated into 10 sectors) of the SASB Sustainable Industry Classification System (SICS)™ map well to the targets of the SDGs. We focus on health care as a case to evaluate the impact of companies in this sector in contributing to the SDGs for which their material issues, as defined by SASB, are relevant. Issues not considered material by SASB are also evaluated. The analysis is limited to SASB’s universe of sustainability issues, consisting of 30 broadly defined general issue categories (GICs) of environmental and social issues.

The paper is structured as follows. In Section 1, we review the profusion of ESG metrics and measures as the context for understanding the relation between SDGs and ESGs. Section 2 shows that while SDGs were initially motivated by and oriented towards the policy context, corporates and investors adopted SDG goals as part of their business practices, both in terms of words and, to a lesser degree, actions. Section 3 explains how we map SDGs to SASB generic ESG issues, which enables corporates and investors to determine if E and S impacts of a firm’s operations and products create positive or negative externalities, focusing on the health care sector for the SDG on health outcomes (SDG 3). Section 4 presents an analysis of the data and some implications. In Section 5, we briefly conclude before suggesting directions for future research based on this limited case study.

Section 1. The SDG Context: Profusion of ESG Standards and Metrics

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Researchers have long been noting that ESG (and socially responsible ratings, but also called sustainable and responsible ratings, responsible investment, and others) rating and ranking organizations (as well as indices) frequently rate the same corporation’s E, S and G elements differently (Kerber & Flaherty, 2017). This is true for those organizations that give overall ratings, as well as those that provide more granular ratings to specific E and S and G content (e.g., supply chain, board structure and performance, carbon use and mitigation). As Chiu (2010) noted in one study regarding company CSR reports (corporate social responsibility, increasingly seen as the corporate flip side of investor-oriented ESG), they are “selective, subjective and not comparable”. In much of the academic literature going back decades, CSR (as defined in a host of ways) has been the object of study, rather than ESG. What has been true for CSR applies as well to ESG raters and rankers: selective, subjective and not (easily or often at all) comparable. There is an increasing amount of academic and practitioner literature on ESG/sustainability raters, such as MSCI (including Innovest and KLD, acquired when MSCI bought Riskmetrics in 2010), Sustainalytics, Asset4 (acquired by Thomson-Reuters in 2009), and Vigeo Eiris.

At first glance, the ESG rating and ranking compatibility challenge stands in contrast to the high level of correlations among and between credit rating agencies for corporate default probabilities (Livingston, Wei, & Zhou, 2010). Yet a closer approximation of the ESG ratings’ general lack of correlation is found in the disagreements among credit rating agencies regarding areas such as corporate governance as well as in investment prohibitions and capital requirements among institutional investors (Cantor & Packer, 1997; Shin & Moore, 2003). It is likely that in the case of default the data is harder, timelier, and standardized, while in the latter cases, it is softer and more open to interpretation. Thus, a better parallel is between ESG raters...
and rankers and sell-side stock analysts who typically have significantly varying buy, hold, and sell recommendations, despite theoretically having access to similar if not identical information. This is also true of pure quant trading, with algorithms substituting for human calls.

Nevertheless, there are upwards of 600 products from over 150 organizations providing ESG data, and dozens of others that rank firms along a host of dimensions. From these hundreds of organizations, there are about 10,000 different ESG/sustainability key performance indicators. Another estimate suggests there were about 500 rankings, 170 ESG indices, over 100 ESG type awards, and at least 120 voluntary ESG/sustainability standards in 2015 (Global Initiative for Sustainability Ratings (n.d.); Mooij, 2017). In spite of the large number of data providers, raters, and rankers, the industry is quickly consolidating, with MSCI and Sustainalytics the current leading players. Although there is rapid rating industry consolidation, the problems of data quality and transparency have not changed. A simple illustration: KLD (as supplied by MSCI) data and Fortune Magazine’s Best 100 Firms has a correlation of only $r=14\%$ (Van den Heuvel, 2012).

Windolph (2011) summarizes six generic problems:

- **Lack of standardization.** There is a diversity of approaches, hence of results, little evaluation of the multiplicity of approaches, and no comparability. Comparability can be developed to some extent through elaborate mapping exercises, which many researchers do, but these inevitably involve inaccuracies and some guesswork.

- **Lack of transparency.** There is rarely full disclosure of methodology, criteria, or threshold values and levels.

- **Biases.** Biases exist along several dimensions.
o **Geographical bias.** As ESG is more developed in Europe, there is a tendency to use European standards.

o **Factor bias.** In some cases, there is no transparency regarding the weighting of various categories or the categories themselves. For example, some firms use economic as well as ESG factors while others focus mainly on their version of what is ethical and, for instance, may minimize environmental factors.

o **Selection bias.** Additionally, there can be bias towards investors or stakeholders. There is bias towards rating larger firms more positively as these firms report on ESG factors in greater proportion and in greater detail than smaller firms. This is sometimes called check the box bias or reporting bias.

- **Trade-off problems.** Some raters focus on a single, top level score, while others are very granular. There can be a tendency to add apples and oranges. For example, Wells Fargo & Company has historically done very well on diversity, including on its board. Yet as recent scandals reveal, the board and top leadership were flawed due in part to their long tenure and insular nature. Thus, diversity appeared strong (as a G factor), yet another G factor, tenure, was overly long compared to industry peers.

- **Lack of credible information.** This dimension has a number of elements. Some raters use questionnaires and interviews with firms, minimizing independent information. Others rely heavily on firms’ own sustainability reports. Some firms use only independent information. Few firms are transparent about their sources, the weighting of these sources and how, if not using pre-set mechanical weighting, interpretation plays a role.
• **Lack of independence.** In some instances, rating and ranking firms have connections with those they rate or indices they create and license (e.g., MSCI).

We would add to Windolph’s six problems two additional ones:

• **Delays in reporting.** Some data are available only annually, and there can be delays with obtaining this (dated) data.

• **Lack of auditing of self-reported data.** CSR/sustainability reports are neither standardized nor audited (with a few exceptions). For example, Boiral (2013) analyzes what he views as deeply flawed high ratings (A and A-) based on self-reporting for Global Reporting Initiative (GRI).

Another way to describe the problem is that on the one hand, there is a range of theorization of what ESG (or CSR/CSP) means. On the other hand, there are huge variations in how to measure (and weigh) factor definitions. These are referred to as the theorization (**a priori** definitions and categories) and the commensurability problems, respectively. Not surprisingly, multiple theorizations and difficult commensurability result in very low *convergence validity* among and between numerous possible ratings and indexes (Chatterji, Durand, Levine, & Touboul, 2014).

But even with similar definitions (theorizations), factor measurement (commensurability) varies considerably. Adding to this the problem of data input/transparency (what is being measured), it becomes clear that there are major problems. Few, if any, studies pay detailed attention to what and how data sources are used, a significant gap in the existing literature. We simply do not and cannot know what the input information is. Part of this lack of data transparency is due to most raters and rankers’ protection of their intellectual property and/or

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protection of data sources. The latter includes proprietary questionnaires sent to firms, and in some cases interviews and/or conversations with firm officials.

The absence of this type of standardization has typically been rectified either through mandates (governmental or otherwise, e.g., stock exchange listing requirements), mergers and market concentration (a few rating firms come to dominate market share), or the creation of a public goods standards. In the latter case, SASB stands out, more specifically its focus on communication of financially material information to investors. SASB’s increasing influence in the United States and elsewhere does not, however, resolve the data problem: What are the inputs? SASB’s approach solves or radically minimizes the commensurability and theorization problems and some elements of transparency due to its clear and granular identification of industry-specific material issues and performance measures. It also creates a public good potential in contrast to categories and data protected by intellectual property. We return to this below.

1.1 A Deeper Dive: Correlations and Information

Correlations. A number of studies have demonstrated the lack of correlations challenge, with some of the best focusing on a specific topic. For example, Semenova and Hassel (2015) examined the validity of environmental performance metrics, comparing KLD data as provided by MSCI, Asset4, and Global Engagement Services (GES). While the ratings have common high-level theorizations, the authors concluded that they do not converge. They argue that the three raters correlate strongly on performance and risk constructs (definitions/theorizations) when they analyzed data for the US MSCI World Index (2003 to 2011), but they diverge.
significantly when the authors’ analysis controls for company-specific characteristics (addressing some of the bias problems), such as size and profitability.

They conclude that strengths in KLD data as provided by MSCI focus on a company and a specific metric while concerns focus on industry wide elements (e.g., emissions, waste, chemical, compliance). Thus, KLD data as provided by MSCI capture historical performance, while GES and Asset4 focus more on environmental opportunity perspectives and future performance metrics.

Semenova and Hassel (2015) further concluded after a detailed examination that the reason for non-convergence lies in specific theorizations (compared to high-level agreements), which leads to commensurability issues. Thus, at a granular level (theorization) there is a priori divergence despite higher-level agreement. Specifically, they attribute the divergence among the three raters to conflating of environmental impact with environmental management. In this paper we distinguish between SDG impacts and ESG performance (mapped to SDGs).

In a similar vein, Dorfaleitner et al. (2016) examine the overall ESG and individual E, S, and G scores of Bloomberg, Asset4 and KLD data arriving at similar conclusions. While noting that all three raters define E issues along similar lines (e.g., emissions, water, waste, resource reduction, impact of products and services), the authors point out that Asset4 alone singles out animal testing, whereas Bloomberg and KLD focused only on regulatory compliance. On S issues, Asset4 and Bloomberg are more detailed than KLD.

In perhaps the most methodologically-developed study, Chatterji et al. (2014) examine three raters (Asset4, Innovest and KLD) and three indices (Dow Jones Sustainable Index, FTSE4Good and Calvert). They, too, begin by asking: “how much do we really know about
CSR?” Their conclusion was that we don’t really know much, because the convergent validity among these six is low. This is not only due to different theorizations, but because “all or almost all of the ratings have low validity”.

How does a researcher make sense of and analyze these types of dichotomous data, a problem that runs throughout rater and ratings comparisons? Without going into the methodological details, various techniques can begin to sort out these problems, starting with a joint probability of agreement followed by Pearson and Spearman correlations and concluding with pairwise tetrachoric correlations among the six indexes.

Chatterji et al.’s (2014) analysis found pairwise tetrachoric correlations for three years among the six raters, with a mean correlation of 0.30 (about two standard deviations). However, this also included some negative correlations, meaning what one rater found responsible another found “irresponsible”. Correlations (all types) were higher among U.S. based raters compared with European ones. Most agree that this stems from definitional practice/theorization and related weighting differences, as noted in the example above, where KLD (U.S.) weighted social higher than Asset4 (European), which weighted employment higher.

After normalizing theorization differences as best they could, Chatterji et al. (2014)’s final exercise was to measure commensurability. They found it to be low, as measurement and methods themselves were different. While this is an important finding, another aspect not examined in their study (and probably unknowable) is what data is being measured, in other words, what are the data inputs used among raters. That is, far more often than not, we simply don’t know the inputs being measured or evaluated. This brings us to the information and transparency problem.

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**Information and Transparency.** The SustainAbility organization published *Rate the Raters*, a five-part study conducted from 2010 to 2012, finding similar results to those noted above. (SustainAbility, 2010). Yet unlike much of the academic and recent practitioner critiques, the reports pointed out several related concerns regarding information. For instance, there was no standard among raters for distinguishing between disclosure (e.g., of carbon) and performance (e.g., trends to lower carbon emissions), and no consistency as to how (or whether) to weigh each of them.

They found that about 60% of raters in 2010 depended overwhelmingly on corporate self-disclosure, either in CSR reports or similar publications, or in response to requests for information and interviews from firms. Indeed, they also found that firms that responded to information requests fared better in ratings than firms that did not respond (selection bias). Of the 120 raters examined, about half relied only on public information sources, and the other half on either corporate self-disclosure alone or some combination of the two. They found that only “a few” raters adequately disclosed information (sources and methods) so that users could understand how the ratings were constructed (SustainAbility).

SustainAbility’s critique of the information problem logically led them to conclude that the rating industry must get beyond the “black boxes” of information. They recognize that the intellectual property of these raters resides in their proprietary data sources and methods, but that is of little solace to the users and consumers of such ratings, as they have tremendous difficulty trying to interpret raters’ typically differing conclusions and recommendations.

1.2 Methods, Metrics and Data: The Take Away

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Standardization/theorization along with a materiality focus are important in cutting through the noise and profusion of metrics while also identifying overlap between societal stakeholder interests and interests of shareholders (in other words, identifying where companies today have incentives to act on environmental and social issues). Yet we recognize that the materiality approach has some limitations, particularly in achieving societal objectives as defined by the SDGs. There may be areas related to the SDGs where companies can indeed act, however they may lack incentives, or their impact may be limited. This study’s mapping helps identify these limitations and provides direction for public policy or impact investors to nudge companies in areas where they don’t currently have incentives, or to develop public sector/NGO solutions where, even if companies do act, they will have limited impact. However, from an investor point of view, the growing influence of SASB has a public goods advantage, both in the United States and increasingly in other countries. If SASB (or others who may come along) can develop a widely accepted (or mandated) set of specific materiality-based standards (a public good), focus will subsequently be on data inputs and analyses into these financially oriented materiality categories for what appears to be a more unified financial-investor client audience. In public goods standardization, information will increasingly come to the fore. SDGs, too, are public good categories.

A corollary to the standardization argument is the likelihood that the terrain of ratings and ranking competition will shift from theorization to commensurability. If this is correct, the field is open to a paradigm shift in how ESG is conceived, analyzed and measured.

Section 2. The Importance of the SDGs to the Private Sector

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The 17 SDGs for 2030, adopted by the 193 countries of the UN General Assembly on September 15, 2015, have been described as “the closest thing the Earth has to a strategy” (PwC, 2017). They are about making the world a better place for this generation as well as future generations. Better is defined by the 169 targets for these 17 SDGs.

The SDGs succeed the eight Millennium Development Goals (MDGs) for 2015 that were adopted in 2000. Opinions vary on how successfully the MDGs were achieved with the common consensus being that “progress was made but not enough” (e.g., World Vision International, 2015). Some argue that the reason for this is that the private sector had no meaningful involvement in the development of the MDGs. It has also been pointed out that governments failed to provide the necessary funding support (e.g., Speri, 2013). Even if they had, the numbers were in the billions, not trillions.

In contrast, the United Nations has called out a $2.5 trillion annual funding gap that must be closed in order to deliver upon the SDGs (Convergence & the Business and Sustainable Development Commission, 2017). It is widely believed that the private sector can and should fund a significant percentage of this gap. Fortunately, the private sector had a much bigger role in developing the SDGs. Its involvement continues such as through the Private Sector Advisory Group established by the SDG Fund (e.g., Norges Bank, 2018; PIMCO 2017a, 2017b; Price, 2017).

Somewhat ironically, while it was largely the corporate part of the private sector rather than the investment community that was involved in developing the SDGs, there is much more excitement in the investment community than the corporate community about them. Many investors see them not only as a useful framework for thinking about their portfolios, but also as

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useful for identifying system-level issues that must be addressed concerning the “State of the World”. Very large asset owners and asset managers cannot diversify away from system-level risks such as climate change and rising inequality (Hawley & Williams, 2000; Hawley & Lukomnik, 2018). The system level is particularly important for those with a long-term horizon and some investors even see the SDGs as helping to identify investment strategies, such as thematic strategies for renewable energy companies.

Even the world’s largest corporations can do little to affect the State of the World on an individual basis. And while they may recognize the importance of a long-term perspective, they still feel pressure from shareholders to deliver returns, especially in the short term. This poses a dilemma for companies: how can they support the SDGs while still delivering returns to shareholders? While investors may be enthusiastic about the SDGs, most of the money devoted to achieving them will come from the resource allocation decisions made by the companies in which they invest. Thematic strategies, impact investing, and infrastructure investing are and will likely remain a small proportion of an investor’s total portfolio, most of which is in public equity and public debt.

One solution to resolving this dilemma starts by recognizing that companies must pick and choose which of the SDGs, and which targets within each SDG, are most relevant to them given their industry and strategy. This can be achieved by first, identifying the material environmental, social, and governance issues that create value for shareholders and, second, by identifying which SDGs and targets these material issues impact. This provides a narrative about the relationship between the material ESG issues that investors care about and the SDGs targets and externalities to companies, which the world cares about. Companies can use this in assessing...
and reporting how their value creation activities contribute to the SDGs. Investors can use this to evaluate the impact of their portfolios. This mapping also has implications for policymakers regarding remaining gaps in achieving the SDGs, which we discuss further below.

Section 3. Framework for Evaluating ESG Performance in the Context of SDG Impact

Mapping the SDGs to a SASB framework aids in resolving theorization and commensurability problems when combined with data transparency including as can be provided by new technologies (big data mining and analytics). We thus develop a framework to evaluate company performance on a material ESG performance dimension and the SDGs impact dimension. This framework also exposes gaps requiring policy intervention, investor engagement, or other alternatives. Rather than adding to the profusion of ESG and SDG metrics and concepts, we argue that this exercise selects some existing standards and products based on their ability to resolve some of the difficulties in sustainability performance evaluation and presents them in a useful manner not previously undertaken.

SASB’s Materiality Map and 30 GICs, organized in terms of the categories of environment, social capital, human capital, business model and innovation, and leadership and governance, provide a useful tool to conduct an SDG-ESG mapping and enables comparison across sectors. SASB’s standards were developed to measure investor oriented materiality (SASB, 2017) and not sustainability impacts. However, marrying that framework of 30 general issues and industry subsets of material issues to the SDGs provides a powerful tool and starting point to focus on the most pertinent and influential environmental and social SDG issues by
industry. Looking beyond material issues to what could be considered ‘immaterial’ ones related to the SDGs could additionally help to identify areas where a company might have only marginal influence (for example due to the nature of its products or activities), or where the issue is not a focus of its business because of the lack of related financial incentives or disincentives. In such circumstances, a focus on public policy becomes evident.

This has been first explored by DeMates and Phadke (2017), who mapped SASB’s 30 GICs to the 17 broad goals of the SDGs, and by Betti, Consolai, and Eccles (2018), who went further and mapped the GICs to specific targets for each SDG.8

Nevertheless, due to the breadth of each SDG, they encapsulate several SASB categories. In several cases, specific topics within a SASB general issue category may be relevant to that SDG rather than the broad conceptualization of the category. For example, Customer Welfare or Product Quality and Safety are relatively broad categories, covering specific topics such as the use of chemicals in products, harmful product malfunctions, and drug safety issues, among others. Therefore, when analyzing individual sectors and industries, it might be necessary, in some cases, to adjust the previous mappings to take into account the specific activities, products, and topics applicable to those industries, as discussed by SASB in its individual industry standards.

As discussed in Betti et al. (2018), if good metrics existed for company performance on their material issues, one could use these ESG measures as proxies for SDG impact: a firm’s negative and positive externalities. The latest machine-learning and natural language-processing technologies are making possible the evaluation of company performance on material issues in the absence of market-wide adoption of specific SASB metrics. Even with such adoption, new

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technologies can allow investors to assess company performance from third party perspectives and with greater frequency than traditional data. TruValue Labs is one provider which offers such a data set.\textsuperscript{9,10}

We use this data from TruValue Labs to evaluate the SDG impact in one sector as an exploratory case, focusing on the Healthcare sector and SDG 3: “Ensure healthy lives and promote well-being for all at all ages” (see appendix for SDG targets and a mapping of SASB GICs relevant to SDG 3 to those targets). In doing so, we provide a framework for identifying specifically where private sector companies can make a meaningful contribution to the SDGs. The framework allows one to analyze where incentives are currently in place for companies to contribute to the SDGs, primarily in the form of material ESG factors as identified by SASB, and to identify gaps wherein policy intervention or investor engagement may be necessary to achieve the SDGs in the absence of such incentives. This framework also provides a useful way for companies to cut through the confusion around where SDGs fit into their existing and planned ESG activities and reporting. Additionally, it provides a transparent manner in which companies can be evaluated for their ESG and SDG performance.

**Section 4. Analyzing ESG performance and SDG impacts for the Healthcare Sector**

Our analysis of how ESG performance measures relate to SDG impacts is based on those companies of the Healthcare sector (as defined by SASB’s SICS)\textsuperscript{11} included in the Russell 3000 and scored by TruValue Labs from January 2007 to February 2018. The original sample size included 545 firms. Nevertheless, as in Malinak, Du and Bala (2018), we ensure statistically
robust information quality by applying a volume filter and including in our analysis only those firms in the top 40% by article volume,\textsuperscript{12} leading to a final sample of 307 firms.

The distribution of the sample among the different industries of the Healthcare sector (Table 1) shows that our sample is quite unbalanced, with around 80% of the sample represented by only three industries (Medical Equipment, Biotechnology and Pharmaceuticals) out of seven, accounting for 34% of total market capitalization yet only 5% of total revenues in the sample. Despite the very low number of companies in the Drug Retailers industry (only 2), it accounts for almost 40% of market capitalization and revenues.

Table 1: Sample distribution - Healthcare sector companies in the Russell 3000

<table>
<thead>
<tr>
<th>Industry</th>
<th>#of data points</th>
<th>#of companies</th>
<th>Mkt cap*</th>
<th>Revenues*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of data points</td>
<td># of companies</td>
<td>Mean</td>
<td>%</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>7,551</td>
<td>27%</td>
<td>84</td>
<td>27%</td>
</tr>
<tr>
<td>Drug Retailers &amp; Convenience Stores</td>
<td>244</td>
<td>1%</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Health Care Delivery</td>
<td>3,499</td>
<td>12%</td>
<td>42</td>
<td>14%</td>
</tr>
<tr>
<td>Health Care Distributors</td>
<td>627</td>
<td>2%</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>Managed Care</td>
<td>1,577</td>
<td>6%</td>
<td>16</td>
<td>5%</td>
</tr>
<tr>
<td>Medical Equipment &amp; Supplies</td>
<td>9,614</td>
<td>34%</td>
<td>95</td>
<td>31%</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>5,286</td>
<td>19%</td>
<td>61</td>
<td>20%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>28,398</td>
<td>100%</td>
<td>307</td>
<td>100%</td>
</tr>
</tbody>
</table>

*millions of USD

In terms of material ESG performance, the distribution of material ESG performance scores (based on TruValue Labs’ Insight scores for each company, considering only all the material issues per company as defined by SASB’s Materiality Map) across industries shows that the highest score on average is in Managed Care and Pharmaceuticals industries, whereas the
lowest score is in Drug Retailers and Health Care Distributors industries. The latter is also the industry with the highest standard deviation (Table 2).

Table 2: Material ESG performance scores

<table>
<thead>
<tr>
<th>Industry</th>
<th>Material ESG performance scores</th>
<th>mean</th>
<th>median</th>
<th>min</th>
<th>max</th>
<th>st.dev</th>
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</thead>
<tbody>
<tr>
<td>Biotechnology</td>
<td>61.03</td>
<td>63.24</td>
<td>2.79</td>
<td>97.51</td>
<td>15.79</td>
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<tr>
<td>Drug Retailers &amp; Convenience Stores</td>
<td>55.54</td>
<td>57.46</td>
<td>28.38</td>
<td>70.21</td>
<td>8.89</td>
<td></td>
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<tr>
<td>Health Care Delivery</td>
<td>61.28</td>
<td>62.04</td>
<td>9.84</td>
<td>99.82</td>
<td>14.63</td>
<td></td>
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<tr>
<td>Health Care Distributors</td>
<td>55.11</td>
<td>56.93</td>
<td>14.14</td>
<td>89.21</td>
<td>17.04</td>
<td></td>
</tr>
<tr>
<td>Managed Care</td>
<td>65.55</td>
<td>66.27</td>
<td>40.50</td>
<td>95.91</td>
<td>9.21</td>
<td></td>
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<tr>
<td>Medical Equipment &amp; Supplies</td>
<td>61.91</td>
<td>63.74</td>
<td>3.71</td>
<td>96.50</td>
<td>15.93</td>
<td></td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>64.68</td>
<td>65.67</td>
<td>2.02</td>
<td>97.16</td>
<td>15.32</td>
<td></td>
</tr>
<tr>
<td><strong>Avg. Healthcare</strong></td>
<td><strong>60.73</strong></td>
<td><strong>63.88</strong></td>
<td><strong>2.02</strong></td>
<td><strong>99.82</strong></td>
<td><strong>15.42</strong></td>
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</tbody>
</table>

Considering only performance on ESG material issues, all industries in the Healthcare sector display positive performance on average, represented by mean scores above 50. However, Table 2 shows that score distributions within industries vary significantly, with a minimum performance score of 2.02 in the Pharmaceuticals industry and a maximum performance score of 99.82 in the Health Care Delivery industry. This indicates potential for investors to select top performing companies on material ESG issues and engage with or exclude bottom performers within an industry or sector.

By themselves, unadjusted, the material ESG performance scores do not identify what impact a company is having on a particular or all SDGs and their targets. To understand the link between ESG performance and progress towards the SDGs (impact), it is useful to look at SDG impact indexes formulated in Betti et al. (2018).

Table 3 shows the values of one such index, the Average Industry SDG Target Impact Index (AISTII) for the Healthcare sector. According to Betti et al. (2018) the AISTII is the ratio, Patent Pending.
multiplied by 100, between the number of material issues of an industry impacting all the SDG Targets and the number of the total SASB GICs impacting all the SDG Targets. This ratio indicates the scope of impact that an industry can have across all SDGs when considering only its material issues and taking into account specific SDG targets for each SDG. An AISTII lower than 50 means that the majority of the SDG impact of an industry comes from non-material ESG issues, as defined by SASB. We see from the table that this is the case for all Healthcare sector industries other than Biotechnology and Pharmaceuticals, which is also reflected in the average Healthcare AISTII being lower than 50.

**Table 3: Average Industry SDG Target Impact Index (AISTII)**

<table>
<thead>
<tr>
<th>Industry</th>
<th>AISTII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotechnology</td>
<td>55.84</td>
</tr>
<tr>
<td>Drug Retailers</td>
<td>23.13</td>
</tr>
<tr>
<td>Health Care Delivery</td>
<td>26.64</td>
</tr>
<tr>
<td>Health Care Distributors</td>
<td>14.49</td>
</tr>
<tr>
<td>Managed Care</td>
<td>15.19</td>
</tr>
<tr>
<td>Medical Equipment</td>
<td>46.96</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>55.84</td>
</tr>
<tr>
<td><strong>Avg Healthcare</strong></td>
<td><strong>34.01</strong></td>
</tr>
</tbody>
</table>

We can disaggregate this to look at SDG impacts at the target level for a specific SDG. This can help with more granular guidance for investors and policymakers on what is possible in terms of SDG targets through performance focused on material ESG issues.

In Table 4, we consider the impact index taking into account material ESG issues per industry as they map to the specific targets of SDG 3. As with Table 3, an impact index lower
than 50 implies that a majority of the impact on SDG 3 and its targets derives from the industry’s non-material issues. The highlighted cells in Table 4 indicate where this is the case.

Table 4: SDG 3 - Industry (Sector) SDG Target Impact Index (ISTII and SSTII) and Industry (Sector) Target Impact Index (ITII and STII)

<table>
<thead>
<tr>
<th>SDG3 ISTII</th>
<th>Biotech</th>
<th>Pharma</th>
<th>Medical Equipment</th>
<th>Health Care Delivery</th>
<th>Health Care Dist.</th>
<th>Managed Care</th>
<th>Drug Retailers</th>
<th>SDG3 SSTII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target 3.1 ITII</td>
<td>70.00</td>
<td>70.00</td>
<td>60.00</td>
<td>40.00</td>
<td>20.00</td>
<td>30.00</td>
<td>40.00</td>
<td>47.14</td>
</tr>
<tr>
<td>Target 3.2 ITII</td>
<td>66.67</td>
<td>66.67</td>
<td>66.67</td>
<td>44.44</td>
<td>22.22</td>
<td>33.33</td>
<td>44.44</td>
<td>49.21</td>
</tr>
<tr>
<td>Target 3.3 ITII</td>
<td>50.00</td>
<td>50.00</td>
<td>33.33</td>
<td>33.33</td>
<td>0.00</td>
<td>33.33</td>
<td>0.00</td>
<td>28.57</td>
</tr>
<tr>
<td>Target 3.4 ITII</td>
<td>66.67</td>
<td>66.67</td>
<td>60.00</td>
<td>33.33</td>
<td>20.00</td>
<td>20.00</td>
<td>26.67</td>
<td>41.90</td>
</tr>
<tr>
<td>Target 3.5 ITII</td>
<td>77.78</td>
<td>77.78</td>
<td>66.67</td>
<td>33.33</td>
<td>22.22</td>
<td>33.33</td>
<td>33.33</td>
<td>49.21</td>
</tr>
<tr>
<td>Target 3.6 ITII</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Target 3.7 ITII</td>
<td>100.00</td>
<td>100.00</td>
<td>50.00</td>
<td>50.00</td>
<td>0.00</td>
<td>50.00</td>
<td>0.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Target 3.8 ITII</td>
<td>71.43</td>
<td>71.43</td>
<td>57.14</td>
<td>42.86</td>
<td>14.29</td>
<td>42.86</td>
<td>42.86</td>
<td>48.98</td>
</tr>
<tr>
<td>Target 3.9 ITII</td>
<td>57.14</td>
<td>57.14</td>
<td>57.14</td>
<td>21.43</td>
<td>21.43</td>
<td>7.14</td>
<td>28.57</td>
<td>35.71</td>
</tr>
</tbody>
</table>

For example, taking Target 3.8 (“Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all”), SASB’s Access & Affordability Patent Pending
category is the most directly pertinent to this target for the Health Care sector; other relevant ones include Customer Welfare (related to drug safety and quality of patient health outcomes), Product Quality & Safety, Supply Chain Management (as it relates to compromised or counterfeit drugs), Employee Health, Safety, and Well-being (to the extent that employers provide access to essential health care services), and Environmental, Social Impacts on Assets & Operations (mostly for the Health Care Delivery and Managed Care industries where climate change impacts influence their operations and the accessibility and quality of care).

If we consider the Health Care Distributors' industry, their target impact for Target 3.8 is only 14.29 according to Table 4. Access & Affordability is not considered material to that industry according to SASB’s assessment of materiality. However, while performance on access and affordability issues may not have a significant impact on a health care distributors’ bottom line, it certainly influences the achievement of Target 3.8. A vast majority of the impact on Target 3.8 for this essential component of drug and medical equipment supply chains comes from the industry’s non-material issues.

Table 4 shows that about half of the impact on Target 3.8 from the Healthcare sector comes from health care industries’ non-material issues. In fact, the same can be said in general of the entire sector and its impact on SDG 3 overall. Material issues account for only about 42% of the impact on SDG 3. Only in the case of Biotechnology, Pharmaceuticals, and Medical Equipment industries would improved performance on material ESG issues translate into improving SDG 3 impacts.

Healthcare companies are likely to focus their efforts to improve performance on their material ESG issues, because their incentive is the resulting improved financial performance. We Patent Pending
cannot reasonably expect significant ESG improvement if companies view actions in these areas as non-material. This is likely to be the case, especially due to the increasing focus on materiality in corporate ESG reporting and related investor engagement and decision-making. This creates a gap between SDG expectations and company actions. Table 4 indicates that a focus on materiality alone may not translate into progress through corporate action towards achieving SDG 3, especially some of its more specific targets.

This has significant implications for policymakers and impact investors interested in achieving the SDG 3 goal and targets. Table 4 highlights specific industries and activity areas in which the public sector either needs to create incentives for the private sector to act, or needs to fill the gaps through its own activities. It also highlights opportunities for impact investors for financing innovative companies and organizations that address those gaps.

For example, Health Care Delivery, Health Care Distributors, Managed Care providers and Drug Retailers lack incentives today to conduct activities that advance progress towards SDG 3, whereas for the other three industries, stronger incentives and payback already exist for most of the targets of SDG 3. Going further, for Health Care Distributors, policies might be required (incentives or disincentives created) for them to adjust their pricing and supply chain and logistics to make drugs and essential medical equipment more affordable and accessible.

When some of an industry’s material ESG issues do drive a majority of its potential impact on SDG targets, for instance when incentives are aligned, this does not automatically imply that progress will be made towards the SDG and overlapping targets. Companies must perform well on those issues for their activities to contribute towards achieving the SDG targets and as such, a measure of SDG-related performance is necessary to evaluate this progress.

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We use TruValue Labs’ ESG performance data to compare the potential impact index per industry and target shown in Table 4 against the actual performance of companies on directly related material ESG issues. This comparison helps identify industries, companies, and targets on which engagement from investors and policymakers to improve performance may be needed.

Consider the Medical Equipment and Supplies industry and its relevance to Targets 3.2 and 3.3. The former relates to ending preventable deaths of newborns and children under 5 years of age, and the latter to ending the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combating hepatitis, water-borne diseases and other communicable diseases. The industry has a relatively high target impact index of 66.67 for Target 3.2 and a low impact index for Target 3.3 of 33.33 as shown in Table 4. This means that the potential of the Medical Equipment and Supplies industry to impact Target 3.2 is much stronger than its potential impact on Target 3.3. How does the industry fare in meeting this potential?

For the Medical Equipment and Supplies industry, the following material ESG issues matter to Target 3.2:

- Energy Management
- Access and Affordability
- Customer Welfare
- Fair Marketing and Advertising
- Product Quality and Safety
- Supply Chain Management

For Target 3.3 for the Medical Equipment and Supplies industry, the overlapping material ESG issues include Water and Wastewater Management and Access and Affordability. We considered a weighted average ESG materiality performance score for companies in the industry.
for the above material ESG issues (and not all of the industry’s material ESG issues). This score is based on the category-level Insight scores as of December 31, 2017 provided by TruValue Labs, weighted by the total historical volume per category (for 10 years of history). The Insight score is indicative of longer-term performance of companies in the industry on the ESG issues. This exercise could also be conducted for historical data as well as ongoing performance data to evaluate how performance has changed and is changing over time, and whether progress is being made or not.

Table 5 shows that while the Medical Equipment and Supplies industry has a large impact on Target 3.2, the industry average material ESG score is only 60.7. A score above 50 indicates positive ESG performance; nevertheless, there is much room for improvement in order for the industry to make a meaningful contribution to achieving Target 3.2, with the full range of scoring being up to 100. On the other hand, the industry is doing better in its ESG performance related to Target 3.3; however, what the industry has the potential to contribute to Target 3.3 (its scope of impact) is limited.

Table 5: Comparison of weighted ESG materiality performance scores (for the subset of material ESG issues overlapping with each target) with the Target Impact Index for the Medical Equipment and Supplies industry

<table>
<thead>
<tr>
<th></th>
<th>Target 3.2-adjusted material ESG Insight 12-31-2017</th>
<th>Target 3.3-adjusted material ESG Insight 12-31-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>60.7</td>
<td>74.1</td>
</tr>
<tr>
<td>median</td>
<td>61.4</td>
<td>74.1</td>
</tr>
<tr>
<td>min</td>
<td>37.2</td>
<td>37.4</td>
</tr>
<tr>
<td>max</td>
<td>88.0</td>
<td>93.7</td>
</tr>
<tr>
<td>Target 3.2 ITII</td>
<td>66.67</td>
<td>33.33</td>
</tr>
<tr>
<td>Target 3.3 ITII</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Therefore, between these two targets for the Medical Equipment and Supplies industry, the focus of engagement for investors (or policymakers) that are interested in the SDGs must lie on Target 3.2 and improving the industry’s performance. In fact, for companies scoring below 50 (such as the company with the minimum ESG materiality performance score for Target 3.2 of 37.2), the implication is that their activities and products or services are creating negative externalities in relation to that target, since scores below 50 indicate negative performance.

A similar analysis could be conducted for every industry (or company) and target to identify areas in which to engage companies to improve their performance on issues that should already matter to their financial performance while contributing directly and significantly to the SDGs. At the same time, this analysis could also identify opportunities for investment in those companies and industries already performing well on material ESG issues that can have a large impact on particular targets or SDGs.

From an investor perspective, the following matrix (Figure 1) can represent a useful instrument to conceptualize asset allocation and portfolio analysis if one wants to take into account not only the ESG materiality performance, but also the scope of SDG impact of the portfolio.
Figure 1: SDG-ESG materiality asset allocation matrix

In Figure 1, a low material ESG performance score can be considered as representing negative or poor performance (scores below 50 in TruValue Labs’ dataset) and vice versa for a high material ESG performance score. The industry SDG impact index on the y-axis can represent the scope of impact across all SDGs, for a particular SDG or a particular target.

Each region (a to d) in the matrix can be interpreted to represent investor asset allocation or government policy decisions in relation to the SDGs:

(a) A low material ESG performance score when the scope of SDG impact (Industry SDG Impact Index) is low can effectively be ignored; however, it may indicate policy gaps in achieving that particular SDG (or its target).
(b) For a low SDG impact index, a high material ESG performance score may not translate into significant progress towards the SDG or its target, again an area for policy concern;

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(c) Region (c) is of particular concern for investors – this represents companies performing poorly on material ESG issues related to the particular SDG or target where the industry has a high scope of impact. This would be an area of engagement or elimination of companies or industries from an investor portfolio.

(d) Companies falling in region (d) represent potential opportunities for investment in order to drive SDG impacts while ensuring strong financial performance.

By bringing together an ESG materiality standard and the SDG goals and targets, the matrix in Figure 1 provides one way to reduce confusion among companies and investors trying to support the SDGs while ensuring strong performance on ESG issues that matter to financial performance.

An additional instrument for analysis can be an *SDG Impact Score* that combines the material ESG performance score with the impact index in the matrix. To illustrate this, we applied the framework developed by Betti et al. (2018) and computed an *SDG Impact Score* for companies in the Healthcare sector, across all SDGs. Table 6 shows the average SDG Impact Score for each industry. For each firm in industry $j$ and for each month $t$ we calculated the *SDG Impact Score* as the product of the firm’s material ESG performance score (ESG MatScore) and the AISTII of the industry to which the company belongs, according to SICS, divided by 100:

$$SDG\ Impact\ Score_{i,t} = ESG\ MatScore_{i,t} \times AISTII_j / 100$$

<table>
<thead>
<tr>
<th>Industry</th>
<th>Mean</th>
<th>median</th>
<th>min</th>
<th>max</th>
<th>st.dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotechnology</td>
<td>34.08</td>
<td>35.31</td>
<td>1.56</td>
<td>54.45</td>
<td>8.82</td>
</tr>
<tr>
<td>Drug Retailers &amp; Convenience Stores</td>
<td>12.85</td>
<td>13.29</td>
<td>6.56</td>
<td>16.24</td>
<td>2.06</td>
</tr>
</tbody>
</table>

Table 6: SDG Impact Score (all SDGs)
Whereas in the case of ESG performance scores provided by TruValue Labs a score above 50 implies positive performance and below 50 negative performance on the ESG issues, this is not true of the SDG Impact Score. This is because the AISTII/100 is necessarily a ratio less than 1. Thus, in the case of an SDG Impact Score, it is simply the case that the higher the score, the higher the actual impact of an industry (or company) in relation to the SDGs.

When comparing Tables 2 and 6, the material ESG performance scores compared to the SDG Impact scores, we can observe that whereas for some industries the relative ranking doesn’t change much (see Pharmaceuticals, Biotechnology and Medical Equipment and Supplies industries, which have high material ESG performance scores and high SDG Impact Scores), Managed Care is in a completely different position.

Methodologically the SDG Impact Score is the result of two components: (a) the material ESG performance score and (b) the industry’s ability to impact SDGs – its scope of impact. This implies that a company with a high material ESG performance score might have a low SDG Impact Score because it is in an industry that has a low scope of impact on the SDGs and vice versa, a company with a low material ESG performance score might have a relatively higher SDG Impact Score because of the higher scope of impact of the industry on the SDGs. This is confirmed in our sample by the Managed Care industry, which is the one with the highest material ESG performance score and one of the industries with the lowest SDG Impact Score.
Section 5. Conclusion: Beyond ESG in the Mist

This case study of the SDG healthcare sector when mapped to SASB material and non-material sustainability/ESG categories and populated with publicly available (transparent) data provides a contrasting model to many if not most ESG theorizations, metrics, and measures currently available. It provides the ability to measure (and therefore evaluate) SDG impact against firms’ and sectors’ ESG performance. In doing so, this paper highlights where private sector firms can (and have) contributed to SDG impact, and where that is either not occurring or perhaps not possible, pointing to the need for public sector activities. Moreover, we suggest that two major problems of the profusion of ESG standards and metrics are addressed: standardization and data transparency. To our knowledge, such an exercise has not been attempted previously. Tracking companies’ SDG impact with their SASB-based ESG performance in a meaningful and transparent manner enables mitigation of greenwashing in relation to the SDGs and ESG, while additionally facilitating the contextualization of companies’ ESG performance not only in terms of their firm specific outputs, but of their environmental and social (societal) impacts as well. We hope that this case example will contribute to the increased linking of ESG standards to SDGs with the incorporation of transparent data to better understand the resulting performance and progress towards the goals.

This is a limited case in two regards and future research needs to address both elements. The first aspect is to use similar (and perhaps more developed) approaches to the 15 other specific SDGs. The second element is to examine correlations (and if possible identity causal links and directions) between firms’ SDG impacts, ESG performance, and a variety of financial
and non-financial firm-specific metrics. In pursuing these and perhaps other SDG and firm interactions, transparent and consistent data is of paramount importance. SDGs are a public good (as is the SASB standard): as such, their evaluations must also be based on publicly accessible granular sustainability data, generally parallel to publicly available financial data. Otherwise, we will still be confronting the overarching problem of ESG in the mist, not being able to clearly see and define all the ESG elements or relevant data.
References


Patent Pending
Global Initiative for Sustainability Ratings. (n.d.). Retrieved from


Patent Pending


Patent Pending


Appendix

Mapping SASB GICS to SDG Targets for SDG 3

The targets for SDG 3 are as follows:

3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol

3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents

3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes

3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

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We mapped each of SASB’s GIC relevant to SDG 3 to one or more of these SDG 3 targets; however, compared to the mapping used for (Betti et al: 2017) we made some changes to ensure that the mapping aligns better with the Health Care sector’s activities and products and services. This adjusted mapping is presented in the table below.

Table A1: Adjusted mapping of SDG 3 Targets to SASB’s GICs:

<table>
<thead>
<tr>
<th>SASB’s general issue categories relevant to SDG 3</th>
<th>SDG 3 Targets Impacted – Adjusted for Healthcare Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>3.1, 3.2, 3.4, 3.9</td>
</tr>
<tr>
<td>Energy Management</td>
<td>3.1, 3.2, 3.4, 3.9</td>
</tr>
<tr>
<td>Fuel Management</td>
<td>3.1, 3.2, 3.4, 3.9</td>
</tr>
<tr>
<td>Water and Wastewater Management</td>
<td>3.3, 3.4, 3.9</td>
</tr>
<tr>
<td>Waste and Hazardous Materials Management</td>
<td>3.4, 3.9</td>
</tr>
<tr>
<td>Access and Affordability</td>
<td>3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8</td>
</tr>
<tr>
<td>Customer Welfare</td>
<td>3.1, 3.2, 3.4, 3.5, 3.8, 3.9</td>
</tr>
<tr>
<td>Fair Disclosure and Labeling</td>
<td>3.1, 3.2, 3.4, 3.5</td>
</tr>
<tr>
<td>Fair Marketing and Advertising</td>
<td>3.1, 3.2, 3.4, 3.5</td>
</tr>
<tr>
<td>Labor Relations</td>
<td>3.3, 3.4, 3.8, 3.9</td>
</tr>
<tr>
<td>Fair Labor Practices</td>
<td>3.3, 3.4, 3.5, 3.9</td>
</tr>
<tr>
<td>Employee Health, Safety, and Well-being</td>
<td>3.1, 3.3, 3.4, 3.5, 3.7, 3.8, 3.9</td>
</tr>
<tr>
<td>Lifecycle Impacts of Products &amp; Services</td>
<td>3.4, 3.5, 3.9</td>
</tr>
<tr>
<td>Environmental, Social Impacts on Assets &amp; Operations</td>
<td>3.3, 3.8</td>
</tr>
<tr>
<td>Product Quality &amp; Safety</td>
<td>3.1, 3.2, 3.4, 3.5, 3.8, 3.9</td>
</tr>
<tr>
<td>Accident &amp; Safety Management</td>
<td>3.6, 3.9</td>
</tr>
<tr>
<td>Materials Sourcing</td>
<td>3.9</td>
</tr>
<tr>
<td>Supply Chain Management</td>
<td>3.1, 3.2, 3.4, 3.5, 3.8, 3.9</td>
</tr>
</tbody>
</table>
Endnotes

1 Examples of dichotomous data among raters and rankers include differing number of firms in each rater’s universe and rater’s views of cut off levels to include a firm in its universe. These make apples to apples comparisons difficult or impossible.

2 Tetrachoric correlations are able to estimate “[…] the quantitative magnitude of the relationship between two raters [that are dichotomous] […] [so that it is] invariant to the number of companies selected in each index […]”, unlike the more familiar Pearson correlation. (Chatterji et al., 2014, p.13). For a more in-depth explanation, see http://www.statisticshowto.com/tetrachoric-correlation/.

3 Chatterji et al. (2014) note there is no clear definition of high or low tetrachoric correlations. Assuming normal data distribution, the authors suggest that 0.68 is quite strong; 0.45 substantial and 0.40 relatively low, somewhat parallel to how Pearson correlations are seen.


5 More information on the Private Sector Advisory Group can be found at http://www.sdgfund.org/sdg-fund-private-sector-advisory-group.

6 For example, see the TIIP project, https://www.tiiproject.com/.

7 SASB’s standards are particularly suited to use in conjunction with the SDGs for a number of reasons:

- SASB has defined the universe of sustainability issues in its 30 general issue categories and has done so in a way that is specific to corporate impacts from, and on, these issues. As such, it provides a view into how global sustainability issues can be influenced by corporate activity.
- With varying views and definitions of “materiality” among different organizations, SASB has also given some clarity to the use of the term in ESG investing. In setting its standards, SASB explicitly considers sustainability information that is important for investor decision-making.
- SASB’s extensive research and stakeholder engagement have resulted in the identification of a minimum set of sustainability issues, per industry, where companies in that industry not only have a significant impact on those issues – such as automobile companies on use-phase GHG emissions and air pollutants – but are also financially and materially affected by them – such as when sales are affected by more stringent fuel economy standards. Thus, its standards serve as a useful tool for investors and companies to focus their attention on those sustainability issues that matter most to their business.
- The 30 general issues and their material subset per industry cover the scope of the environmental and social challenges identified by the SDGs.

SASB standards are industry-specific and are based on SASB’s own Sustainability Industry Classification System (SICS), that classifies companies according to their sustainability risks and opportunities and resource intensity. This is particularly relevant for understanding which industries are likely to have a large impact on specific SDGs.

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In their analysis, Betti et al. (2018) do not consider SDG 17 (global partnership to implement the first 16 SDGs) since this is an overarching one covering all SDGs.

TruValue Labs' Insight360 SASB Edition utilizes the framework of SASB’s 30 general issue categories and the material subset for each industry, applying that lens to big data gathered and analyzed by artificial intelligence. Data is available for over 9,000 companies, for a period of 11 years from 2007 to 2018. One of the benefits of this unique data set is that it provides transparency into the data inputs, as each data point contributing to the category level or overall score is visible in the form of underlying source articles that discuss the ESG issue in question.

TruValue Labs provides a continuous time series of scored ESG events for all 30 categories as well as for only the material categories. As a result, TruValue Labs also provides a composite score based on all 30 categories and a materiality composite score based on material categories. A particular event may be scored in multiple categories. We use the Insight Score from TruValue Labs, which is a measure of a company’s longer-term ESG track record, equivalent to ratings provided by others, but continuously updated based on an underlying Pulse Score, which captures events as they occur. Utilizing unstructured data from more than 75,000 sources, Insight360 applies natural language processing (NLP) and uses criteria that are consistent with established sustainability frameworks such as that of SASB, to score performance using a 0 to 100 scale. A score of 50 represents a neutral impact. Scores above 50 indicate positive performance, and scores below reflect negative performance.

According to SICS, the industries include biotechnology, pharmaceuticals, medical equipment and supplies, managed care, health care delivery, health care distributors, and drug retailers and convenience stores. The drug retailers industry is in the consumption sector in the current version of SICS; however, SASB plans to fold it under the health care sector in the updates mentioned earlier.

TruValue Labs provides Volume data for each company, representing the number of ESG-relevant data points for that company on any given day. Our dataset included trailing twelve-month Volume information for every month from January 2007 to February 2018.

According to SASB’s definition, health care distributors manage supply chains and supply medical equipment, instruments, supplies, and drugs to hospitals, pharmacies, physicians and end consumers.

This is one definition of the scope of impact. Others may have a different definition of what could be considered as the degree of impact of an industry on an SDG. However, a similar analysis can be conducted no matter the definition of impact. The policy and investor implications of this exercise will depend on that definition.