
R-Factor™

Scoring Model

Bringing

Transparency to

ESG Investing

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Executive Summary

The universe of environmental, social, and governance (ESG) data coverage is expanding but the lack of transparency into ESG materiality considerations, as well as opaque scoring systems, highlight the limitations of relying on any one ESG data provider.

Transparency is at the heart of this data challenge. While firms providing valuable ESG data have proliferated in recent years, they provide little transparency into how they collect data and convert these inputs into the ESG scores assigned to companies. This is extremely problematic for investors, as well as for the companies themselves.

Without transparency into how data providers treat key issues such as materiality, investors that rely on ESG scores must adopt the data provider's conclusions without a full understanding of how the provider arrived at those conclusions. Similarly, the companies being scored don't have visibility into the factors that affected their ratings, which makes it difficult for them to know which actions to take to improve their sustainability ratings.

At State Street Global Advisors, we firmly believe that the consideration of material ESG factors in the investment process is an integral part of honoring our fiduciary duty. Consequently, we have made a commitment to fully integrate ESG into our investment processes over the long term.

A central part of this commitment is the creation of an innovative solution to these data challenges, one that determines a score for each company's "responsibility factor." We call it the R-Factor™ score.

R-Factor™ is built off a transparent scoring methodology that leverages the Sustainability Accounting Standards Board (SASB) Materiality Map, corporate governance codes and inputs from four best-in-class data providers, while drawing on State Street's stewardship and investment expertise. R-Factor™ supports the development of sustainable capital markets by giving investors the ability to invest in ESG solutions that integrate financially material ESG data while incentivizing companies to improve their ESG practices and disclosure in areas that matter. We believe that by aligning our scoring model with SASB's leading materiality framework and national governance standards, we can play an important role in promoting long-term sustainable value creation, higher-quality reporting standards and the more efficient allocation of capital — thereby creating a more sustainable financial system.

In this paper, we explain the thinking that shaped the development of R-Factor™, as well as provide a detailed look at the methodology that underpins what we believe is a highly valuable scoring system for investors focused on sustainability.

R-Factor™ — A Transparent ESG Scoring System

R-Factor™ is an ESG scoring system that leverages commonly accepted transparent materiality frameworks that are supported by a large group of companies and investors to generate a unique ESG score for listed companies.

The score is powered by ESG data from four different providers (Sustainalytics, ISS-Oekom, Vigeo-EIRIS, and ISS-Governance) in order to improve overall coverage and remove biases inherent in existing scoring methodologies. These scores will power our investment and client reporting capabilities and be fully integrated into our stewardship program.

Defining Characteristics of R-Factor™

We designed R-Factor™ around four core pillars. These pillars define our approach to ESG data and scoring:

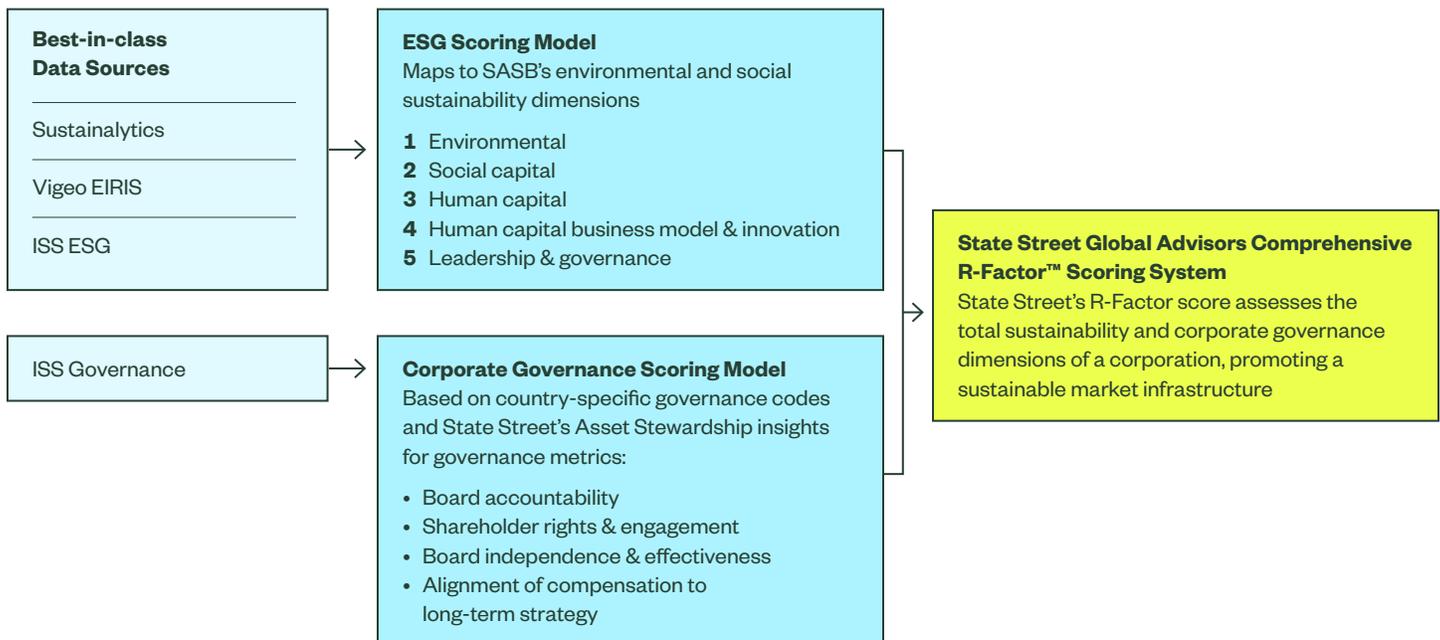
- 1 Focus on materiality.** For investors to be able to fully trust and integrate ESG scoring into their investment process, they must have confidence that the ESG considerations are material and have a demonstrated link to sustainable long-term value creation.
- 2 Commonly accepted transparent framework.** We selected the SASB materiality map as well as national and/or investor-developed corporate governance codes because they are transparent frameworks supported by large numbers of investors. We support these frameworks as they send a unified message to companies about which ESG factors are material to a company's performance and important to disclose and address.
- 3 Strong stewardship.** R-Factor™ supports the efforts of our Asset Stewardship team to provide clear expectations of company performance on material ESG factors. During engagements with portfolio companies, we disclose companies' R-Factor™ scores, as well as the underlying basis for those scores. This gives boards and management teams a roadmap for the specific dimensions that investors are evaluating to assess a company's sustainability efforts. It also helps companies identify which metrics to disclose and manage to improve future scores — creating a positive feedback loop.
- 4 Multiple data sources.** R-Factor™ is powered by the raw metrics (see glossary; raw vs. aggregated metrics) from four different data providers: three that inform the ESG component of the score and one that informs the corporate governance component of the score. This approach increases the overall coverage of our data set, filling in the gaps that exist with any one data provider. Using the inputs from multiple providers also reduces the potential biases that may be built into a provider's methodology.

Overview of R-Factor's™ Scoring Methodology

In building R-Factor™, we sought frameworks that could transparently address material environmental, social, governance, and corporate governance issues. In doing so, we differentiate between ESG issues that are industry specific and traditional corporate governance issues that are geographic specific. For example, the importance of energy management and data security varies significantly from industry to industry but is not limited to specific geographic regions. Conversely, the importance of corporate governance accountability and shareholder rights varies significantly across geographic regions (given that regulation and legal enforcement still operate at national levels). We believe it is important to hold companies to the corporate governance standards appropriate to their headquartered region. R-Factor™ takes these dynamic industry and geographic nuances into account.

Through our research, we determined that aggregating and weighing data on ESG factors versus corporate governance factors requires a different approach. The methodology we have designed and built to create R-Factor™ scores reflects this.

- R-Factor™ scores are powered by four different providers to achieve better global coverage and remove biases inherent in any one existing scoring methodology.
- The ESG Scoring Model is aligned with the SASB standards, framework, materiality map, and powered by three data providers — Sustainalytics, Vigeo Eiris, and ISS ESG.
- The CorpGov Scoring Model is aligned with national and regional governance standards, and powered by ISS Governance.



Distinguishing Two Types of Governance

It is important to note that the “G” in ESG stands for governance but is a different dimension of governance than corporate governance in the traditional sense. In the context of ESG, governance refers to management of issues in a business that have the potential to conflict with the interests of broader stakeholder groups from an environmental and social perspective — issues such as regulatory compliance, risk management, and anticompetitive behavior. Corporate governance in the traditional sense refers to issues that are dealt with more formally at the board level, such as board accountability, shareholder rights and engagement, and executive compensation. While there certainly is a large degree of conceptual overlap between the two definitions of governance, our methodology reflects this distinction in the final scoring model — using different raw-level data metrics, **SASB’s materiality framework** to address ESG-related governance, and **national/market frameworks** to address traditional corporate governance.

R-Factor's™ ESG Scoring Model

Academic and industry research has demonstrated the importance of materiality in analyzing the ESG factors or long-term sustainability dimension of a company.¹

Our scoring model was inspired by this theoretic and empirical literature but makes advancements in the areas of multi-data sources, expanding global coverage, and systematically mapping data to a transparent materiality framework. We believe that the framework and materiality map created by the Sustainability Accounting Standards Board (SASB) provides the transparency, standardization, and market relevancy that institutional investors need for capital allocation decisions.

About SASB

SASB is a non-profit organization with a mission to help businesses around the world identify, manage, and report on the sustainability topics that matter most to investors.

Established in 2011, SASB has developed two key pieces of market infrastructure: a commonly accepted materiality map identifying financially material ESG issues for 11 sectors and 77 industries, as well as a set of sustainability accounting standards that companies can use as a guide to report on material topics and related metrics.

SASB's standards were developed over six years, with consultation and public comment from investors, companies, and other stakeholders. In November 2018, SASB published these standards, providing a complete set of globally applicable industry-specific standards that identify the minimal set of financially material sustainability topics and their associated metrics for the typical company in an industry. The SASB standard-setting process follows a multi-year cycle (typically three years). This involves systematic, independent evaluation of evidence-based research, balanced stakeholder consultation, technical agenda-setting, proposed updates, public comment, and ratification — all of which are subject to independent oversight and public transparency.

SASB's standards are supported by investors representing \$32T. The value of SASB's materiality framework is validated by academic research showing that companies that score higher on material ESG metrics for their industries according to the SASB framework generate stronger long-term sustainable returns.

To learn more about SASB's materiality framework, visit materiality.sasb.org.

SASB Framework

Sustainability reflects the management of a corporation's environmental and social impacts arising from production of goods and services, as well as its management of the environmental and social capital necessary to create long-term value. The concept also includes the impacts that sustainability challenges have on innovation, business models, and leadership. In its effort to standardize ESG reporting, SASB organizes sustainability topics under five broad dimensions:

Environment Environmental impacts, either through the use of nonrenewable, natural resources as inputs to the factors of production or through harmful releases into the environment that may affect the company's financial condition or operating performance.

Social Capital The expectation that a business contributes to society in return for a social license to operate. This dimension addresses the management of relationships with key outside parties, such as customers, local communities, the public, and the government. It includes issues related to human rights, protection of vulnerable groups, local economic development, access to and quality of products and services, affordability, and responsible business practices in marketing and customer privacy.

Human Capital The management of a company's human resources (employees and individual contractors) as key assets to delivering long-term value. This includes issues that affect the productivity of employees, management of labor relations, management of the health and safety of employees, and the ability to create a safety culture.

Business Model and Innovation The integration of environmental, human, and social issues in a company's value-creation process. This includes resource recovery and other innovations in the production process and product innovation, including efficiency and responsibility in the design, use, and disposal of products.

Leadership and Governance The management of issues that are inherent to the business model or common practice in the industry and that are in potential conflict with the interest of broader stakeholder groups, and therefore create a potential liability or a limitation or removal of a license to operate. This includes regulatory compliance, risk management, safety management, supply-chain and materials sourcing, conflicts of interest, anticompetitive behavior, and corruption and bribery.

Figure 1
**SASB's Five Sustainability
Dimensions**

1

Environment

- Green House Gas (GHG)
- Air Quality
- Energy Management
- Water & Wastewater Management
- Waste & Hazardous Materials Management
- Ecological Impacts

2

Social Capital

- Human Rights & Community Relations
- Customer Privacy
- Data Security
- Access & Affordability
- Product Quality & Safety
- Customer Welfare
- Selling Practices & Product Labeling

3

Human Capital

- Labor Practices
- Employee Health & Safety
- Employee Engagement, Diversity, & Inclusion

4

Business Model & Innovation

- Product Design & Lifecycle Management
- Business Model Resilience
- Supply Chain Management
- Materials Sourcing & Efficiency
- Physical Impacts of Climate Change

5

Leadership & Governance

- Business Ethics
 - Competitive Behavior
 - Management of the Legal & Regulatory Environment
 - Critical Incident Risk Management
 - Systemic Risk Management
-

SASB's Materiality Map

The SASB Materiality Map defines financial materiality across a "Sustainability Industry Classification System" (SICS) that categorizes companies according to 11 different sectors and 77 industries. The materiality map follows their framework standards, data hierarchy, and taxonomy. In particular, SASB identified more than 200 individual topics and indicators that are potentially material for specific industries and sectors. Those topics are mapped to 26 General Issues, or sustainability key performance indicators (KPIs). General Issues are tied to one of the five broad sustainability dimensions.

As described in the next section, the ESG scoring model takes into account that, at the company level, only a few of the aforementioned 26 General Issues are material given their specific industry. For example, on average, each industry has between two and 11 material General Issues.

This graphic shows SASB's materiality map for three of the covered sectors: consumer goods, extractives and minerals processing, and financials. The dispersion of the shaded squares shows how financial materiality shifts among sectors and industries.

Figure 2
SASB Materiality Map —
A Snapshot

■ Likely a material issue for companies in the industry

Dimension	General Issue Category	Consumer Goods	Extractives & Minerals Processing	Financials
Environment	GHG Emissions		■	
	Air Quality		■	
	Energy Management			
	Water & Wastewater Management		■	
	Waste & Hazardous Materials Management		■	
	Ecological Impacts		■	
Social Capital	Human Rights & Community Relations			
	Customer Privacy			
	Data Security			
	Access & Affordability			
	Product Quality & Safety	■		
	Customer Welfare			
	Selling Practices & Product Labeling			■
Human Capital	Labor Practices			
	Employee Health & Safety		■	
	Employee Engagement, Diversity, & Inclusion			
Business Model & Innovation	Product Design & Lifecycle Management	■		■
	Business Model Resilience			
	Supply Chain Management	■		
	Materials Sourcing & Efficiency			
	Physical Impacts of Climate Change			
Leadership & Governance	Business Ethics			■
	Competitive Behavior			
	Management of the Legal & Regulatory Environment			
	Critical Incident Risk Management		■	
	Systemic Risk Management			■

Source: SASB, as of 08/30/2019.

Metric Mapping

The ESG Model maps all relevant raw-level data across the three data providers to SASB's five broad sustainability dimensions — environment, social capital, human capital, business model and innovation, and leadership and governance. Using raw-level metrics, rather than relying on the providers' aggregate ESG scores, is essential to this mapping process. In particular, our scoring model did not want to capture the data providers' decisions on materiality, data treatments, and industry weights. Our scoring model mapped 479 raw-level ESG metrics to SASB's 26 General Issues and 200+ topics. This final set of 479 metrics was screened down from the total available universe of more than 2,000+ raw-level metrics.

We narrow down final metrics based on relevance of each metric to the SASB framework, General Issues, and topics through a two-stage process. We begin by linking all relevant raw-level metrics to one of the 200+ SASB Topics. If that mapping cannot be achieved, we move to the next level and map it to one of the 26 SASB General Issues. These mapping rules allow the model to disregard indicators that are not deemed to be a good empirical fit for the SASB framework. Our research team consulted with SASB Research on the final list of mapped ESG metrics to the SASB framework.

Figure 3
Metric Breakdown

Sustainability Dimension	Number of Metrics
Environment	124
Business Model & Innovation	118
Social Capital	117
Leadership & Governance	62
Human Capital	58

Score Calculation

The ESG score calculation process connects the 479 mapped raw-level ESG metrics to the 77 industries classified by SASB — based on their Sustainable Industry Classification System (SICS) — to create one dynamic ESG Score for each company. This procedure aggregates metrics across the three data providers at the SASB General Issue level. The calculation averages all financially material metrics mapped to that particular General Issue across all three data providers. This calculation results in three scores for each individual data providers at the General Issue level. (See below for data quality treatments.) Averages are calculated at the data-provider and General Issue level because there are significant differences in the number of mapped metrics across the three data providers. This methodology choice limits the influence of any one data provider and prevents a single source from overpowering the final ESG score.

In general, most firms covered by the scoring model are covered by all three data providers and ESG scores are calculated in the standard process. However, one of the advantages of the ESG scoring model is that when a particular General Issue is not covered by all three data vendors, a score is still calculated on the remaining available data providers and mapped metrics. The final step in the ESG scoring model is to calculate the total score based on all material General Issue scores relevant for a company's industry.

Data Quality Treatments

Five data treatments, data quality checks, and low-information techniques are applied throughout the ESG score calculation process:

- First treatment step is to rescale all mapped raw-level ESG metrics that do not follow a 0–100 range. Standardizing the scores creates comparability across all data providers — raw level scores are in a 1 to 4 and 0–100 scale. The final ESG scoring model results in a score on a 0–100 scale — this scale is maintained in the total R-Factor™ Scores.
- Second treatment step employs minimum threshold requirements at the metric level. A fixed, hard cutoff is established to ensure ESG scores cannot be generated by fewer than six metrics.
- Third treatment step employs a statistical technique to improve the quality of the data powering the ESG scores. The model limits “low-information” ratings for companies supported by only six to nine metrics. The statistical technique calculates the average of the scores of companies in each specific industry whose ratings are driven by at least 10 metrics. Companies that are powered by 10 or more metrics retain their original ratings. For those company scores only powered by six to nine metrics, we employ the formula listed below to establish a more stable score:

$$S = W * M_i + (1 - W) * \bar{M}$$

where S is the final score of a company, W is the weight of that company’s original score, M_i is that security’s specific score, and \bar{M} is the industry average score (calculated from companies in that industry supported by 10 or more metrics). Ultimately, the model requires at least five companies supported by 10 or more metrics to calculate a specific industry average. Whenever an SASB industry does not have at least five companies with 10 or more metrics, the industry average is calculated by taking the average of every company with at least six metrics.

W is computed employing the following formula:

$$W = \frac{(\#M - C1)}{(C2 - C1)}$$

That is, we take the number of metrics powering that specific company minus the number of metrics at cutoff 1 (six metrics) and divide the result by the number of metrics at cutoff 2 (10 metrics) — number of metrics at cutoff 1. Ultimately, the weight of the individual company’s original rating becomes higher as it moves closer to cutoff 2.

- Fourth treatment step employs minimum thresholds to limit the potential of creating inaccurate scores by excluding companies that do not have metrics mapped to at least 50% of the General Issues material to their industries.
- Fifth treatment step is a standard “substitution logic” process in order to fill gaps at the General Issue level. This procedure is implemented when a material General Issue score is not supported by any ESG metrics either because that company’s coverage is poor or because the company’s General Issue is not supported by any of the three data vendors. The model fills in missing material General Issue scores with industry averages. It is important to note that this average filling procedure is only used in limited cases when a company has at least 50% of their General Issues scores generated by its own metrics.

From a risk-management perspective, the data treatments, data quality checks, and low-information technique ensures the model inputs reach a minimum requirement, and that the resulting information allowed to power any company's individual score is significant and robust.

In addition to the data treatments mentioned earlier, the ESG model undergoes two distinct BLOM normalization processes. BLOM-normalization² is a rank-based inverse normal transformation technique used to standardize data — refer to glossary for a detailed description. The first normalization step happens at the General Issue Data-Provider level. All metrics pertaining to a material General Issue and belonging to an individual data provider are first averaged to create General Issue Data-Provider scores. Next, these General Issue Data-Provider scores are normalized over the entire universe of companies for which the General Issue is material. This normalization, which is designed to improve the distribution of scores, especially for metrics that have low coverage, is done at the data-provider level to account for significant differences in score averages and distributions for the various data vendors. The second normalization, and the very last methodological step in the ESG model, is to BLOM normalize² all the company-level scores at the universe level.

Characteristics of ESG Scores

The ESG sub-model produces sub-scores by company on a 0–100 scale, with 0 being the worst ESG performance and 100 being the best. ESG scores are based on universal raw metric scores and are therefore comparable across industries.

R-Factor's™ Corporate Governance Scoring Model

The SASB materiality framework does not incorporate traditional corporate governance factors. Traditional corporate governance factors tend to be more national and market specific, and are well defined by the myriad of national corporate governance codes.

As noted above, the SASB materiality framework does not incorporate traditional corporate governance factors. Further, traditional corporate governance factors, such as board accountability, shareholder rights, and compensation vary geographically rather than by industry. This creates a unique challenge to systematically evaluating the governance practices of companies globally. However, national and investor-led corporate governance codes define minimum expectations for these factors. Each of these codes reflects local market practices and standards, and can therefore be used as the basis of the evaluation.

To construct the corporate governance component of the R-Factor™ score, we leverage these corporate governance codes. Like the SASB materiality map, these codes are transparent and widely supported by the investment community. In all, we draw upon 15 national codes and two investor-led codes.

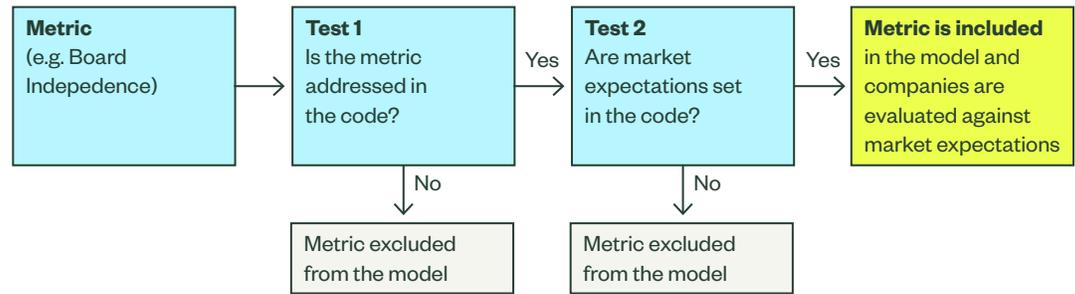
To incorporate the corporate governance codes into R-Factor™, we relied on the expertise of our Asset Stewardship team to systematically map the material metrics from ISS Governance to the principles articulated in each of the 17 codes.

We employ only the corporate governance metrics that are material to a given code. A metric is determined to be material if:

- 1** It is referenced in the code, and
- 2** The code establishes quality or minimum level of expectations needed for compliance

For example, metrics related to 'board committee independence' would be considered to be material only if the code mentions that there should be specific board committees and specifies the expected independence level of the committees. The metrics would not be considered material if the code only calls for board committees without setting expectations for independence or if the code does not reference board committees at all.

Figure 4
**Metric Mapping to
 Governance Codes**



This approach to materiality ensures transparency and consistency with the governance standards that are appropriate for the legal and regulatory regimes in which each company operates. For example, only 86 of the 230 metrics provided by ISS Governance are material to the US code while 95 are material to the UK code.

This section provides a detailed explanation of the CorpGov sub-model we have built to incorporate the traditional corporate governance dimension into R-Factor™.

Most regional models are national models and are applied to one single country. However, there are a few outliers. One model includes both Australia and New Zealand. Another one includes both the U.K. and Ireland. The most comprehensive model is the ICGN version. As mentioned previously, the ICGN code is based on a set of international standards and is applied to any company that does not fit into one of the other 16 regions.

Governance Codes & Metric Selection

CorpGov scores are calculated using 17 regional models based on the national and investor-led corporate governance codes identified in Figure 6. The codes are used to evaluate companies' compliance with a public, transparent corporate governance standard that is relevant based on the country in which the company is headquartered.

Fifteen of the aforementioned codes have been issued by national entities. Two of the governance codes are broadly endorsed by international investors. These are the Corporate Governance Principles established by the Investor Stewardship Group (ISG) in the US and the Global Corporate Governance Principles established by the International Corporate Governance Network (ICGN).

We use a specific regional model rather than the ICGN model when both of these criteria are met:

- 1** The governance code establishing minimum expectations is publically available through a national body or endorsed by a large group of international institutional investors.
- 2** The market is classified as developed according to the MSCI classification framework, and has a sophisticated domestic investor base actively engaging on corporate governance matters.

Most of the regional models are national models and are applied to a single country. However, there are two outliers in addition to the ICGN model. One model includes both Australia and New Zealand. Another model includes both the UK and Ireland.

Corporate governance expectations are presented as principles to be followed, not metrics to be measured. As such, we use the corporate governance codes to select only metrics that are material to a market into the regional model. A metric is considered to be material based on the criteria noted above.

The CorpGov model relies on one data source, ISS Governance. We map the material ISS Governance metrics to each of the 17 regional governance models independently. Ultimately, the CorpGov model employs 175 of 230 total ISS Governance metrics available. The number of metrics associated with each of the regional models ranges from 79 to 120.

Figure 5
**Governance Codes
 Incorporated Into
 R-Factor™**

Market	Issuing Authority and Code
Australia	ASX: Corporate Governance Principles and Recommendations
Denmark	Committee on Corporate Governance: Recommendations on Corporate Governance
Finland	Securities Market Association: Finnish Corporate Governance Code 2015
France	AFEP & MEDEF: Corporate Governance Code of Listed Corporations
Germany	Regierungskommission: Deutscher Corporate Governance Kodex
Hong Kong	HKEX: Corporate Governance Code and Corporate Governance Report
ICGN	International Corporate Governance Network: Global Corporate Governance Principles
Italy	Borsa Italiana Corporate Governance Committee: Corporate Governance Code
Japan	JPX: Japan's Corporate Governance Code
Netherlands	Monitoring Committee Corporate Governance Code: The Dutch Corporate Governance Code
Norway	Norwegian Corporate Governance Board: The Norwegian Code of Practice for Corporate Governance
Singapore	Monetary Authority of Singapore: Code of Corporate Governance
Spain	Comisión Nacional del Mercado de Valores: The Unified Good Governance Code of Listed Companies
Sweden	Swedish Corporate Governance Board: The Swedish Corporate Governance Code
Switzerland	Economiesuisse: Swiss Code of Best Practices for Corporate Governance
United Kingdom	Financial Reporting Council: The UK Corporate Governance Code
United States	Investor Stewardship Group: Corporate Governance Principles

Score Calculation

ISS Governance metrics require a set of data treatment steps within this scoring model. While some raw-level metrics are numerical in nature (percentages, number of months, number of people, etc.), others are binary or on qualitative scales. Hence, to rate companies from a performance perspective, we assign specific numerical scores of '0' or '100' to all outcomes of the material ISS Governance metrics based on the minimum level of expectations established in the specific code.

The final CorpGov score of a company is calculated by averaging the scores of all of the corporate governance metrics that are material for the specific region and for which data is available. If an ESG score is generated for a particular company but that firm is not covered ISS Governance, then a CorpGov score is assigned based on the average score of the companies in that particular region. This allows us to provide a final R-Factor™ score for a significant number of holdings that otherwise would have been excluded from the final, investable universe.

CorpGov final scores undergo the same normalization process used for the ESG model. The final CorpGov scores are normalized at the universe level, using a BLOM normalization technique, which makes scores normally and uniformly distributed.

Characteristics of CorpGov Scores

CorpGov scores are similar in form to the ones generated by the ESG model; both scores are normalized at the universe level, and on a 0-100 rating scale (with 0 being the worst, and 100 being the best).

Finally, it is important to emphasize that the CorpGov model is intended to rate companies based on traditional corporate governance dimensions, such as board accountability, shareholder rights, and compensation. As discussed above, those dimensions are not captured in the ESG model; therefore there is no overlap in ESG metrics, topics, or themes between the two models.

R-Factor's™ Composite Score

The final R-Factor™ scores are based on the aggregation of the normalized scores sourced from the two models that make up the R-Factor™ Scoring Model: the ESG model and CorpGov model. Using company identifiers and dates as keys, the final model merges the two ratings to generate a score for a particular company at a specific point in time.

Score Construction

One of the key characteristics of the R-Factor™ Scoring Model is the weighting calibration assigned to the two sub-models. Given R-Factor™ is designed primarily to be an ESG integration scoring model focused on the SASB materiality framework, the final methodology places greater weight on the ESG model — 90% of the final R-Factor™ score is generated by the ESG model score and 10% is powered by the CorpGov score. It is important to point out that both sub-models take into account governance of companies. The ESG model focuses on the governance of environmental and social general issues within companies — governance programs, policies, disclosures, and quantitative performance. The CorpGov model focuses on the traditional corporate governance issues within companies — board accountability, shareholder rights and engagement, and board independence.

The final methodological step is to BLOM-normalize the final R-Factor™ scores at the universe level.

Characteristics of R-Factor™ Scores

R-Factor™ scores are normally distributed using normalized ratings on a 0–100 rating scale. The final R-Factor Scores are comparable across industries. The ESG and CorpGov scores are based on issues that are material to a company's industry and regulatory region.

Based on the historical time-series of R-Factor™ scores, we have developed the corresponding performance grading scale. This grading scale follows the normal distribution and allows for interpretation of the final company level score to allow for comparison across companies.

Figure 6
R-Factor™ Performance Scale

Performance Brackets	Percentile Ranges
R-Factor™ Laggard	Bottom 10% of total R-Factor universe
R-Factor™ Underperformer	Following 20% of total R-Factor universe
R-Factor™ Average	Middle 40% of total R-Factor universe
R-Factor™ Outperformer	Following 20% of total R-Factor universe
R-Factor™ Leader	Top 10% of total R-Factor universe

Frequency of Updates and Historical Time-Series

R-Factor™ scores are updated on a monthly basis on the first week of every month. Historical R-Factor™ scores are available monthly starting from December 2013. Given coverage is dependent on the four data providers, the final R-Factor™ investable universe is reliant on the underlying data provider universes — which exhibit fewer companies during the 2013-2015 period and increase over the five-year time-series. R-Factor's™ current global coverage is approximately 5,500+ companies. As the underlying data vendors extend their coverage universe, R-Factor's™ investable universe will expand.

Supporting Sustainable Capital Markets

R-Factor™ supports the development of sustainable capital markets by giving investors the ability to invest in ESG solutions that integrate financially material ESG data while incentivizing companies to improve their ESG practices and disclosure in areas that matter. The composite R-Factor™ score allows for a global comparison of companies' ESG performance within a sector or industry.

For companies and their management teams, R-Factor™ offers clear guidance on which ESG topics to focus on and disclose to investors. In doing so, this is the first ESG scoring system to put companies in the driver's seat, allowing them to take the action needed to enhance their scores and improve investors' view of their ESG performance.

By investing in ESG solutions powered by R-Factor™, investors have the opportunity to ensure their capital is being allocated to companies that are focusing on managing and mitigating material ESG risks. Investing in an ESG scoring methodology that provides clear guidance to companies on what to disclose will ultimately lead to better available data and will allow for ESG to be more accurately priced into financial markets.

Endnotes

- 1 Khan, Serafeim et al. "Corporate Sustainability: First Evidence of Materiality." Harvard Business Review, 2016.
- 2 BLOM-normalization is a rank-based inverse normal transformation technique used to standardize data. Please refer to the Glossary for a detailed description.

Contributors

Important contributions were made in the design, build, and governance of R-Factor™. In particular, a special thank you to Benjamin Colton, Tom Favazza, Ashish Kasturia, Siddharth Sundar, Philip Vernardis, Robert Walker, Michael Younis, and Jing Jean Zhou.

Appendix

Data Providers Powering R-Factor™

Sustainalytics is one of the most prominent and established ESG data vendors. It gives its clients access to dozens of ESG metrics, as well as controversies, carbon, corporate governance, product involvement and sovereign risk indicators and data points. It provides company ratings and scores for a universe of more than 10,000 companies, and publishes thematic thought pieces and industry research documents. Sustainalytics differentiates ESG indicators according to four management dimensions: disclosure, preparedness, quantitative performance, and qualitative performance. The company relies on its proprietary 42-industry classification, while it bases its materiality evaluations on the IFRS materiality definition.

ISS-Oekom is an ESG data provider that currently provides data analysis and scores for more than 4,000 securities worldwide. Oekom Research, which was one of the leading rating agencies worldwide in the field of sustainable investment, was acquired by ISS in 2018. Its Corporate Rating evaluates companies' sustainability performance comprehensively against a large number of general and industry-specific environmental and social criteria/indicators covering all relevant environmental and social topics. Each rating is generated by approximately 100 individual criteria, a large proportion of which are industry-specific. In addition to its positive screening, ISS Oekom research carries out a comprehensive negative screening against a large number of ethically controversial business fields and practices.

Vigeo-EIRIS is a French-British global provider of environmental, social, and governance research to investors and public and private corporates. Vigeo and EIRIS merged in 2015. The company has built its benchmarks around universally recognized standards drawn from UN, ILO and OECD conventions, guidelines, and compacts. Vigeo EIRIS provides numerous services related to ESG management of risks and opportunities, from sustainability rating and controversy risk assessment to climate risk assessment and evaluation of controversial activities and weapons.

ISS Governance Corporate Governance Principles and Recommendations highlighted by the aforementioned 17 issuing authorities have driven the selection of metrics provided by ISS Governance, the lone data vendor supporting the SSGA CorpGov model. ISS (Institutional Shareholder Services) is a proxy advisory firm and the leading corporate governance and responsible investment data provider in the world. ISS analysts have unique expertise and insight on the governance and RI landscape, local market voting practices, and regulatory requirements, along with expertise in varied fields such as law, M&A, compensation, and analytics. Indeed, the firm provides analytics, information, and ratings for thousands of companies worldwide, mainly focusing on director data, executive compensation, investors' engagement, employees' retention rate, and other governance metrics.

About State Street Global Advisors

For four decades, State Street Global Advisors has served the world's governments, institutions and financial advisors. With a rigorous, risk-aware approach built on research, analysis and market-tested experience, we build from a breadth of active and index strategies to create cost-effective solutions. As stewards, we help portfolio companies see that what is fair for people and sustainable for the planet can deliver long-term performance. And, as pioneers in index, ETF, and ESG investing, we are always inventing new ways to invest. As a result, we have become the world's third-largest asset manager with US \$2.69 trillion* under our care.

* AUM reflects approximately \$50.01 billion USD (as of March 31, 2020), with respect to which State Street Global Advisors Funds Distributors, LLC (SSGA FD) serves as marketing agent; SSGA FD and State Street Global Advisors are affiliated.

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Glossary

BLOM Normalization BLOM-normalization is

z_i	Standardized score of observation i
ϕ^{-1}	Inverse standard normal
N	Number of observations
r_i	Rank of observation i , ranges from 1 to N

a rank-based inverse normal transformation technique used to standardize data. Observations are first ranked in increasing order, and then the following formula is applied:

$$z_i = \phi^{-1} \left(\frac{r_i - \frac{3}{8}}{N + \frac{1}{4}} \right)$$

ESG Governance vs. Corporate Governance

In the context of ESG, governance refers to management of issues in a business that have the potential to conflict with the interests of broader stakeholder groups from an environmental and social perspective – issues such as regulatory compliance, risk management, and anticompetitive behavior. Corporate governance in the traditional sense refers to issues that are dealt with more formally at the board level, such as board accountability, shareholder rights and engagement, business ethics, and executive compensation.

ESG Data Providers Third-party companies that provide data and aggregate scores for companies' ESG performance.

Materiality Mapping The process of determining the degree to which a specific sustainability-related business practice is material to a specific sector or industry. SASB's Materiality Map forms the foundation of R-Factor's™ ESG scoring model.

Raw ESG Data vs. Aggregate ESG Scores Raw level ESG data refers to the metrics provided by ESG data providers that are structured into a particular format (0-100 or 0-4) and capture an E, S, or G issues – but not weighted or aggregated according to proprietary methods. Raw level ESG metrics capture the sustainability dimension of a company's performance for specific sustainability-related business practices in an untreated form. Aggregate ESG scores are provided by ESG data providers as a secondary level aggregate metric that incorporates their own proprietary weighting models, normalization techniques, and determination of "financially material" business issues.

Transparency vs. Opacity The degree to which data providers provide visibility into weightings, materiality assessments, and other methodology choices that inform their aggregate ESG scoring systems.

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Investing involves risk including the risk of loss of principal.

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