

FAST & FURIOUS ESG INTEGRITY

High-Performance Data Analytics to Shift ESG Quantification
and Verification into High Gear

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INTERSECTION OF DATA TECH ADVANCES AND ESG



Tech advances have been powering the convergence of high-performance computing with data analytics. To date, turbocharged data analytics have been applied at the firm level to high-margin businesses, risk measurement, and loss mitigation. Now, the opportunity to apply high-performance data analytics and AI to a global good has arrived, driving ESG (environmental, social, and governance) quantification and verification and thereby ESG integrity.

Two positive mega trends are converging to drive and reward corporations' ESG results (Figure 1). First, tech advances are turbocharging data infrastructure and, thereby, data analytics, resulting in high-performance data analytics and AI. Second, ESG initiatives have grown exponentially as activist money managers and shareholders have increasingly demanded ESG initiatives from corporations and rewarded them for their efforts.

Figure 1: Advances in Data Tech and ESG

ADVANCES IN:	2010 - 2014	2015 - 2021	2022 & BEYOND
DATA TECH	<ul style="list-style-type: none"> • Rise of cloud-native architecture • Improved connectivity through API adoption • More powerful data engines: Hadoop and SQL • Common data formats • Early days in harnessing unstructured data 	<ul style="list-style-type: none"> • Mainstreaming of cloud-native architecture and open source • Rise of high-performance data analytics and AI • Decoupling of compute from data, giving rise to new data software defined architectures • Enabling advanced analytics and AI methods, driving a fundamental shift in the way businesses leverage data in planning, products/services and operations 	<ul style="list-style-type: none"> • Advanced analytics and AI methods form a foundation for leading-edge business model innovation • Enabling high levels of automation and autonomy within business processes • Driving the emergence of whole new classes of data-driven models, such as Industry 4.0 and platform-centric businesses
ESG	<ul style="list-style-type: none"> • Early days with unclear metrics and lukewarm investor interest • Supranational efforts, e.g., United Nation's Principles for Responsible Investment (PRI) 	<ul style="list-style-type: none"> • Major investors begin rewarding ESG initiatives (e.g., 2016 BlackRock begins ESG campaign) • Exponential growth in ESG investment (\$47 billion in 2020, double the cumulative amount 2015-2019; Goldman Sachs) 	<ul style="list-style-type: none"> • Continued momentum: Investors plan to double their sustainable AUM 2021-2025 from 18% to 37% on average (BlackRock)

Source: Celent interviews with Hitachi Vantara, research, and analysis

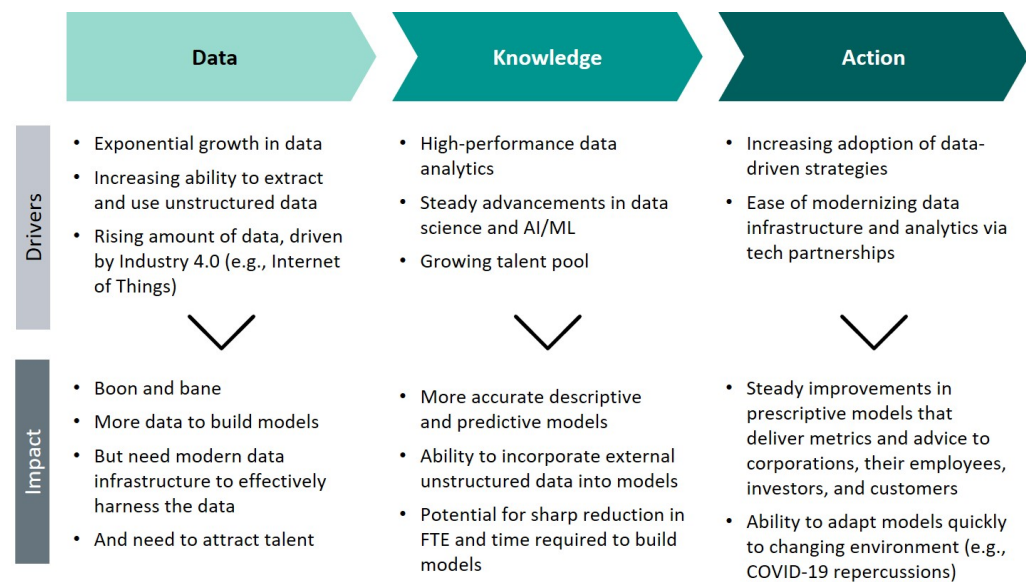
Turbocharging Data Infrastructure and Analytics

Over the past decade, exceptional advancements in data infrastructure and analytics have been achieved. The turbochargers have been high-performance computing; cheaper, more accessible data; exponential growth in data and improved data quality; and steady improvements in advanced analytics and AI methods. Combined, these are driving a paradigm shift in data-driven businesses. Increasing computing power, including graphics processing units, custom silicon, and field-programmable gate arrays, has created a foundation for business model innovation.

The quantity of data that businesses need to process has grown exponentially, and the data now originates from myriad sources, such as operational sensors (e.g., Internet of Things), financial transactions, unstructured data sources, and carbon emissions. Waves of digitalization, innovation, and competitive dynamics are driving this exponential growth. At the same time, achieving the 4 “Cs” of data—capture, clean, cache, and call—has become easier. Just as important as the tech advancements are the paradigm shifts: an increasing comfort with and use of cloud infrastructure, open source, and collaboration. In addition, corporations and investors are increasingly confident in the use of artificial intelligence and machine learning to gain insights and drive broad-scale automation.

As a result of this turbocharging, data is readily being translated into knowledge and action (Figure 2).

Figure 2: From Data to Knowledge to Action



Source: Celent interviews, research, and analysis



56% of respondents stated that their company benchmarks their ESG disclosures against that of peers.”

Intelligize *The Conscience of Corporations: Public Company ESG Adoption*

ESG-Driven Corporations Becoming the Norm

The belief that corporations are responsible not only to their shareholders and customers but also to people and the planet in general is becoming the norm. Hence ESG initiatives are shifting into high gear.

Until recently, corporations’ and investors’ journey to believing in and acting on ESG responsibilities had been protracted. The journey began in 2004 at the supranational level when the United Nations Secretary General launched a Global Compact initiative to integrate ESG into the capital markets and invited over 50 CEOs of major financial institutions to participate. In 2006, the New York Stock Exchange launched the Principles for Responsible Investment (PRI), and then in 2007 launched the Sustainable Stock Exchange Initiative (SSEI). It was not until the second half of the 2010s that ESG initiatives were materially rewarded by the capital markets.

Around 2015, money began to talk, as evidenced by the steepening slope of the number of PRI signatories and their assets under management (AUM). The signatories include asset owners, investment managers, and service providers who commit to integrating ESG factors into their investment decision-making. Between 2015 and 2021, PRI signatories jumped from 1,500 to 3,826 and their AUM from \$100 trillion to \$121 trillion. Money managers and investors have been increasingly embracing the credo articulated by BlackRock’s CEO letter in 2016: “Over the long-term, environmental, social and governance (ESG) issues...have real and quantifiable financial impacts. At companies where ESG issues are handled well, they are often a signal of operational excellence.”

The repercussions of the pandemic have underscored the importance of corporations taking responsibility for people and the planet. In response, more money is talking. During 2021, the number of PRI signatories increased a record-breaking 26%. In addition, the vast majority (86%) of the millennial generation, which will inherit over \$68 trillion by 2030 (Coldwell Banker report), are showing strong interest in sustainable investing (Morgan Stanley Institute report).

HIGH-PERFORMANCE DATA ANALYTICS SHIFTING ESG INTO HIGH GEAR



Investors want better ESG data

53% of global respondents cited the poor quality or availability of...ESG data and analytics as the biggest barrier to deeper or broader implementation of sustainable investing, higher than any other barrier that we tested.”

BlackRock *2020 Global Sustainable Investing Survey*



Corporate employees want better ESG data

Over a third of respondents find their company’s ESG reporting not informative to minimally informative.

A little over 40% rate it as somewhat informative.

Intelligize *The Conscience of Corporations: Public Company ESG Adoption*

A clear gap exists between the supply of ESG data from corporations and the demand for robust information from both investors and employees. For the ESG reward mechanism to work, the results of ESG initiatives must be accurately measured. Thanks to advances in data tech and analytics, ESG quantification and verification can shift into high gear.

When the capital markets reward certain claims, the claims become vulnerable to exaggeration or outright falsification. A prime example is the late 1990s dot.com bubble, when corporations’ share price went up when they claimed a dot.com strategy. ESG is equally vulnerable, although the stakes are much higher. To mitigate greenwashing, a solution to mediocre quantification and verification must be found. High-performance data analytics, accompanied by new data sources, is poised to provide that solution.

Corporations, money managers, and investors, as well as public sector entities (e.g., regulators), are increasingly familiar with high-performance data analytics because such analytics have been battle-tested in high-margin businesses (e.g., complex derivatives trading), risk measurement (e.g., capital markets and credit), and loss mitigation (e.g., payments fraud). Those organizations and individuals are now

applying high-performance data analytics to translate the exponential growth in ESG-related data into knowledge and action.

The rise of Web 2.0 and Industry 4.0 is driving exponential growth in ESG-related data that can be tapped both by corporations, to improve self-reporting and credibility, and by other ESG-interested parties. Web 2.0 is delivering information from news outlets, social media (e.g., ESG watchdogs), professional networks (e.g., LinkedIn), and regulators. Industry 4.0 is delivering new data sources, most prominently satellite imagery and the Internet of things (IoT; sensors and devices connected via the Internet). Satellite imagery can help both corporations and other ESG-interested parties monitor the activities of their supply chain partners. (For example, is deforestation and/or human displacement occurring in input production?) IoT could deliver valuable data on a range of environmental and social indicators, ranging from energy efficiency/carbon footprint to waste management to workplace air quality. Web 3.0 and the increasing adoption of blockchain show potential to deliver improved ESG data and social outcomes. A prime use case is found in agriculture, notorious for poor paper-based data on provenance and, in certain sectors/countries, farmer exploitation.

To translate these vast amounts of data into knowledge and action requires advanced natural language processing (i.e., deep learning), including sentiment analysis, and image recognition models. These models improve not only measurement but also comparability of ESG data across companies, overcoming a current challenge for investors. To succeed at building these models, ESG stakeholders must invest in high-performance data analytics and AI. The time is nigh. ESG risk is not only investment risk but also people and planet risk. Credibly measuring and rewarding positive ESG behavior is paramount.

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We provide services that help you refine your product and service offerings. Examples include:

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RELATED CELENT RESEARCH

For more information on data analytics and ESG investing see:

[Capital Markets Innovation Series: Pitch Perfect | ESG Edition](#)
October 2021

[ESG in Portfolio Management: From Data to Deployment](#)
September 2020

[Sustainability in the Capital Markets](#)
June 2020

[Data Science in Claims - Digital Acceleration and Customer Delight](#)
June 2020

[Data to Actively Manage ESG Investing](#)
July 2018

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