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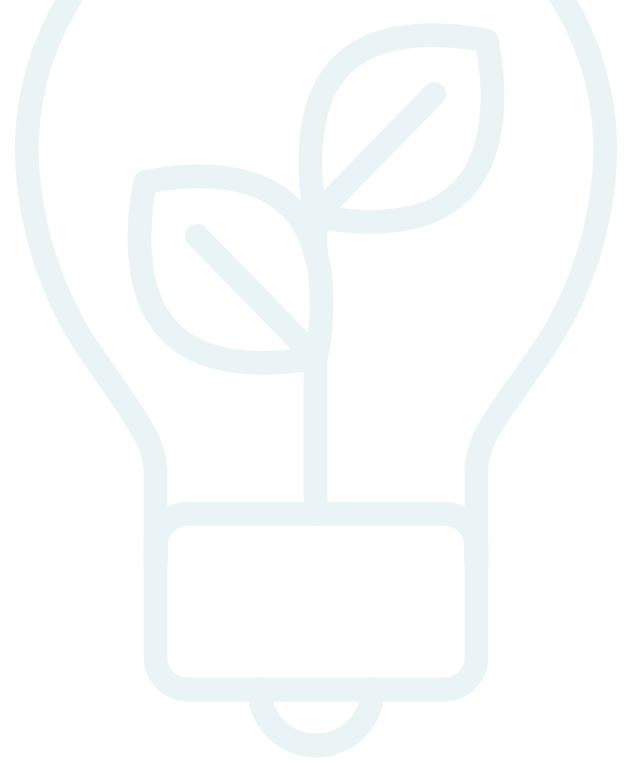
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D&B ESG Rankings Dataset

Context, Methodology, and Applications

Contents

Executive Summary	03
Introduction	04
ESG Data Landscape	05
Data Collection	05
Scoring	06
Dun & Bradstreet Approach	07
Dun & Bradstreet’s Approach for Building the ESG Rankings Dataset	08
Data Sourcing and Collection	10
Processing and Quality Assurance	10
Analytical Model	11
ESG Outputs	12
Data Validation	19
Frequency and Data Maintenance	19
Data Depth Score	20
ESG Rankings in Practice	21
ESG Self-Assessment	24
Applications for the ESG Rankings	25
Conclusion	27
Appendix: ESG-related Data per ESG Topic	28



Executive Summary

Environmental, social and governance metrics — or ESG — have become mainstream with the emergence of more and better data and understanding of the environmental and social pressures of modernity. Dun & Bradstreet is committed to contributing meaningful and consistent ESG data on public and private businesses. Dun & Bradstreet ESG Rankings dataset covers over 80 million public and private companies in over 185 geographies and is constantly expanding.

To compose an ESG Ranking, Dun & Bradstreet has built on efforts present in the current ESG landscape and added its unique data assets to provide transparency around ESG performance across public and private companies.

THE DATASET WILL CONTRIBUTE TO THE ESG DATA LANDSCAPE AS FOLLOWS:

- Wide coverage of both public and private companies using a consistent approach.
- Rankings that are informed by real data, the majority of which is verified information.
- Emphasis on the importance of metrics to company financial performance and “dynamic materiality”.

The ESG Rankings dataset’s topic architecture was created by referencing several of the leading ESG standards; data is sourced, collected, and quality-checked through various processes. In preparation for analytical modeling and calculations, data is further normalized, processed, and weighted. The outputs are various ESG-related rankings as well as overall scores. The ESG outputs are calculated in a straightforward, mathematical manner to create data that is

normally distributed between 1, indicating low risk or best performance, and 5, indicating high risk or worst performance.

The Dun & Bradstreet ESG Rankings dataset offers a decision-useful set of metrics that can be used in multiple applications, such as supply chain management, investing, lending and credit evaluation, insurance inputs, and even sales and marketing segmentation. Aggregating a massive array of ESG-related data into manageable indicators that are decision-useful has been one of the long-term goals of the sustainability field, and one that Dun & Bradstreet supports and contributes to.

Dun & Bradstreet has tested our ESG Rankings dataset for robustness but recognizes there are areas of refinement. These areas are the focus of existing workstreams that increase data availability through more granular and broad data acquisition as well as further use of modeling, where appropriate; refinement of natural language processing (NLP) libraries and analysis to filter out “greenwashing”; and harmonizing of local ESG data availability in an ESG dataset with global coverage. Developing ESG products that provide depth around specific risks or trends, such as climate impact or emerging regulations, is also part of providing a wide range of useful and valuable intel on the ESG metrics for public and private companies.



Introduction

ESG has become mainstream in the past few years, but it has been around for more than a century. It originated primarily with socially conscious investors who wanted to align their investments with their values.

The pressures that have helped put ESG in the spotlight include macro drivers like increased resource scarcity and impacts on productivity from natural disasters, such as the 2021 winter storm Uri in Texas (deemed the most expensive event to occur globally at that time).¹ They also stem from the increasing expectation that corporations should commit to improving social outcomes, from addressing inequality and diversity representation to meeting several of the socially oriented United Nations Sustainable Development Goals (SDGs).²

ESG data tends to capture extra-financial factors that were traditionally absent in financial analysis: company management of energy and water use, waste generation, employee rights and working conditions, community engagement, data privacy rights, and more traditional indicators of corporate accountability and transparency. While ESG is traditionally not seen as material to business outcomes, evidence increasingly shows that there is a strengthening financial relationship to it. The exact relationship is inconclusive, but ESG has become a

popular strategy for identifying additional alpha and managing market volatility. For example, in April 2020, at the start of the COVID-19 recession, multiple ESG funds experienced smaller downturns than those of common benchmarks such as the S&P 500®.³ In a world that has changed considerably in the last few decades, it is fitting that a new genre of company analysis via ESG factors can guide us.

When it was founded almost 200 years ago, Dun & Bradstreet had a value proposition to provide reliable, consistent, and objective credit information on businesses. Building on this legacy to provide essential intel, as well ongoing development to now cover more than 500 million companies globally, Dun & Bradstreet continues to explore how it can contribute meaningful and consistent ESG data on public and private businesses. This paper describes the approach and methods for the Dun & Bradstreet ESG Rankings dataset, which currently includes real ESG data factors on more than 80 million and growing public and private companies.

¹ Steve Evans, "US Winter Storm Uri Insured Loss to Break Records, May Reach Double-Digit Billions," Artemis, 19 February 2021. Retrieved 16 June 2021 from <https://www.artemis.bm/news/us-winter-storm-uri-insured-loss-to-break-records-may-reach-double-digit-billions/>.

² Division for Sustainable Development Goals, "The 17 Goals," United Nations Department of Economic and Social Affairs. Retrieved 16 June 2021 from <https://sdgs.un.org/goals>.

³ <https://www.blackrock.com/corporate/about-us/sustainability-resilience-research>; <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/esg-funds-beat-out-s-p-500-in-1st-year-of-covid-19-how-1-fund-shot-to-the-top-63224550>; <https://www.morningstar.com/articles/1019195/a-broken-record-flows-for-us-sustainable-funds-again-reach-new-heights>.



ESG Data Landscape

ESG data has evolved considerably since the early days of socially responsible investing, when negative screenings eliminated investment in controversial sectors such as tobacco, alcohol, gambling, and weapons. A handful of niche commercial and non-profit data providers emerged in the early 2000s to collect and organize additional information on companies as ESG norms changed. By the 2010s, several major global players had emerged, primarily through the acquisition of these earlier niche providers.

Two main trends have fueled the expansion of ESG data: increasing corporate disclosure and investor uptake. Of companies on the S&P 500 in 2021, 96% published sustainability reports compared with only 20% in 2011. On the

investor side, inflows of ESG assets have increased significantly, bringing in more than \$2.5 trillion at the end of 2022.⁴ These trends are expected to accelerate, as is more directive regulation concerning the disclosure of ESG factors, such as Sustainable Finance Disclosure Regulation (SFDR) and EU Taxonomy in Europe and stock index requirements in Asia; and the U.S. SEC Climate Disclosure Rule proposed in March 2022.

Data Collection

To date, ESG scores on companies are primarily derived from company disclosure, whether from annual reports, ESG reports (also labeled as sustainability, corporate social responsibility, or impact reports), and financial filings. Because of this, updating of ESG data is limited to yearly cycles as new reports are published and this data is collected. While company disclosure has increased, it remains non-standardized and even rare for ESG data, and providers may use varying factors for calculating the same ESG topics (e.g., workplace health and safety).⁵ Several ESG factors, particularly for environmental impacts,

4 <https://www.bankrate.com/investing/esg-investing-statistics/#stats>

5 <https://www.hbs.edu/faculty/Pages/item.aspx?num=56372>

are often modeled using generic segmentation such as sector, size, and location of a company, given limited and varied disclosure. In addition, data collection is often inclusive of only public companies, given the reliance on obtaining ESG data from reporting.

Some companies also request distinct information directly from other companies that is not shared widely but can be included in aggregated or normalized ESG scores. This data is often not standardized between providers and may capture significantly different attributes of ESG performance. It is also voluntarily self-reported data that may not be authentic. While the volume of ESG data now assured by third parties is increasing, that assurance often refers only to the data collection processes and not to the actual data itself. In addition, often only a small amount of ESG data can be assured, including greenhouse gas (GHG) emissions and, in lesser instances, energy consumption, water consumption, and waste generation. Assurance of ESG metrics will likely increase as regulations require it.⁶

Because of the non-standardization of company disclosure as well as the collection of additional data from sources such as news and the media, ESG data providers often require a manual review of the data by an analyst. This has benefits in terms of capturing nuances around ESG disclosure, and it is the preferred approach for providing ESG in a traditional or associated rating, such as for providers like S&P Global and Moody's. However, manual evaluation of companies can also introduce bias that can result in inconsistencies and issues regarding company comparability. Manual analysis is also resource intensive. These factors have resulted in a new wave of ESG providers quickly entering the market by providing ESG data collected via artificial intelligence (AI) and machine learning (ML) methods such as scraping reports and news channels using NLP, which automatically processes human language in a computational manner.

As ESG data covers such a broad spectrum of issues, emerging data collection methods including geospatial data from satellites, sensor data from the use of the industrial internet of things and the internet of things, and the application of advanced AI and ML analytics to additional datasets will likely uncover potentially more accurate modes of measuring ESG-related metrics.

Scoring

Once collected, data can be standardized through a process of normalization to allow comparing and aggregation of different metrics containing differing units. For example, 1,000 tons of carbon dioxide equivalent (tCO₂e) can be converted to a number between 0 and 100 depending on the included maximum and minimum values in the sample (which may be the entire universe of companies or only companies in the same industry). Metrics can be aggregated to more general themes, such as environmental performance, which can be rolled up again into an overall ESG score.

Before such aggregation, however, topic-specific weighting can be applied based on the importance, or materiality, of that topic to the company's sector. The Sustainable Accounting Standards Board (SASB) Materiality MapTM,⁷ for example, provides a matrix that illustrates which ESG topics are considered financially material to distinct sectors. Weighting of topics can also vary depending on preference, such as weighting diversity more heavily because it is considered of greater importance to specific stakeholders. This latter approach is more common in impact metrics and investing, which is focused more on longer-term outcomes that may yield a smaller financial performance than traditional benchmarks until later years.

⁶ <https://www.cpajournal.com/2018/07/20/sustainability-assurance-services/>

⁷ <https://materiality.sasb.org/>

Dun & Bradstreet Approach

To compose an ESG ranking, Dun & Bradstreet has chosen to build on efforts present in the current ESG landscape and its unique data assets to provide transparency on ESG performance across public and private companies.

The Dun & Bradstreet ESG Rankings dataset will contribute to the ESG data landscape by providing the following:

- **WIDE COVERAGE OF BOTH PUBLIC AND PRIVATE COMPANIES, BASED ON A CONSISTENT APPROACH.**

Today, there is a paucity of data on private companies, as these companies are not required to submit annual reports and filings on their performance. Where there is ESG data on private companies, it was often collected using methods that differ considerably from those of public companies. Through multiple venues, Dun & Bradstreet reports on more than 500 million public and private companies on data related to their performance and trade. This data includes many topics that are important to ESG performance and offers existing channels for additional information related to environmental and social topics. This enables wide coverage and a consistent approach for compiling the ESG Rankings dataset for companies.

- **RANKINGS THAT ARE INFORMED BY REAL DATA, THE MAJORITY OF WHICH IS VERIFIED INFORMATION.**

Due to the lack of data standardization and the paucity of some data points, most ESG scores model data using a broad segmentation approach based on general variables such as company sector, location of headquarters, and/or revenue size. To limit the use of modeling, the ESG Rankings dataset leverages Dun & Bradstreet data, which is real data collected on and from companies. Other data sources, such as news and company reports, are triangulated with additional data collected by Dun & Bradstreet in order to confirm their veracity. The variable, GHG emissions, which is infrequently disclosed is modeled using predictive machine learning algorithms for a subset of companies using numerous firm-specific variables.

- **EMPHASIS ON THE IMPORTANCE OF METRICS TO COMPANY STABILITY, FINANCIAL PERFORMANCE AND “DYNAMIC MATERIALITY”.** The D&B ESG Rankings apply a materiality weighting to the 31 ESG Topics scores that compile the final E, S, G and ESG Rankings that is informed by the current materiality assignments per industry as outlined by the Sustainable Accounting Standards Board (SASB), now part of the International Financial Reporting Standards (IFRS)’s International Sustainability Standards Board (ISSB). The SASB Standards identify the subset of sustainability issues most relevant to financial performance. Dun & Bradstreet has chosen to incorporate this assigned materiality per issue in a way that accounts for “dynamic materiality,” or acknowledging that what is financially immaterial to a company or industry today can become material tomorrow. Aggregating a massive array of ESG-related data into manageable indicators that are decision-useful has been one of the long-term goals of the sustainability field, and one that Dun & Bradstreet supports and contributes to.

- **UPDATED DATA PROVIDED ON A MONTHLY BASIS.** The business landscape is rapidly changing, and so should the data that describes its impact on environmental and social factors. Because ESG data is so often reliant on publicly available reports and filings that might be refreshed on an annual basis at most, ESG data is often limited in its update frequency. While the ESG Rankings dataset also ingests this type of data, much of its private data is gathered throughout the year on a rolling basis, is updated consistently, and can be processed quickly in order to be available to customers. For the ESG Rankings dataset, data is processed weekly and updates are available monthly.

Building on the points above as well as on a mature and rapidly evolving ESG data landscape, the ESG Rankings dataset will provide decision-useful metrics across a wide range of companies. The next section provides more detail on the methods used to create the ESG Rankings dataset.



Dun & Bradstreet's Approach for Building the ESG Rankings Dataset

The ESG Rankings dataset's topic architecture was created by referencing several of the leading ESG standards, including the SASB, the Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosures (TCFD), the CDP (formerly the Carbon Disclosure Project), the UN SDGs, and other notable sustainability reporting frameworks. Under each of the environmental (E), social (S), and governance (G) dimensions, specific themes were described, as well as another layer of specific topics that relate to each general theme.

Once this framework was established, each of the ESG Themes could then be populated with hundreds of variables sourced from various datasets within and outside Dun & Bradstreet. The ESG Rankings dataset uses the SASB Sustainable Industry Classification System[®] taxonomy for sector classifications. According to SASB, this taxonomy categorizes companies into sectors and industries in accordance with a fundamental view of their business model, their resource intensity, their sustainability impacts, and their sustainability innovation potential. This sector classification is superior to other such systems, such as the Global Industry Classification Standard, for improving ESG issue identification per sector segment.⁸

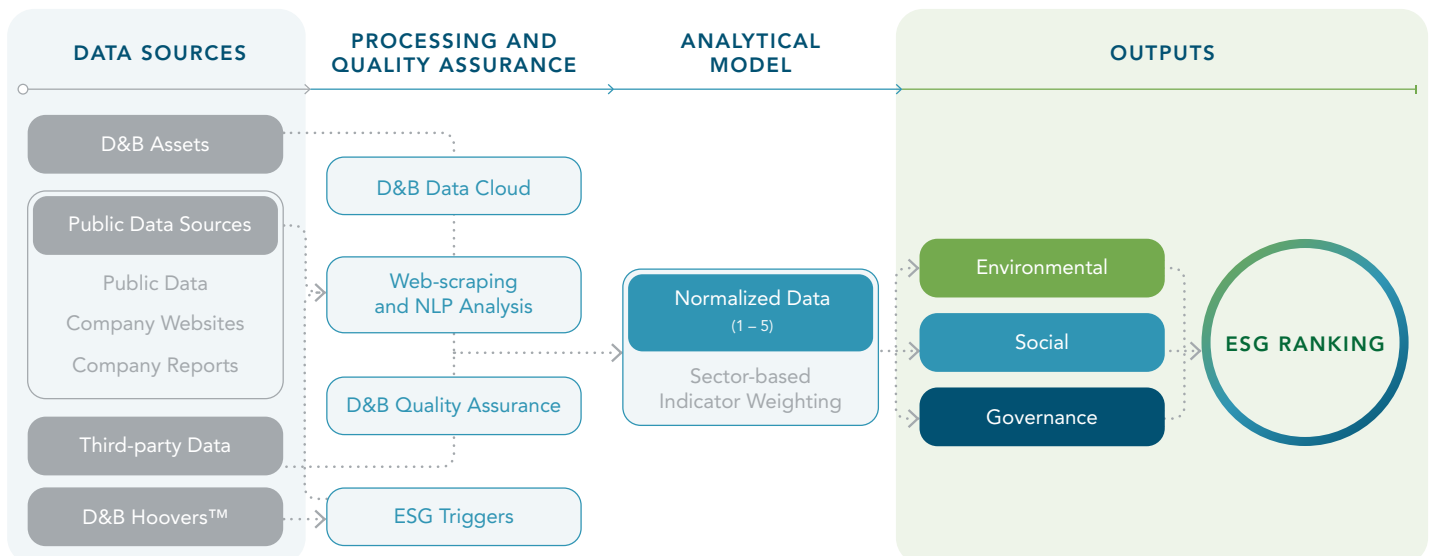
⁸ <https://secureservercdn.net/198.12.144.78/avu.efb.myftpupload.com/wp-content/uploads/2020/10/2018-September-Nascimento-Decio-Payal-Shivani-Industry-Classification-and-Environmental-Social-and-Governance-ESG-Standards.pdf>

FIGURE 1: ESG Rankings data set's topic architecture

ENVIRONMENTAL		SOCIAL		GOVERNANCE	
THEMES	TOPICS	THEMES	TOPICS	THEMES	TOPICS
Natural Resources	Energy Management	Human Capital	Labor Relations	Corporate governance	Business Ethics
	Water Management		Health and Safety		Board Accountability
	Materials Sourcing and Management		Training and Education		Shareholder Rights
	Waste and Hazards Management		Diversity and Inclusion		Business Transparency
	Land use and biodiversity		Human Rights Abuses	Corporate behaviors	Corporate Compliance Behaviors
	Pollution Prevention and Management	Product Quality Management	Governance-Related Certifications		
GHG Emissions and Climate	GHG Emissions	Customer Engagement	Product and Services	Business resilience	Business Resilience and Stability
	Climate Risk	Community Engagement	Data Privacy		
Environmental Risk	Environmental Compliance	Supplier Engagement	Corporate Philanthropy		
Environmental Opportunities	Environmental Opportunities	Certifications	Community Engagement		
	Environmental Certifications		Supplier Engagement	Supplier Engagement	
			Social-related Certifications		

The variables are then ingested and quality checked through various processes. In preparation for analytical modeling and calculations, data is further normalized, processed, and weighted. The output is various ESG-related rankings as well as an overall score.

FIGURE 2: High-level methodology for the ESG Rankings



Data Sourcing and Collection

Data is first sourced through internal Dun & Bradstreet databases using analytical tools. This data was complemented with data from government sources (e.g., U.S. Environmental Protection Agency (EPA) compliance and environmental pollutant data), public sources (e.g., company reports and filings), news (e.g., processed through D&B Hoovers⁹), and some third-party licensed data (e.g., aggregation of sustainability reports, GHG emissions from CDP¹⁰). Companies can also directly submit additional ESG-related data through Dun & Bradstreet channels that can then be integrated into the ESG Rankings dataset.

The following are the main data sources for the ESG Rankings dataset:

01 Dun & Bradstreet proprietary business information

02 Legal documents and government websites

03 Global news

04 Non-governmental organization (NGO) evaluations and data sources

05 Third-party certifications

06 Company websites

07 Company sustainability reports, annual reports, and filings

08 Third-party licensed data

09 Additional supplied ESG data from companies that is internally validated

Processing and Quality Assurance

For all data ingested by Dun & Bradstreet, variables are mapped to distinct company branches and parents. A single business entity is then assigned a numeric identifier, its Dun & Bradstreet D-U-N-S® Number. This allows easy identification and comparability of data from a company against other data about the same company, as well as efficient organization of company information. To be in the Dun & Bradstreet Data Cloud, data on companies goes through a strict data governance and quality process until it can be appended to a company's record. Company branches are currently assigned the ESG score associated with the company's headquarters, unless data is available on the branch level.

⁹ <https://www.dnb.com/products/marketing-sales/dnb-hoovers.html>

¹⁰ <https://www.cdp.net/en>

FIGURE 3:

The Dun & Bradstreet Data Cloud contains data on more than 500 million companies globally



GLOBAL COVERAGE

- 500M+ records
- Covering majority global GDP

GOVERNANCE AND QUALITY

- Patented identity resolution
- Award-winning governance process

APPLIED INNOVATION

- AI/ML
- Augmented intelligence matching

ANALYTICS AND INSIGHTS

- Ultimate Beneficial Owner
- Hierarchy and linkage
- Predictive analytics and data science

CONNECTIVITY AND INTEGRATION

- Our solutions and yours
- CRM, MAP, CMS, DMP

For textually based data, such as from company reports, websites, and news sources, topic extraction is done via NLP and deep learning. Proprietary keywords are organized in an ontology specific to the ESG domain. This is created through deep learning models such as Latent Dirichlet Allocation topic modeling, Google’s pretrained word embeddings, word2vec, and evaluations from subject experts that inform testing. A proprietary ESG-BERT model is employed to detect polarity among keywords after models are trained using manually labeled sentences containing those keywords. These phrases are collected, evaluated, and organized into distinct keywords, bigrams (two keywords in one phrase), trigrams (three keywords in one phrase), and so on, that are combined across sources and averaged. Calculated averages are then normalized between -1 and 1 and mapped to an associated ESG topic.

Other data from licensed, government, or NGO sources that includes discrete or continuous variables is collected via numerous modes such as web-scraping, existing data collection portals at Dun & Bradstreet, or data licenses and subscriptions. All data is cleaned, standardized, run through verification processes, and normalized between -1 and 1 before it is assigned to an ESG topic.

Analytical Model

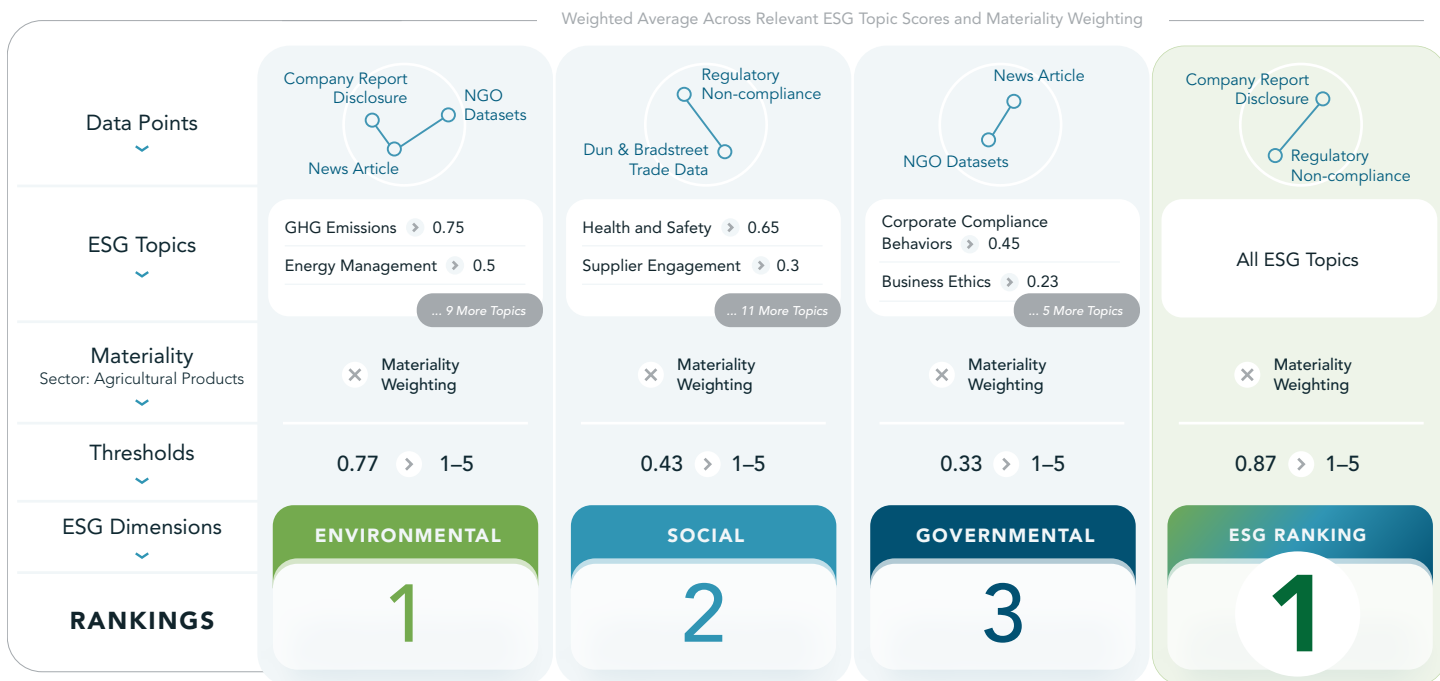
Once the data is organized by ESG topic, weightings are applied that determine the final ESG topic score. If an ESG topic is considered material as determined by SASB Standards it is weighted at 100% and if it is not considered material, then a weight of 10% is assigned. Immaterial Topics still receive a weighting to incorporate the concept of “dynamic materiality,” or acknowledging what is financially immaterial to a company or industry today can become material tomorrow.

In order to calculate an ESG topic score, there must at least beenough data to inform the variables that cover the financially material ESG themes. ESG topic scores then inform a larger ESG theme score and the overall ESG Ranking. There must be enough ESG-related data available to adequately populate four of the 13 ESG themes (see [Figure 1](#)). As more data is ingested and becomes available, it is likely more companies will be assigned an ESG Ranking.

In the following figure, we explore how individual data points inform the final ESG Rankings. In this example for an agricultural product company, we view how data points are normalized and calculated into the final ESG Rankings ([Figure 4](#)).

Individual data points are assigned to specific Topics, normalized between -1, being the worst performing and 1 being the best performing, and arithmetically averaged to compose the Topic score. These are then weighted according to their associated materiality weighting — 100% or 10% — based directly on guidance stipulated in the SASB Standards. This weighted average composes associated ESG Themes — such as Natural Resource Management — as well as the ESG Dimensions — such as Environmental. Rankings are then assigned based on where the ESG Theme and ESG Dimension scores land between thresholds that provide distinction between companies according to a risk-based approach. Depending on where the score lands between the threshold will determine a ranking from 1, being the best performing company, to 5, being the worst performing company. The Environmental, Social, Governance and ESG Rankings are all calculated separately directly from the associated ESG Topic scores and their materiality weightings, and then determined by where this weighted average falls between specific thresholds.

FIGURE 4: How ESG Rankings are calculated: Agricultural Product Company example



Data is illustrative. Calculation Method: Quantitative data is scaled, and textual data is assigned sentiment from -1 (worst performance/negative) to 1 (best performance/positive). If multiple datapoints, numeric assignment is averaged across datapoints.

ESG Outputs

The ESG outputs are calculated in a straightforward, mathematical manner to compose a dataset that results in a distribution of data between 1, indicating low risk or best performance, and 5, indicating high risk or worst performance. Cluster analysis on the company universe informs the number of thresholds (in this case 5), while thresholds are determined based on the standard deviation for the distribution of companies. This range is chosen in order to provide enough distinction between

risk categories based on the available data that can conclusively express a risk factor on a reliable scale. For example, a company ranked 4 will have a significantly different risk profile than a company ranked 5, and even more so than a company ranked 1.

Dun & Bradstreet has chosen to refrain from statistical modeling because the main relationship of ESG data to company risk is captured when data is topically organized and aggregated to an overall metric. ESG data is also not generally rich enough to allow non-transparent calculation methods, which can occur with ML. As the dataset grows in both coverage and depth, there may be opportunities to identify specific variables that can contribute to ESG-related algorithms that benefit from ML.

The current ESG Rankings dataset is a ranking model and will adjust as the overall market improves and changes its ESG-related activities. The more companies implement management of ESG issues, the harder it will be for companies to remain in the top class. The model depicts placements based on observed behaviors and not a probability of a perceived change or exposure to risk, although historical observed behaviors can have a correlation to risk events that can result in financial, reputational or operational damages. Future developments of ESG data and analytics include development risk models that capture perceived change or exposure to an event.

CHART 1:

Distribution of ESG Rankings, where a darker hue indicates higher ESG risk



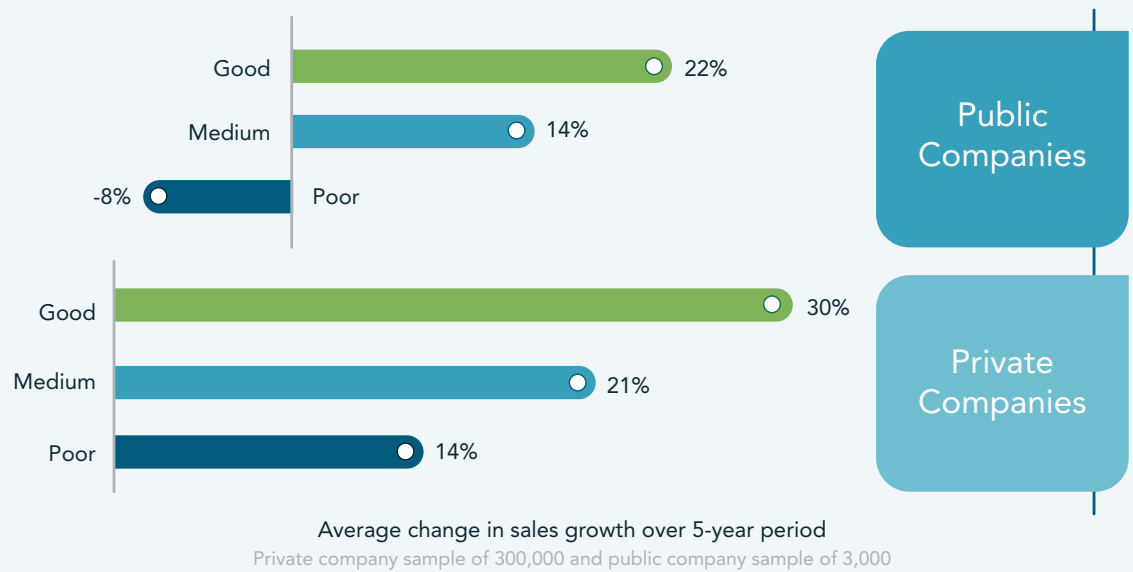
Testing and Validation

As part of results testing, Dun & Bradstreet back-tested the final ESG Rankings with various financial and firmographic metrics over 1-, 3-, and 5-year time frames. Additional testing was done on individual ESG themes to explore the predictive ability of individual ESG focus areas.

For both public and private companies, there is a strong positive correlation between good ESG performance and return on sales growth, a reliable indicator of company stability, over the 1-, 3-, and 5-year periods. Companies with poor ESG performance had a considerable decline in return on sales, while those with good ESG performance showed growth.

CHART 2:

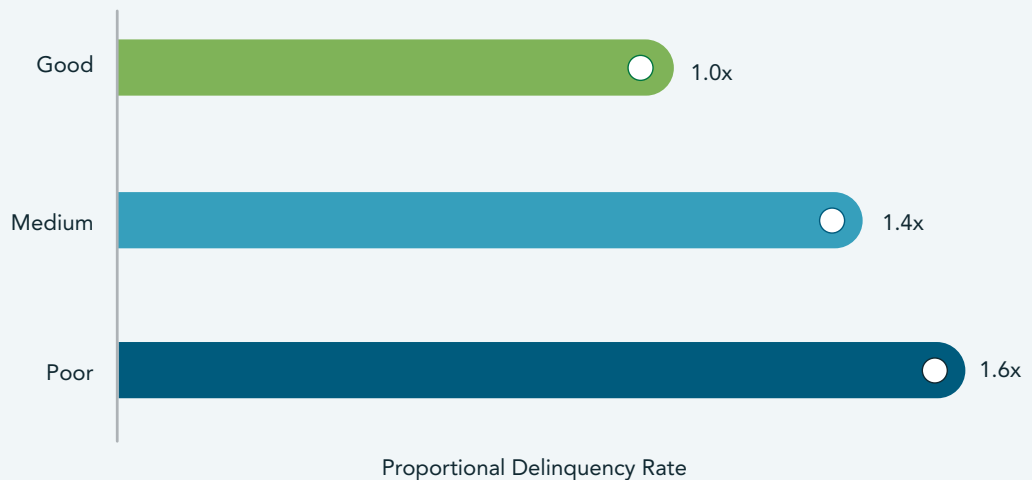
ESG Rankings are correlated with sales growth for public and private companies



A popular commercial credit risk measurement is payment delinquency. Within a sample of 200,000 private companies, the delinquency rates of businesses with poor ESG Rankings are almost double that of businesses with very good ESG performance.

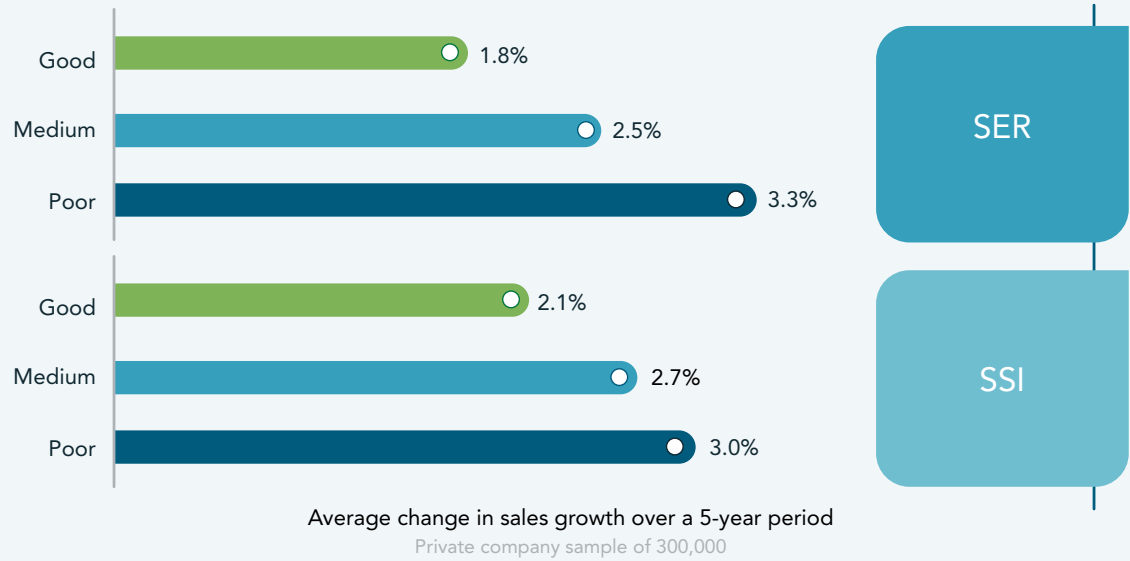
CHART 3:

ESG Rankings are negatively correlated with payment delinquency rates



Dun & Bradstreet also compared the ESG Ranking scores against our supplier risk scores, including the D&B Supplier Evaluation Risk (SER) ratings, which predict the long-term (12 months) financial health of a supplier, and the D&B Supplier Stability Indicator (SSI), which predicts the short-term (90 days) financial and operational health of a supplier.¹¹ Companies with poor ESG performance are more likely to have a high risk of future company inactivity.

CHART 4:
ESG Rankings are correlated with supplier risk indicators



Several indicators with comprehensive coverage across the dataset and ESG relevance were found to be predictive or could reliably estimate sales growth, depending on the ESG Ranking. GHG emissions and climate (Environmental dimension), Supplier engagement (Social dimension), and business resiliency (Governance dimension) were found to have predictive capabilities. Companies with good ESG performance on these metrics also have lower delinquency rates.

¹¹ SER rating definition: For the United States and Canada: The rating predicts the likelihood that a supplier will cease business operations or become inactive over the next 12-month period based on the depth of predictive data attributes available for the business. For the rest of the world: The rating predicts the likelihood that a supplier will seek legal relief from creditors or cease operations without paying creditors in full over the next 12-month period. Both are derived from D&B failure scores.

SSI risk definition: This indicator predicts the likelihood that one of the following events will occur over the next 90 days: a business will cease operations or voluntarily withdraw from doing business; a business will seek legal relief from creditors, go into receivership or reorganization, or make arrangements for the benefit of creditors; or a business will become inactive due to merger- or acquisition-related activity

TABLE 1:

Select ESG themes with strong correlation to return on sales and lack of delinquency payments

ESG THEME	DIMENSION	DEFINITION	INDICATIVE DATA POINTS
GHG Emissions and Climate	Environmental	Indicator on measurement and management of greenhouse gas emissions	<ul style="list-style-type: none"> Carbon emissions GHG Emissions (Physical Quantity tCO₂e, Intensity tCO₂e/\$m)
Supplier Engagement	Social	Indicator of the quality of relationships and engagement of a company with suppliers	<ul style="list-style-type: none"> Slow and delayed payments to suppliers compared with industry Negative payment experiences by suppliers Presence of supply chain initiatives
Business Resiliency	Governance	Indicator of a company's ability to be resilient to volatility, including economic and weather-related events	<ul style="list-style-type: none"> Business activity related to preparing for bankruptcy Business recovery from natural disasters Meeting with creditors Systemic risk management

Businesses ranking higher with the responsible management of GHG emissions demonstrate greater growth in sales over the past year. For delinquency rates, companies with good GHG emission management have a lower proportion of late payments over the 1-, 3-, and 5-year periods.

CHART 5:

Businesses with better GHG emissions management have greater sales growth

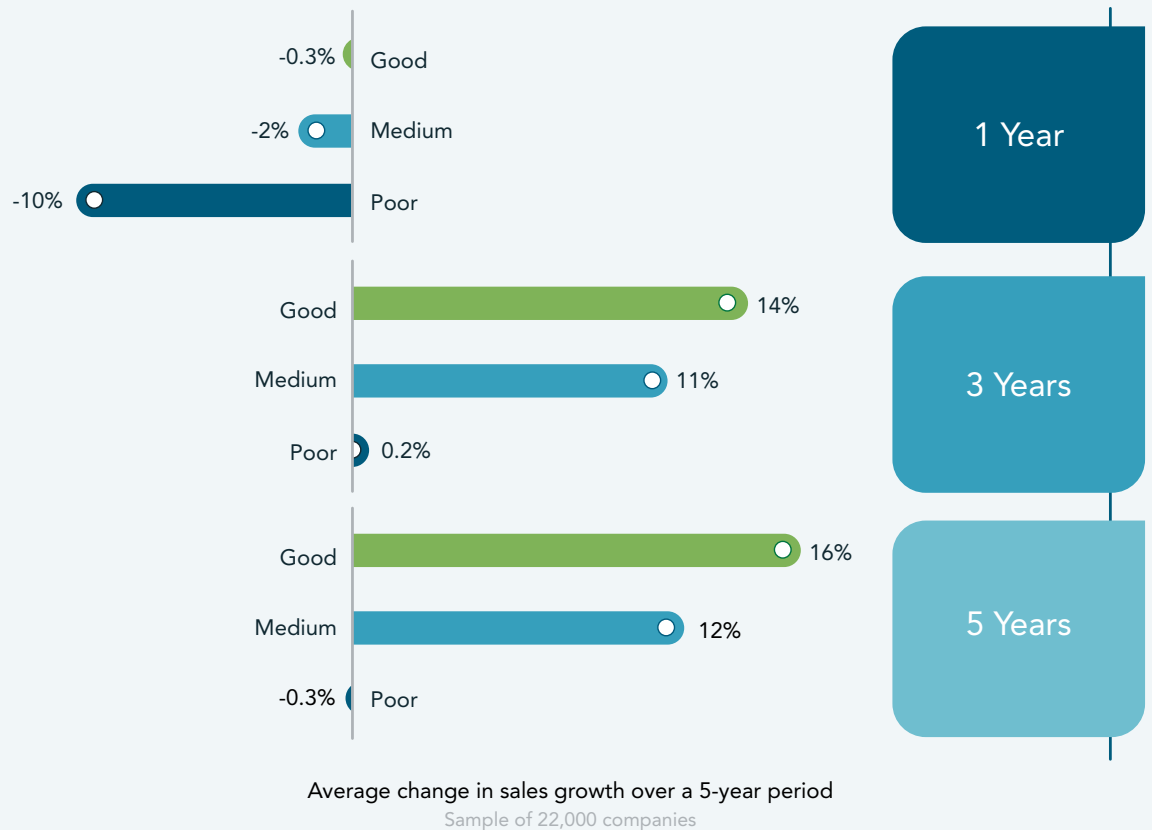
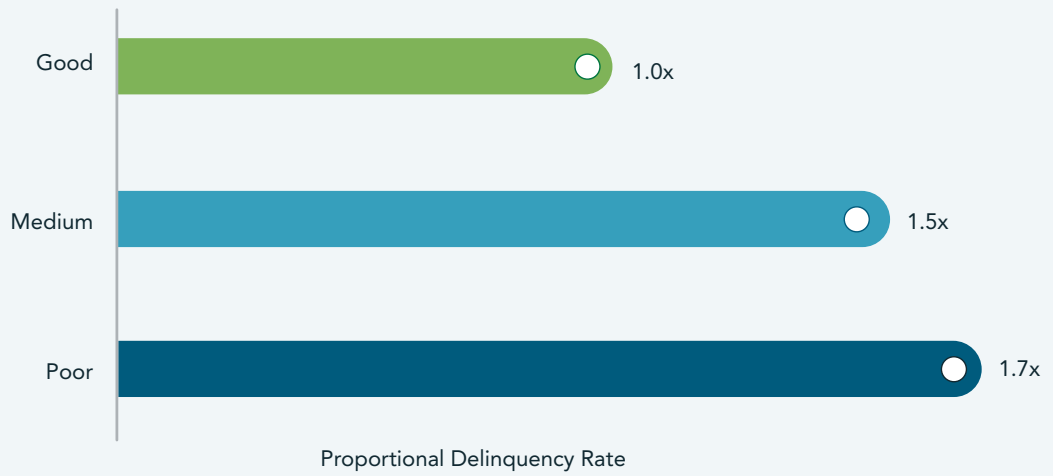


CHART 6:

Businesses with better GHG emissions management have lower delinquency rates



Strong rankings related to supplier engagement are a predictor of company sales growth, with companies with good ESG performance having greater rates of sales growth over the 1- and 3-year period. During the 5-year period, companies with medium performance slightly outperform those with good performance. Companies with good supplier engagement also have an overall lower proportion of delinquency rates, where poor rankings indicate a delinquency 15.1 times that of companies with good rankings.

CHART 7:

Businesses with better supplier engagement have greater sales growth

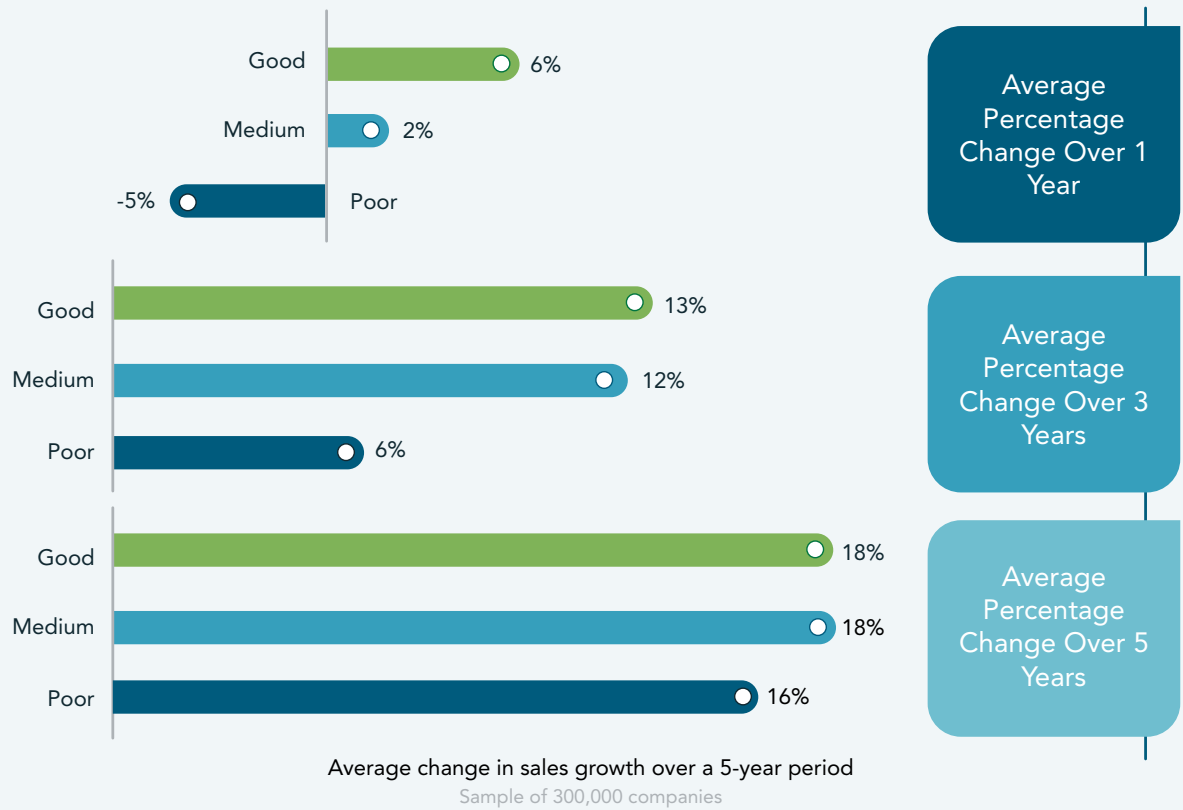
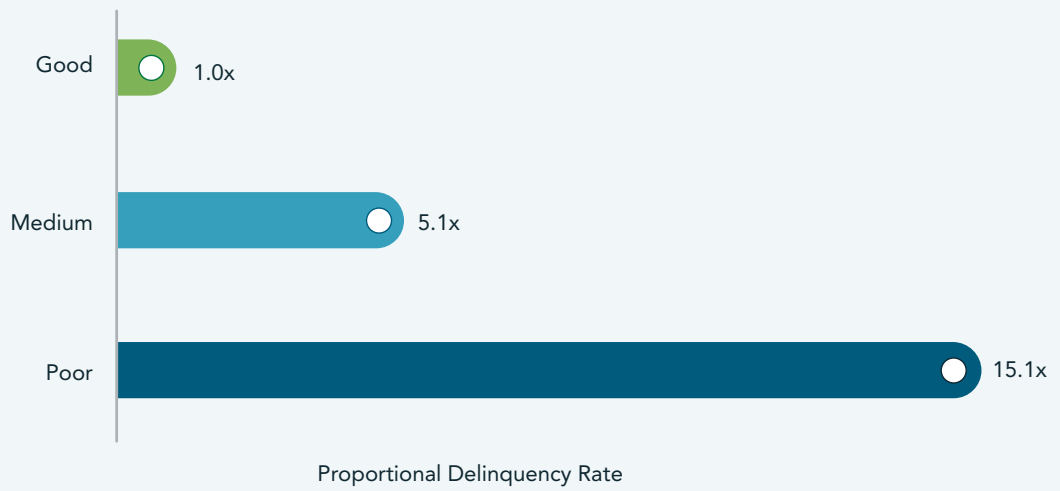


CHART 8:

Businesses with better supplier engagement have lower delinquency rates



Business resiliency performance showcases a higher return on sales over the short and long terms. Companies that perform well on business resiliency also have 1.4 times lower delinquency rates than those that perform poorly.

CHART 9:

Businesses with better business resiliency have greater sales growth

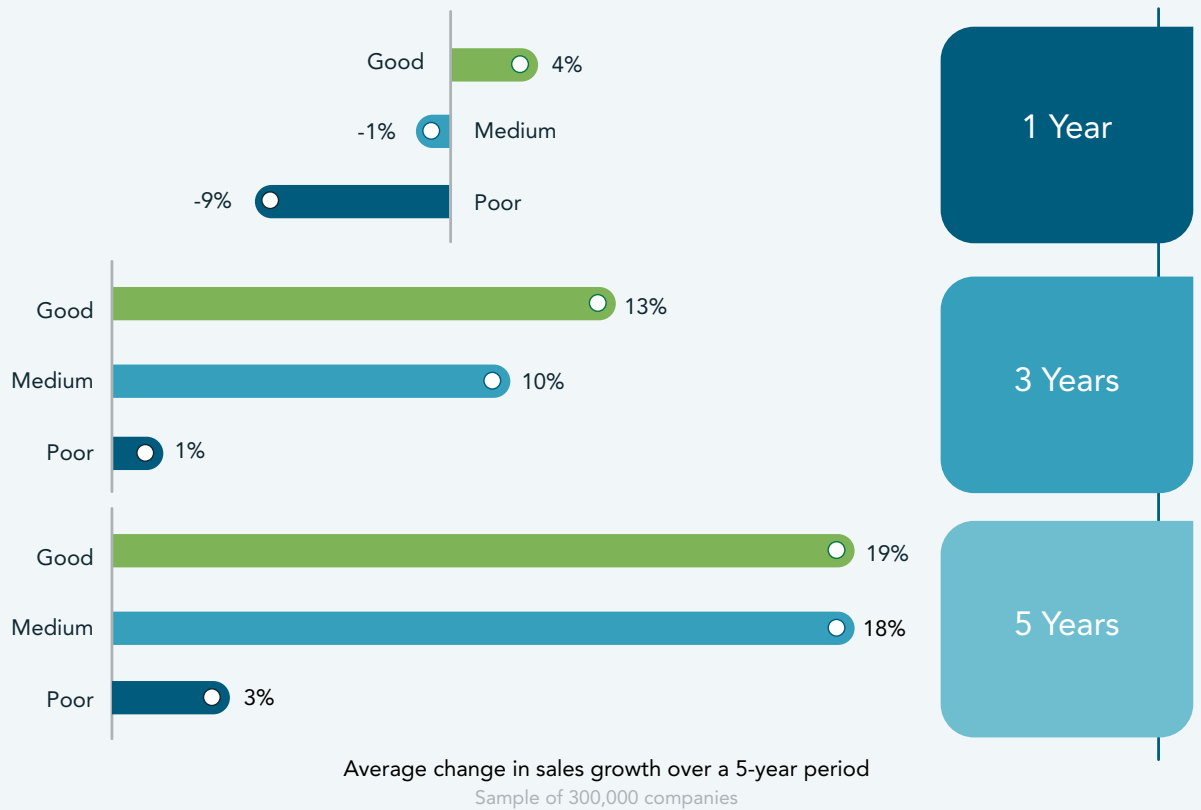
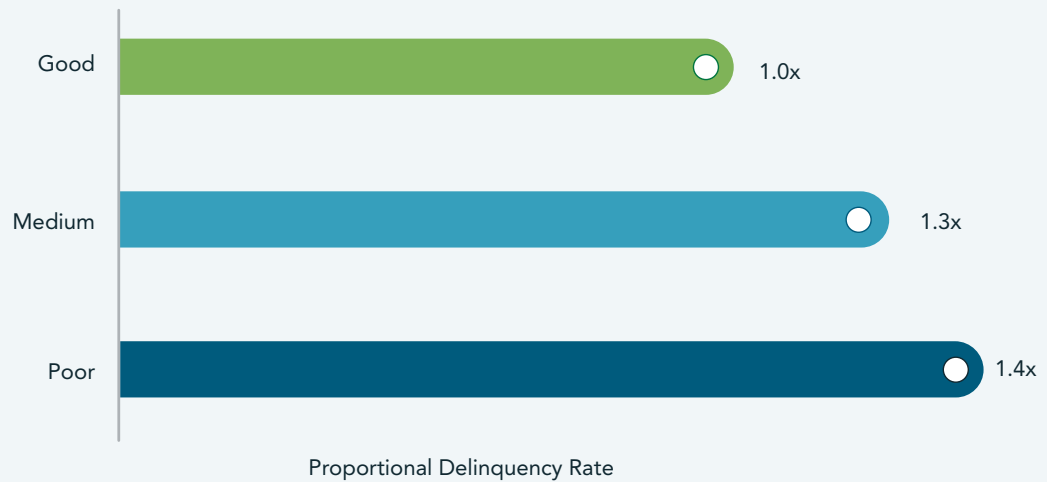


CHART 10:

Businesses with better business resiliency have lower delinquency rates



Data Validation

Data testing and validation of the accuracy of underlying ESG data was also undertaken to ensure the quality of the ESG Rankings dataset outputs. For data from sources other than Dun & Bradstreet, whose data goes through extensive validation and quality review processes, several validation steps are taken to ensure usability:

- **CROSS-VALIDATION** — Ingested data is compared with other private and public records from Dun & Bradstreet databases to identify congruencies and validate information. For example, if a company report states that sites have LEED green building certification, this is cross validated in internal datasets that identify green certifications with specific sites.
- **TRIANGULATION** — Where direct congruencies are not available, ingested data is compared with adjacent types of information. For example, if a company is associated with a human rights abuse in a news article, this information is checked against internal databases to see if that company has facilities and employees in the location or region specified.
- **MANUAL REVIEWS** — Manual reviews by analysts are undertaken via random sampling to ensure automatic data extraction, such as NLP analysis, is providing accurate assessments of keywords, sentiment, and polarity.
- **COMPANY VALIDATION** — Businesses can update data related to internal Dun & Bradstreet data via associated data portals. There is also an ESG Self-Assessment option for companies to submit additional or updated information specific to ESG.

Frequency and Data Maintenance

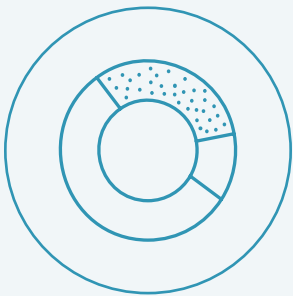
Sweeps for updated data are done on a weekly basis throughout the data sources that feed into the ESG Rankings dataset. These are then analyzed and used to update the dataset, which can be distributed to users on a monthly basis via batch downloads (e.g., FTP, S3), an application programming interface (API) platform, or a user interface platform. The data architecture is supported on Dun & Bradstreet's Global Data Supply Chain systems, so data from around the world is accessible to inform ESG Rankings in real time. Data hosted on the API is purged after 24 months per compliance requirements, but historical data beyond 24 months can still be made available via batch.

Data Depth Score

To provide additional transparency and information on the data availability fueling the ESG Rankings dataset, Dun & Bradstreet provides “data depth” scores. A data depth is provided for each ESG Ranking and separate E, S, and G scores, indicating the richness of ESG data behind the corresponding ESG score. The data depth is measured by sources and data points available for the ESG calculation for each topic, taking into consideration the topic’s importance to the company’s industry. Specifically, importance or “materiality weights” are combined with data availability to indicate the depth of data coverage for each ESG topic.

TABLE 2: Data depth levels and descriptions

DATA DEPTH	DESCRIPTION	#	CORE D&B DATA TYPES	EXAMPLE
A	<ul style="list-style-type: none"> Core D&B Data D&B Scores Certifications Blacklists NLP or D&B ESG Self-Assessment 	1	Trade	<ul style="list-style-type: none"> Delinquency rates on payments to suppliers
		2	Inquiry	<ul style="list-style-type: none"> Inquiries by government and tax departments
		3	Spend	<ul style="list-style-type: none"> Spend on employee training
		4	Derogatory	<ul style="list-style-type: none"> Lawsuits
		5	Diversity	<ul style="list-style-type: none"> Minority-owned business
B	<ul style="list-style-type: none"> Core D&B Data D&B Scores Certifications Blacklists 			
C	<ul style="list-style-type: none"> Core D&B Data D&B Scores NLP or D&B ESG Self-Assessment 			
D	<ul style="list-style-type: none"> Core D&B Data with 5/5 Types of Core Data D&B Scores 			
E	<ul style="list-style-type: none"> Core D&B Data with 4/5 Types of Core Data D&B Scores 			
F	<ul style="list-style-type: none"> Core D&B Data with 3/5 Types of Core Data D&B Scores 			
G	<ul style="list-style-type: none"> Core D&B Data only 			
H	<ul style="list-style-type: none"> D&B Scores only 			
I	<ul style="list-style-type: none"> NLP only or ESG Self-Assessment only 			



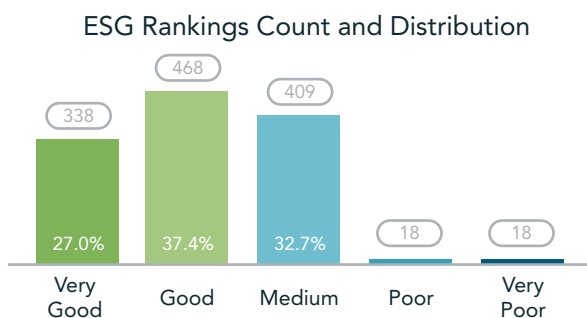
ESG Rankings in Practice

To put the ESG Rankings into practice, we use an example of a financial services company and its supply chain. This example illustrates how a business might assess its supplier network using different criteria for the three core components of ESG — environmental, social, and governance — to create a stronger and more resilient supply chain.

The organization has 1,251 suppliers in its portfolio, with an overall ESG Ranking of 2.13, ahead of the industry average of 2.40. Most of its suppliers are high performing, but 36 suppliers give cause for concern and would warrant further investigation. Suppliers that are deemed to be too high risk can then be replaced by others, creating a stronger supply chain.

FIGURE 8:

A financial services company's distribution, industry comparison, and count of suppliers in its supply chain portfolio



Portfolio average vs. Industry average



1,251
Portfolio

FIGURE 9:

A financial services company's distribution, industry comparison, and breakdown for the environmental ranking and specific environmental themes

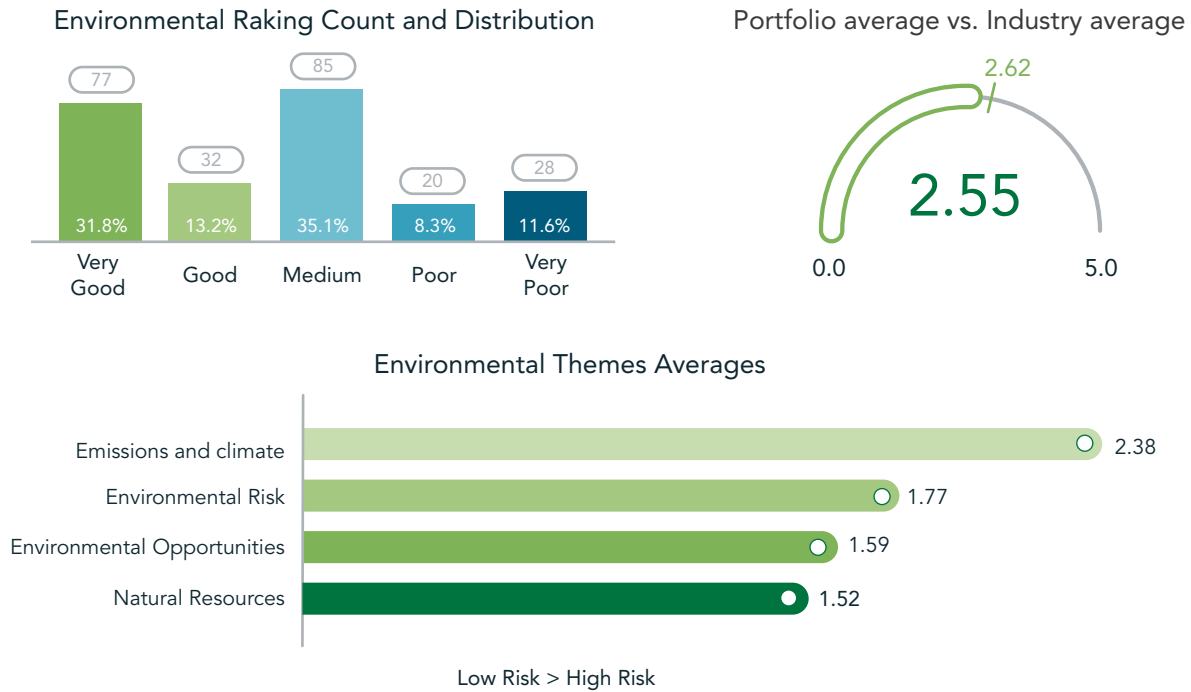
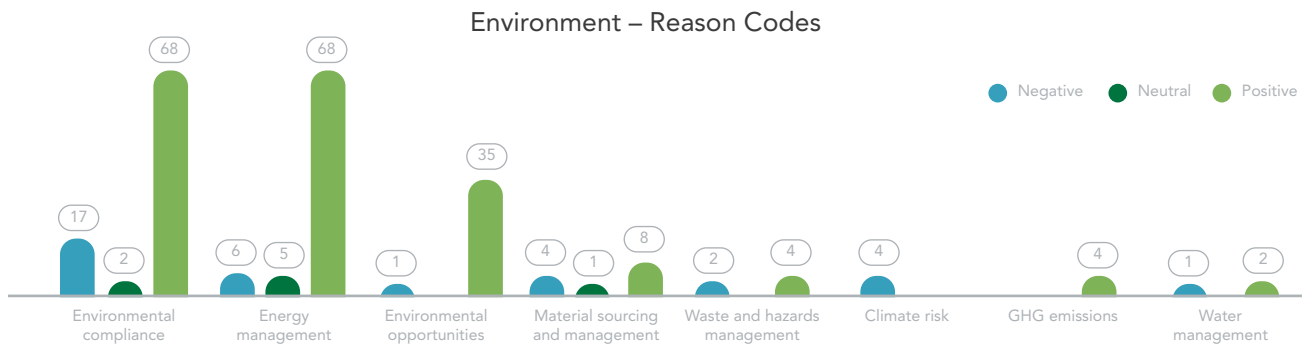


FIGURE 10:

Breakdown of primary reasons and their direction or polarity (negative, neutral, positive) influencing the environmental ranking

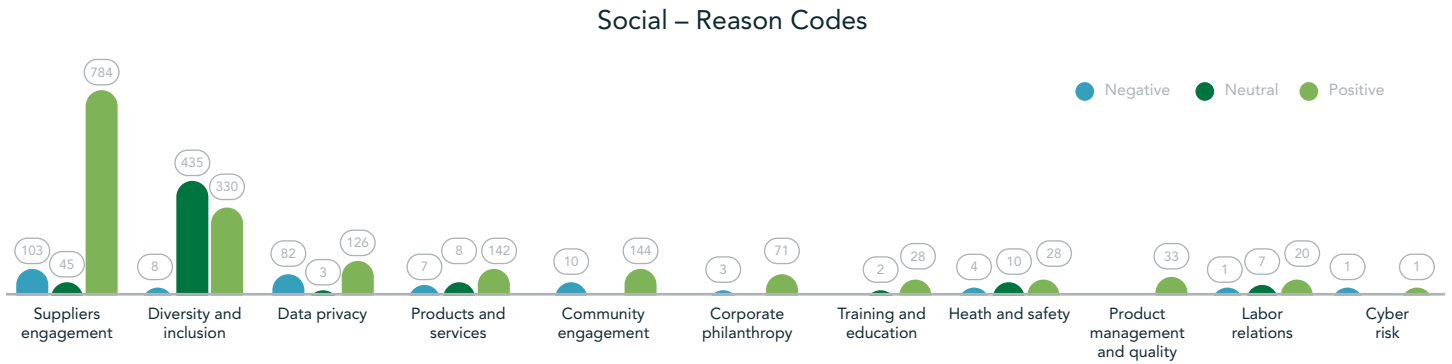


Related to environmental measures, the majority of the company's suppliers perform well, but 48 of those suppliers have poor or very poor performance. This is in part driven by the 17 suppliers that have negative environmental compliance indicators related to fines or non-compliance, and concerns with some suppliers regarding their energy management, materials sourcing, waste management, climate risk, and water management.

Being associated with a supplier that has poor environmental credentials can damage the reputation of that supplier’s customers. Furthermore, should a preventable environmental accident threaten the supply or shipping of goods or components, a customer-centric organization will find itself unable to meet the demands of its own customers, resulting in lost profits as well as a damaged reputation. Using sustainable sources and operating in a responsible fashion can reassure customers, senior leaders, shareholders, and supply chain managers.

FIGURE 11:

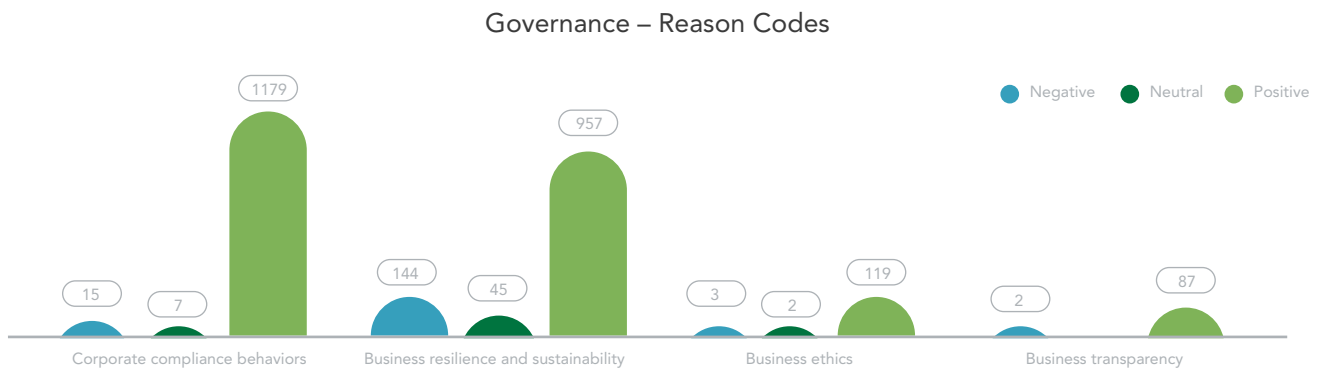
Breakdown of primary reasons and their direction or polarity (negative, neutral, positive) influencing the social ranking



On the social side, analysis suggests the majority of the company’s suppliers have good or average performance, but there are concerns about several of them. This is partly due to negative supplier engagement, such as slow payment or poor communication, but there are also issues with the quality of products and services as well as data privacy related to security breaches of customer information.

FIGURE 12:

Breakdown of primary reasons and their direction or polarity (negative, neutral, positive) influencing the governance ranking



The governance element for the financial services company is stronger, but there are concerns about a few suppliers, which would require further exploration. These revolve largely around business resilience — both in terms of financial stability and the ability to respond to climate events — but there are also some issues regarding corporate compliance, business ethics, and transparency.

Strong corporate governance practices are vital for organizations to be able to respond to operational problems, as well as cope with intensifying regulatory requirements, for instance, regarding diversity and equality or financial reporting. Using ESG data to manage a company's risk, such as through its suppliers, can help generate confidence that a company is unlikely to become caught up in regulatory or reputational issues, while having a stronger supply chain can act as a source of competitive advantage when it comes to winning new contracts.

ESG Self-Assessment

The ESG Self-Assessment provides an additional channel for data collection and company validation of ESG data. Any collected information goes through additional verification processes and, once processed, is added to any existing ESG data on a company. The ESG Self-Assessment is an online questionnaire composed of questions regarding ESG performance. The Self-Assessment references several of the main existing sustainability frameworks (e.g., the GRI, SASB, International Integrated Reporting Council, TCFD) as well as any current and emerging ESG-related regulatory frameworks. It is also designed to be complementary to the ESG Rankings dataset in order to streamline and prioritize specific ESG topics that are financially material to companies.

The ESG Self-Assessment is a mechanism for further data collection and company validation of data, but it also provides identification of the topics and areas where a company may want to focus its ESG strategies, especially as it moves through differing cycles of sustainability maturity. In conjunction with the ESG Rankings, the ESG Self-Assessment helps companies identify current ESG-related gaps in its strategy, reveals areas of potential improvement, and can inform the creation of ESG short- and long-term targets and goals.



Applications for the ESG Rankings

The coverage and materiality focus of the ESG Rankings allow for myriad applications, especially wherever risk identification needs to occur across a wide range and number of companies. The ESG Rankings dataset can be useful for the following positions.

PROCUREMENT LEADER

USE CASE: Evaluating the ESG performance of a large portfolio of third-party vendors or suppliers.

APPLICATIONS: Prioritizing monitoring or engaging with highest- or lowest-risk suppliers; evaluating hotspots of ESG risk among suppliers and throughout tiers; identifying suppliers to assist with corporate-led sustainability goals; identifying low-risk suppliers with which to build relationships by increasing spending or awarding long-term contracts or preferred contract terms.

INVESTMENT MANAGER

USE CASE: Evaluating the ESG performance of a large portfolio composed of public and/or private equity companies.

APPLICATIONS: Identifying public and/or private equity companies that will provide or impact additional returns using ESG risk as a proxy; identifying public and/or private equity companies that contribute to impact or thematic investing for portfolio composition; reporting and disclosing ESG-related data to regulators, asset managers, or other financial institutions.

BUSINESS SUSTAINABILITY MANAGER

USE CASE: Comparing company ESG performance; informing corporate sustainability strategy and/or reporting.

APPLICATIONS: Benchmarking company ESG performance compared with industry or competitive peers; evaluating ESG performance of a company's customers to inform sustainability strategies, including product development, customer engagement, or goal setting; evaluating ESG performance of a company's supply chain to inform reporting, strategy, or target setting.

BANKING/CREDIT EVALUATOR

USE CASE: Inputting the data into the lending, due diligence, or credit evaluation of companies.

APPLICATIONS: Considering ESG issues when evaluating credit worthiness; inputting for offering preferred lending rates to low-risk companies; evaluating and stress testing loan books using ESG as a parameter; incorporating ESG issues as part of due diligence and KYC (know your customer) during onboarding.

INSURANCE UNDERWRITER/ANALYST

USE CASE: Inputting the data into pricing models; identifying risk throughout a company's portfolio.

APPLICATIONS: Inputting into actuarial models for determining insurance premiums; identifying low-risk companies that may be candidates for insurance syndicates; evaluating company and supplier tier risks throughout the insurance portfolio.

SALES AND MARKETING MANAGER

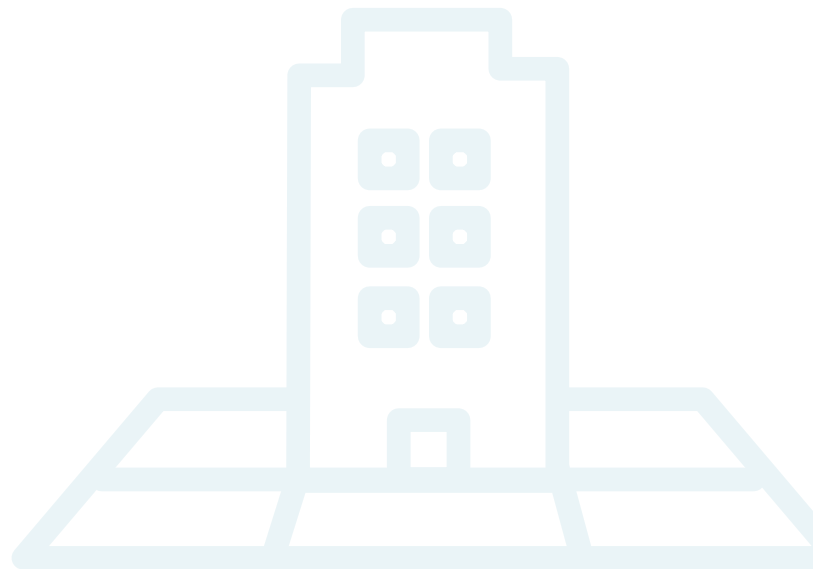
USE CASE: Identifying specific market segmentations based on ESG characteristics.

APPLICATIONS: Identifying sustainability-forward companies that may be interested in specific products or services; identifying sustainability-laggard companies that may be interested in specific products or services; inputting into market segmentation exercises to identify new markets and market penetration strategies.



Conclusion

The Dun & Bradstreet ESG Rankings dataset offers a robust look at public and private company ESG performance across a large volume of companies. While ESG has been a focus of many large, multinational companies for several years, there is little insight on these companies' supply chains, their private company customers or small to medium businesses. The ESG Rankings dataset aims to provide intel on a substantial size of the market that has historically been difficult to understand in terms of ESG performance. As the ESG landscape becomes more defined by incoming regulation, agreed upon standards and increased data transparency, ESG data can be yielded to make informed decisions towards improved outcomes. Through its current and upcoming efforts, Dun & Bradstreet aims to be a core partner in helping companies incorporate this valuable type of information into their business operations and short-, medium-, and long-term strategies.



APPENDIX:

ESG-related Data per ESG Topic

DIMENSION ENVIRONMENTAL

THEME	TOPIC	DESCRIPTION	INDICATIVE DATA POINTS
Natural Resource Management	Energy management	Indicator of the extent of a company's energy management efforts	<ul style="list-style-type: none"> Total energy use (quantity, spend, type) Renewable energy use Green energy commitments Energy efficiency measures
	Water management	Indicator of the extent of a company's water management efforts	<ul style="list-style-type: none"> Water consumption Water efficiency Water reuse and replenishment Wastewater treatment and permits
	Materials sourcing and management	Indicator of a company's approach to the risk management, availability, and preferred policies related to procurement and materials sourcing	<ul style="list-style-type: none"> Raw materials use in the supply chain Research and development investment in substitute materials Pricing and availability of resource use in a supply chain Management of risk through product design, manufacturing, and end-of-life management
	Waste and hazards management	Indicator of the extent of a company's waste management efforts	<ul style="list-style-type: none"> Total weight of waste in metric tons Waste reduction Percentage of hazardous waste Percentage of recycling
	Land use and biodiversity	Indicator of policies and impact related to land use and biodiversity loss	<ul style="list-style-type: none"> Natural resource extraction and cultivation Impact on biodiversity loss Habitat destruction from land acquisition
	Pollution prevention and management	Indicator of policies and impact related to pollution management	<ul style="list-style-type: none"> Measurements taken to prevent pollution and reduce the amount of toxins entering air, land, or water environments Adverse events such as spills or contamination Remediation or decontamination efforts
GHG Emissions and Climate	GHG emissions	Indicator of the measurement and management of GHG emissions	<ul style="list-style-type: none"> Carbon emissions GHG emissions (physical quantity of tCO₂e, intensity of tCO₂e/\$M)
	Climate risk	Indicator of a company's awareness of and readiness to address climate-related impacts	<ul style="list-style-type: none"> Climate risk and disaster recovery plans Measurement of climate risk, including floods, hurricanes, tornadoes, droughts, wildfires, etc.

DIMENSION ENVIRONMENTAL — CONTINUED

THEME	TOPIC	DESCRIPTION	INDICATIVE DATA POINTS
Environmental Risk	Environmental compliance	Indicator of a company's adherence to environmental regulations	<ul style="list-style-type: none"> • Non-compliance with environmental regulations • Delays on regulatory requirements, such as permits • Companies on environmental "black lists" and "polluters' lists"
Environmental Opportunities	Environmental opportunities	Indicator of a company's initiatives toward sustainable and green activities	<ul style="list-style-type: none"> • Clean tech initiatives • Number of green buildings • Percentage of renewable energy • Sustainability awards
	Environmental certifications	Indicator of whether a company has environmentally related certifications associated with its branches and headquarters	<ul style="list-style-type: none"> • ISO 14000, ISO 14001, ISO 14010, ISO 14011 • LEED, Forest Stewardship Council, Marine Stewardship Council, USDA Organic, Fair Trade, Rainforest Alliance, etc.

DIMENSION SOCIAL

THEME	TOPIC	DESCRIPTION	INDICATIVE DATA POINTS
Human Capital	Labor relations	Indicator of the quality of company and employee relationships	<ul style="list-style-type: none"> • Responsible employer relations • Satisfactory rate • Layoff and hiring rates • Spend on employees (activities, supplies, events)
	Health and safety	Indicator of the extent of a company's responsibility for employee health and safety	<ul style="list-style-type: none"> • Total incident rate, fatality rate, vehicle incident rate • Spend on industrial safety and maintenance • Occupational Safety and Health Administration compliance
	Training and education	Indicator of the extent of a company's focus on employee training and education	<ul style="list-style-type: none"> • Average hours of training • Spend on human relations, training, seminars, educational materials
	Diversity and inclusion	Indicator of the demographic diversity within a company and among its leadership	<ul style="list-style-type: none"> • Employee diversity ratio • Gender ratio, gender pay gaps • Minority-owned business (racial minority, woman, veteran, LGBTQ+, disabled) • Board of directors diversity; CEO diversity
	Human rights abuses	Indicator of the coverage of potential human rights abuses within a company's operations	<ul style="list-style-type: none"> • Human trafficking and human rights data • Conflict minerals and controversial commodities • Child and forced labor • Migrant rights

DIMENSION SOCIAL — CONTINUED

THEME	TOPIC	DESCRIPTION	INDICATIVE DATA POINTS
Products and Services	Cyber risk	Indicator of the vulnerability of a company to business disruption from cyber-related incidents	<ul style="list-style-type: none"> • Number of cyberattack incidents • Number and cost of data breaches
	Product quality management	Indicator of investment and activities related to the quality of a company's current and future product and service portfolios	<ul style="list-style-type: none"> • Internal and external product management processes and procedures • Product recalls • New product launches • Big data, data center, or cloud computing initiatives • Food and Drug Administration approval • New IT contracts • Product quality and safety; ISO 9001-certified companies
Customer Engagement	Products and services	Indicator of a company's investment and activities related to customer engagement for its products and services	<ul style="list-style-type: none"> • Spend on promotional materials • Working contact numbers for customer inquiries • Call center initiatives • Customer relationship management initiatives
	Data privacy	Indicator of a company's vulnerability to breaches related to personal and customer data	<ul style="list-style-type: none"> • Number and cost of data breaches that released customer or personal data • Data security measures
Community Engagement	Corporate philanthropy	Indicator of a company's commitment to providing philanthropy	<ul style="list-style-type: none"> • Spend on philanthropy • Spend on annual donations • Minimum time since last donation
	Community engagement	Indicator of a company's commitment to providing resources and channels for community enhancement	<ul style="list-style-type: none"> • Number of "do good" events • Total revenue spent on do-good initiatives • Volunteer days per employee
Supplier Engagement	Supplier engagement	Indicator of the quality of relationships and engagement of a company with its suppliers	<ul style="list-style-type: none"> • Slow and delayed payments to suppliers compared with industry • Negative payment experiences by suppliers • Presence of supply chain initiatives
Certifications	Social-related certifications	Indicator of a company's commitment to pursuing formal processes and management systems related to social issues	<ul style="list-style-type: none"> • OHSAS 18001-, ISO 45001-, ISO 26000-, ISO 20400-certified companies

DIMENSION GOVERNANCE

THEME	TOPIC	DESCRIPTION	INDICATIVE DATA POINTS
Corporate Governance	Business ethics	Indicator of a company's commitment to conducting ethical business practices	<ul style="list-style-type: none"> Ethical conduct and policies (code of conduct, committee charter, governance programs, regulatory programs) Whistleblower and grievance mechanisms History of corruption or misdeeds
	Board accountability	Indicator of accountability measures present in a company's board of directors	<ul style="list-style-type: none"> Board structure Board diversity: number of women on the board, number of minorities on the board Governance/conflict/auditing/compensation committees
	Shareholder rights	Indicator of the quality and use of appropriate channels for shareholders to enact their rights	<ul style="list-style-type: none"> Minority investors protection Number of shareholder proposals and policies ESG-related shareholder proposals and policies
	Business transparency	Indicator of a company's commitment to operating in a transparent and accountable manner	<ul style="list-style-type: none"> Transparency index, transparency awards Willingness to provide ESG disclosure Auditor details
Corporate Behaviors	Corporate compliance behaviors	Indicator of adherence to regulatory requirements and absence of liabilities	<ul style="list-style-type: none"> Sanctions list Awards list Liabilities and lawsuits Criminal activity Government inquiries Accounting and regulatory errors
	Governance-related certifications	Indicator of adherence to formal governance structures via pursuit of certifications	<ul style="list-style-type: none"> ISO 9000-, ISO 9001-, ISO 27001-, ISO 9002-, ISO 55001-certified companies
Business Resiliency	Business resiliency and stability	Indicator of a company's ability to be resilient against volatility, including economic- and weather-related events	<ul style="list-style-type: none"> Business activity related to preparing for bankruptcy Business recovery from natural disasters Meeting with creditors Systemic risk management

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