Arabesque S-Ray

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Introduction, Methodologies and FAQs

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Introduction to Arabesque

Arabesque S-Ray is a global financial services company that focuses on advisory and data solutions by combining big data and environmental, social and governance (ESG) metrics to assess the performance and sustainability of publicly listed companies worldwide.

With offices in London, Frankfurt, Singapore, Delhi and Boston, S-Ray empowers investors, corporates, and other stakeholders across the world to make more sustainable decisions. The firm's evolution is a story of partnership between leaders in finance, mathematics, and sustainability working together to accelerate the transition to a more sustainable future.

Our proprietary tool, Arabesque S-Ray®, which scores companies on a range of Environmental, Social and Governance (ESG) metrics, is available through a variety of products. S-Ray recognizes that technology and human experience must intersect to best collaborate with and serve our clients. With the S-Ray teams' diverse industry and academic experience, we provide corporates and investors with advisory and bespoke solutions.
Arabesque's vision is to help make sustainable and responsible investing attractive and available to everyone. To empower organizations and people through data transparency. We believe economic value creation can and should be combined with environmental stewardship, social inclusion, and sound governance. This is because sustainability factors are more than merely extra financial considerations for investors; they form the very foundations of successful markets.

Through big data and machine learning, our technology integrates ESG information with the aim of delivering tools and solutions that help clients manage risk and drive long-term performance. By making this approach accessible to all, we believe that finance can be a catalyst for change. We believe that the sustainability data industry is on the cusp of a significant tipping point - from the traditional model where companies were assigned scores by analyst driven rating agencies with little transparency on the data used or methodology, to one with access to and disclosure of raw data and transparency in methodology and data used, and where bespoke solutions and tailored data sets based on investors' values will reign.

Methodology Links:

- ESG/GC Methodology
- Preferences Filter Methodology
- Temperature Score Methodology

Research Links:

- Screened Investing: A Practitioner's Perspective
- Diversity: More than a Buzzword
- Temperature Score: Less than one quarter of companies on track for 1.5
- Can Palm Oil Become a Sustainable Investment?

Frequently Asked Questions

General

What is the difference between S-Ray and other sustainability scores and rankings?

The key factors that distinguish S-Ray from other companies in the ESG data space, include the following:

Board: Arabesque has a world-class board and advisory board within the sustainability space which provides S-Ray with oversight as well as content.

Academic insight: S-Ray has been developed in collaboration with leading universities and a world-renowned board.

Reduction of potential behavioural biases: S-Ray utilises an algorithmic approach, systematically combining a diverse set of data sources, rather than relying on one set of human judgements.

Investor perspective: Initially developed for Arabesque's investment process, S-Ray provides a unique investor perspective and a deep understanding of materiality.

Daily scoring: Through the combination of multiple data sources and news signals, daily updates can provide for more responsive decision making.

Multiple lenses: To reflect the multi-faceted nature of corporate sustainability, S-Ray provides four distinct sustainability measurements, instead of one simple score.

Scalable: S-Ray's quantitative methodology allows for the constant addition of inputs for greater coverage, more comprehensive scoring, and competitive pricing.

Machine Learning: The S-Ray model uses machine learning techniques to determine how much variation in returns can be explained by each of the 22 sustainability topics. S-Ray utilises recursive feature elimination using a Gradient Boosting Regressor with a least-squares loss function to understand which S-Ray features work best to explain financial performance.

What is the difference between the GC Score and the ESG Score?

While the GC Score builds from a normative framework to approximate reputational risk, the ESG Score identifies companies that are better positioned to outperform over the long term. To understand the potential for long-term performance, the S-Ray® methodology considers the principle of financial materiality. That is, when computing the ESG Score of a company, the algorithm will only use information that significantly helps explain future risk-adjusted performance. Materiality is applied by more heavily weighting features with higher materiality, and weights are rebalanced on a rolling quarterly basis.

Together, the GC Score and ESG Score provide a powerful and holistic understanding of a company's sustainability profile.

Note that this also means that a company's environment sub-scores of the GC and ESG Score will not be identical. The ESG-E score considers the financial materiality of Features (i.e. when computing the ESG-E score of a company, the algorithm will only consider that information that significantly helps explain future risk-adjusted performance). The GC-E score does not consider financial materiality, but rather looks at how companies treat their environment from a normative perspective

How often are the scores updated?

Our S-Ray® GC and ESG scores, as well as our Preferences filter are calculated daily. This does not, however, mean that a company's score will change every day, but that when new data is available, it is incorporated immediately. This is different for the Temperature Score which is updated at a minimum annually, in-line with the typical reporting cycles of emissions data. The calculation of the Temperature score will be undertaken weekly, however, to incorporate any new emissions or revenue data that may become available.

Can you please explain how you normalise scores (ESG/GC Relevant)?

Normalisation occurs at the Input Layer and Feature Layer. Please note that scores are not normalised at the Score Layer.

With regards to the Input Layer, S-Ray aggregates data from various data sources. To ensure comparability between providers, normalisation is applied to all these metrics. Our input mapping allows us to more uniformly normalise within the S-Ray universe for a broader set of datapoints, increasing consistency and stability over time.

Regarding Feature Score normalisation, we observe that – on average – the short-term corrections pull the Feature Score down by 5 points. In an effort to normalise our scores with 50 as the neutral centre, we add a normalisation adjustment of 5 points to each Feature, except in cases where the long-term feature score will exceed 100. Given this normalisation method, it is possible for the average score to not equal exactly 50 as the effects of short-term corrections may vary at any given point in time.

ESG Score

What is the ESG Score?

The ESG Score identifies sustainable companies that are better positioned to outperform over the long-term. To understand the potential for long-term performance, the S-Ray methodology considers the principle of financial materiality. That is, when computing the ESG Score of a company, the algorithm will only use information that significantly helps explain future risk-adjusted performance.

Materiality is applied by over-weighting features with higher materiality, and rebalancing these weights on a quarterly basis.

How is the ESG score Calculated?

The S-Ray® methodology is built on 3 layers. First, through the Input Layer, data from company reports, news articles, and NGO campaigns is collected and prepared. These inputs are then mapped into various Features representing distinct sustainability topics. Finally, the features are used in different ways to produce a range of S-Ray® scores.

The ESG Score is a sector-specific analysis of each company's performance on financially material environmental, social, and governance (ESG) issues. This score is all about identifying companies that are better positioned to outperform over the long term. To understand the potential for long-term performance, the S-Ray® methodology considers the principle of financial materiality. That is, when computing the ESG Score of a company, the algorithm will only use information that significantly helps explain future risk-adjusted performance. Materiality is applied by more heavily weighting features with higher materiality.

What is considered to be a 'good' score?

In general, we consider 50 to be the neutral centre i.e. anything above 50 is performing relatively well, whilst anything below 50 is performing relatively poorly and has room for improvement.

What is your approach to materiality/weighting methodology?

S-Ray aggregates inputs along 22 well-defined sustainability topics (features) using dimensionality reduction techniques.

S-Ray's ESG Score methodology identifies companies that are better positioned to outperform over the long-term by considering the principle of financial materiality. That is, sustainability features that are more material to financial performance are weighted more heavily in the overall ESG Score.

For each quarter for every company, materiality is assessed on a sector- and industry-level, using both equal- and market-cap-weighted monthly index returns over a period of the past 1, 3, and 5 years. This results in 12 different portfolio index returns for each company. For each portfolio, the materiality is then calculated as follows:

1. Static Materiality: The S-Ray model assigns a baseline materiality to each feature in each portfolio. These baselines are based on third-party research and industry reports that have looked at the materiality question. These inputs may help obtain a first understanding of which categories are material in a company's ability to outperform in the long-run
2. Dynamic Materiality: The S-Ray model considers how much of the variation in returns can be explained by each of the features. This is achieved by first applying a multi-factor asset-pricing model to obtain residuals (i.e. the unexplained part of variation in returns), followed by a recursive feature elimination procedure with cross-validation to identify those features that explain a significant part of the variation in residuals from the multi-factor regression. As a result, features which are found to be material during this process are assigned more weight.

Global Compact Score

What is the GC Score?

The GC Score provides a normative assessment of companies based on the four core principles of the United Nations Global Compact: Human Rights, Labour Rights, the Environment, and Anti-Corruption.

With more than 9,000 corporate signatories from over 160 countries, the Global Compact is the world's largest corporate sustainability initiative. With Arabesque S-Ray, these principles are quantified for the first time. We believe the GC Score can be used to approximate reputational risk facing companies with lower scores. As such, the GC Score also provides a tool to investors to help limit downside risk.

How is the GC Score calculated?

The S-Ray® methodology is built on 3 layers. First, through the Input Layer, data from company reports, news articles, and NGO campaigns is collected and prepared. These inputs are then mapped into various Features representing distinct sustainability topics. Finally, the features are used in different ways to produce a range of S-Ray® scores.

The GC Score, on the other hand, offers a normative assessment of companies based on the core principles of the United Nations Global Compact. Here, the sustainability features are mapped against the four main principles - Human Rights, Labour Rights, Environment, and Anti-Corruption - to produce four GC sub-scores. These scores are then aggregated using a non-compensatory aggregation approach that reflects the universal nature of the GC principles. If performance in any one GC category deteriorates below 50 (i.e. the neutral centre), heavier weighting is applied to underperforming categories to hold companies to the UNGC.

If a company is a signatory of the UN Global Compact, will this directly impact their GC Score in any way?

We do indeed look at whether a company is a signatory to the UNGC as a data point that is mapped to Human Rights, but its impact to the overall score is rather low since there are many other data points we consider too. However, it should be noted that this data point does not explicitly state whether or not a company is a signatory to the UNGC. Instead, it has the following description: "Does the company have a policy to respect Business Ethics, or has the company signed the UN Global Compact, or follow the OECD guidelines?".

As such, if a company has signed the UNGC – it would get a 'Yes' for the input, which would positively (albeit not significantly) affect the company's Human Rights feature score, and the Human Rights GC sub-score.

The main reason for this is that, while being a UNGC signatory shows good intent, it doesn't necessarily enforce good behaviour. The UNGC is mostly about increasing transparency and building a framework. So, while the GC Score calculation does integrate data points on membership, policies etc ('preparation'), we also try to make sure that highly scored companies actually behave well (via inputs that focus on 'outcome').

Value Alignment Tool

What is the Value Alignment Tool?

At S-Ray, we acknowledge that there is no one definition of sustainability for all - it means different things to different people, corporations, and countries.

To that end, the S-Ray Value Alignment Tool is the lens of Arabesque S-Ray that allows users to screen over 27,000 companies for 33 different business involvements. The filter enables investors and consumers alike to research the business involvements of companies based on their own values, empowering everyone to make more informed decisions on how and where they use their money. The Preferences Filter offers selection tools based on the location, size and activities of a company, together with business involvements and faith compliance.

How is the Value Alignment Calculated?

Each filter is made of two parts. A revenue filter, and an involvement filter. Revenue associated with each business segment is calculated, and an allowed revenue threshold is set. Separately, company involvement associated with each business segment is recorded. Then, both revenue and involvements can be combined as desired to create the final preference filter.

The revenue breakdown data tracks reported company revenue from financial statements and 10-K reports. The business involvement data tracks products and services sold by companies as reported on company websites or in company reports and presentations. It is possible for a company to have a recorded involvement in a particular business segment, but no reported revenue, or visa versa.

What is the difference between Revenue and Involvement?

1. The Involvement flag is binary and shows a Y/N answer for the question: 'Does the company sell products or services within this business stream.
2. The Revenue flag is numeric and shows if a certain % of the proportion of a companies revenue is associated with this business stream.

The standard value alignment filters flag companies that are over a 5% revenue threshold or that have recorded involvement in each business segment. Due to the nature of the new data source it is possible to create filters set at custom revenue threshold, or without the inclusion of the involvement data.

Appendix I – Feature Definitions

Feature	Description
Environmental	
Emissions	The contribution of business activities to the emission of greenhouse gases and other air pollutants. Inputs into this feature include emissions data as well as reduction initiatives, objectives, policies and monitoring.
Environmental Stewardship	The impact of business activities on biodiversity and animal welfare. Inputs into this feature include the use and regulation of animal products/testing alongside biodiversity impact initiatives and targets such as Forest Stewardship etc.
Resource Use	The efficient use of energy and other natural resources including land and materials. Inputs into this feature include energy use/efficiency and land use reduction initiatives, recycled raw materials, toxic chemicals reduction and resource efficiency policies as well as targets and monitoring.
Environmental Solutions	The environmental impact of products and services and the contribution towards sustainable consumerism. This feature includes inputs including, but not limited to, the development of hybrid vehicles, smart water solutions and sustainable building products as well as offering environmental and renewable/clean energy products. Responsible asset management, the supply of renewable energy and environmental products targets are also included.
Waste	The generation of waste and other hazardous output as part of business activities. This includes inputs covering hazardous and general waste generation and reduction policies, recycling practices and oil spill disclosure.
Water	The efficient and responsible use of water throughout company operations. Covering water pollution, recycling initiatives and water withdrawal.
Environmental Management	The mechanisms and policies employed to manage the overall environmental performance of the business. Inputs to this feature relate to environmental lawsuits, investments into resource efficiency and environmental impact reduction as well as the environmental management system of the company.
Social	
Diversity	The representation of and equal opportunity for women and minorities in the workforce and on the board. To calculate this board and employee diversity, discrimination lawsuits and commitment to supplier diversity among other inputs are used.
Occupational Health and Safety	The workplace-related health and safety performance. This includes inputs such as the disclosure of accident rates and workplace injuries, employee health and safety training and certification, policies/procedures and targets.
Training and Development	The opportunities and programmes in place to enable and support learning across employees and the supply chain. Considering employee training hours, costs, and policies as well as the monitoring and targeting of these.

Product Access	Providing access to products and/or services for disadvantaged communities. Product access is composed of the access to finance, medicine, education, food and affordable housing programmes.
Community Relations	The level of community involvement and public trust. Inputs include customer satisfaction and community relations policies, targets and the monitoring of these as well as a disclosure of employee volunteering hours.
Product Quality and Safety	The quality and safety of products and services and level of customer satisfaction. This feature is composed of lawsuits, policies, targets and monitoring relating to the product quality management as well as consumer satisfaction and others.
Human Rights	Adherence to and promotion of human rights throughout all business activities, including the supply chain. Inputs include suppliers' human rights consideration, employee human rights training and policy as well as targets and monitoring of these.
Labour Rights	Compliance with internationally recognised labour standards, both in-house and across the supply chain. This includes the Freedom of Association, Supplier Code Audit and child labour, forced labour and labour rights policies.
Compensation	The fair and equal compensation of staff and board members. Judged by average salaries and benefits, board member compensation, pension funding among many more.
Employment Quality	The working conditions and employee satisfaction. Accounting for employee turnover, work-life balance policy and worktime flexibility as well as several other inputs.
Governance	
Business Ethics	Fair business practices as it relates to issues like corruption, political contributions and anti-trust. Typical inputs include lawsuits relating to these issues and policies in place to monitor and reduce their impact.
Corporate Governance	The procedures and mechanisms in place that ensure proper long-term control and management of the corporation. The feature inputs relate to the board and committee as well as policies and targets surrounding governance issues like shareholder rights, insider trading and many other common problems.
Transparency	The level of transparency and disclosure of critical information about the business. This accounts for disclosures relating to director compensation and articles of association as well reporting standards and external verification.

Forensic Accounting	The overall earnings quality or the degree to which reported earnings properly represent a company's financial health.
Capital Structure	The relative level of leverage and how it might take away from a long-term focus in decision making. Inputs will typically include the debt to equity ratio and targets for this.

Appendix II - Value Alignment Tool Filter Definitions

Screen	Definition
All Mining	Companies that extract naturally occurring metals and minerals from mines, such as coal, base and precious metals and other non-metallic minerals.
Coal Mining	Companies involved in the leasing of coal mines and the mining and processing of coal. Additionally, this includes those companies producing coke for sale to others.
Thermal Coal	Companies involved in the leasing of coal mines and the mining and processing of thermal (steam) coal.
Unconventional Fossil Fuel Extraction	Companies engaged in oil/gas exploration and production including shale gas, coalbed or coalseam methane (CBM/CSM), tight gas, gas hydrates, and oil shale deposits. Moreover, Unconventional Fuels covers oil sands and synthetic crude oil operations which are considered unconventional in exploration and production.
Traditional Energy Generation	Companies which provide electricity generated by hydrocarbon and nuclear technologies.
Forestry Products	Companies engaged in the manufacturing of products derived from timber, such as pulp, paper, and paperboard. For example, those which manufacture pulp and/or paperboard (i.e., the raw material from which paper products are made), paper and cardboard, newsprint and other mass-produced publications. Furthermore, this includes companies engaged in the growing, harvesting, and management of timber properties as well as, manufacturers of specialised machinery used by forestry industries. Some examples include chip bodies and utility tree vehicles.
Palm Oil Production	Companies that are involved in palm farming, including companies that produce or extract crude palm oil from their own agricultural operations.
All Fossil Fuels	Companies involved in all aspects of oil and gas exploration and production, pipeline transportation, refineries, and oil and gas equipment and services. Includes utilities who provide natural gas or electricity generated by fossil fuels. Includes Coal Mining.
Private Prisons	Predominantly, correctional institutions operated by private companies on behalf of federal, state and local government agencies, which are generally responsible for incarceration, detention, education and treatment service for adults and juveniles.
Correctional Health	Predominantly, companies that operate within jails, prisons, or other detention facilities, to provide medical, dental, substance abuse, and mental health services. This sector does not include hospitals, urgent care centers or physician practices that may provide care to prison inmates or detained persons who are transported to the hospital facility for treatment.

Predatory Lending	Includes pawnshops that sell used merchandise, as well as check-cashing services. These companies often operate a number of small outlets offering small, short-term loans at very high interest rates.
Firearms	Companies that sell small arms and ammunition, generally comprised of personal, non-military firearms and ammunition.
Defence	Manufacturers of advanced equipment and providers of services targeted at combat, national security, and other defence applications, including defence contractors, advanced weaponry and combat equipment and support systems, autonomous military drone manufacturing, and advanced electronic hardware targeted at military and intelligence applications. Military and defence functions testing equipment. Propulsion launch used in vehicle and missile launch, and computer systems, electrical components, IT solutions and software tailored and designed for the defence industry (note - such technology can also have applications in the aerospace sector).
Advanced Weaponry	Manufacturers of advanced weaponry and combat equipment and systems such as artillery equipment and other heavy weaponry, combat and combat-support vehicles, missile systems, attack submarines, military aircraft, unmanned aerial vehicles (UAVs), autonomous military drones, and other combat equipment and systems. Note these categories are also covered within the broader Defence screen.
Controversial Weapons (Production)	Companies with a direct involvement in controversial weapons, such as through involvement in the manufacturing and supply-chain. This includes producing products or services related to any of the following: Landmines, Cluster bombs, Chemical and biological weapons, or Nuclear weapons; either whole strategic parts or platforms for the use of.
Controversial Weapons (Investments)	Companies with a direct investment in controversial weapons. Direct investments can include providing loans to or issuing bonds to companies that fall in the above categories, as reported by both news outlets and non-governmental organisations.
Tobacco	Leaf Tobacco sold to manufacturers of finished tobacco products. Manufacturers of cigars, cigarettes and other tobacco products, including e-cigarettes, rolling tobacco, and cigarette papers. Wholesalers of tobacco and tobacco products.
Alcohol	Alcoholic beverage manufacturing, including breweries, distilleries, wineries and manufacturers of other alcoholic beverages. Wholesalers of beer, wine and distilled alcoholic beverages. Alcohol-serving bars and pubs.
Gambling	Companies in the casino, casino hotel, gaming equipment, and horse racing industries. Software with functionality specific to the casino industry.
Adult Entertainment	Web sites that generate revenues by providing erotic content. Companies which produce, distribute, and exhibit adult-oriented content, including the production of Adult-oriented content for the cable television, video/DVD, and internet market. Magazines that generally contain explicit sexual content.

Cannabis	Farms which cultivate cannabis, including products for both medical and non-medical use.
Pesticide Production	Includes companies engaged in the manufacturing of pesticides, such as herbicides, fungicides, insecticides, miticides, rodenticides, germicides, and others.
Fertiliser Production	Includes companies engaged in the manufacturing of fertilisers, such as nitrogenous fertilisers, potassium fertilisers and phosphate fertilisers. Additionally, this includes companies engaged in the manufacturing of mixed fertilisers and other fertilisers not derived from nitrogen, potassium or phosphate.
Plastic Production	Companies involved in the production of plastic packaging, materials and resins as well as, wholesalers of plastic materials. Includes companies engaged in the manufacturing of synthetic rubber resins and materials, such as styrene, neoprene and polychloroprene. Industry-specific factory machinery and equipment used by producers of plastics and rubber.
Animal Farming	Companies involved in the raising and processing of animals and related support activities. This may include, beef, dairy cattle, hog, pig, chicken egg, chicken meat, turkey, fish, shellfish farming for food consumption. The raising of different animals in an agricultural setting, including but not limited to horses, bees, silk worms, goats, and sheep. Similarly, shellfish harvested from the ocean or raised in a controlled environment (aquaculture) for eventual consumption (includes pearl production).
Animal Products	Includes the generation of food for any household pets, leather goods, those involved in the processing of slaughtered animals and seafood into food products ready for consumption, or used as ingredients for other foods. Moreover, includes fresh milk and milk-based products, e.g. yogurt, evaporated/condensed milk, ice cream, butter, cheese, dairy spreads, etc.
Leather Goods	Includes companies that manufacture goods from leather, such as wallets, belts and other leather products.
Animal Research	Includes companies that manufacture specialised equipment, instruments and research models (laboratory animals) that are used in preclinical trials and other animal research to monitor and measure the effects of experimental conditions.
Pork and Beef	Includes those companies involved in hog and pig farming for food consumption (e.g. bacon, pork, ham), and beef and dairy cattle farming. Additionally, this includes manufacturers of pork and beef into meat products or edible casings ready for consumption, or as ingredients for further processing.
Stem Cells	Companies that use adult stem cells obtained from adult human cancellous bone and bone marrow to aid bone regeneration, and autologous stem cells that are harvested from the patient's own body and implant back for repair and healing, including systems used for the collection, cryopreservation, and archive storage of stem cells to be used in stem cell therapy. Companies that offer bioanalytical services that are used to produce identical DNA or RNA molecules (cloning), and bioanalytical services that identify and isolate clones based on DNA fragments.

Reproductive Health	Companies involved in the management of the specialties involving the areas of human reproduction. Care in this area include the specialties of obstetrics and infertility as a few others. Management of obstetrics and gynecology specialists.
Catholic Non-Compliance	Companies that do not adhere to the USCCB (United States Conference of Catholic Bishops) guidelines for responsible Catholic investment.
Genetically Modified Organism (GMO)	Companies engaged in plant and animal breeding, genetics and genomics, including animal and plant DNA testing services.
Air Transporation	Companies involved in transport cargo and freight by air, and provide affiliated services, owners of aircraft used to transport cargo, operators of fixed wing aircraft and helicopters providing goods and passenger transportation services to remote communities, or mining and forestry operations, aerial fire management, note, companies that focus on the Delivery and Logistics sector are generally excluded, however, even if they own and operate aircraft.
Petroleum Shipping	Companies involved in the transportation of petroleum and petroleum products using barges or VLCCs (Very Large Crude Carriers).
Nuclear Energy	Wholesalers which provide electricity generated by nuclear power. Nuclear (radioactive) waste processing, including mixed waste, which is waste that contains both low-level radioactive and hazardous waste. Companies engaged in uranium, radium, and vanadium mining.

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