

CDAO Fall – BOSTON

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Data Driven ESG

Leverage Data & AI for
transformational shifts in ESG
reporting

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Our effort...

“We don’t have to engage in grand, heroic actions to participate in change. Small acts, when multiplied by millions of people, can transform the world” ~ **Howard Zinn**

Industry trends in ESG...



Decarbonization

Carbon Neutrality –Net ZERO

Supply Chain

Sustainable sourcing

Regulatory Compliance

Tighten ESG Disclosure

Community Engagement

Social impact

Investments

Managing ESG criteria & data

Key Metrics in ESG

Environmental

Carbon Footprint
Energy Efficiency
Water & waste management

Social

Diversity Metrics
Employee Well Being
Community engagement

Governance

Transparency & reporting
Ethical Compliance
Board Diversity



ESG Data Pointers 2024

One of the biggest challenges in ESG reporting is the lack of data availability, particularly in emerging markets and small and medium-sized enterprises (SMEs) - **Data Availability**

ESG data is typically self-reported by companies, which can lead to inaccuracies, inconsistencies, and outright greenwashing. No standardized framework for ESG reporting – **Data Quality**

Lack of data consistency across different sectors and regions. This makes it difficult to assess the sustainability performance of companies in different industries and geographies – **Data Consistency**

It's common for organizations with relatively lower levels of ESG maturity to lack a solid data governance framework – **Data Governance**

Transformation of the ESG journey

THE HISTORY OF ESG

1950s-80s

An economist starts the discussion on **business ethics** and **social responsibility**. 1960s movements force companies to consider social issues for the first time. In 1971, the first fund that only invests in **responsible companies** is established.

1990s

The UN Environmental Program (UNEP) gets financial institutions to commit to their role in creating sustainable economies. The yearly COP conferences begin. And the Kyoto Protocol makes lowering GHG emissions, and the environment, a shared responsibility.

2000s

In 2004, the UN coins the term **ESG** in the Who Cares Wins Report. With another report, the two give way to the launching of Principles for Responsible (PRI). Corporate scandals like Enron and BP prompt the need for accountability and transparency.

2010s

In 2011, the Sustainable Accounting Standards Board (SASB) is founded. In 2015, the Taskforce on Climate-Related Financial Disclosures (TCFD). And in 2016, Global Reporting Initiative's GRI Standards. These are among the top **reporting frameworks** for ESG.

PRESENT

ESG is now part of mainstream business strategy, and investing and reporting are hot topics. The world has moved on from environmental sustainability alone. People expect more and more from companies and their commitments.

Enhancing ESG on large scale – AI Driven

- **Advanced data analysis and integration**
AI can process large volumes of complex data from a variety of sources relevant to ESG reporting
- **Enhancing data quality and reliability**
AI algorithms can identify anomalies, inconsistencies or gaps
- **Real-time monitoring and alerts**
IoT, AI on the edge, offering real-time insights and alerts
- **Benchmarking and performance tracking**
AI systems can benchmark a company's ESG performance against industry peers and standards
- **(NLP) for enhanced reporting**
Analyze textual data & consolidate findings

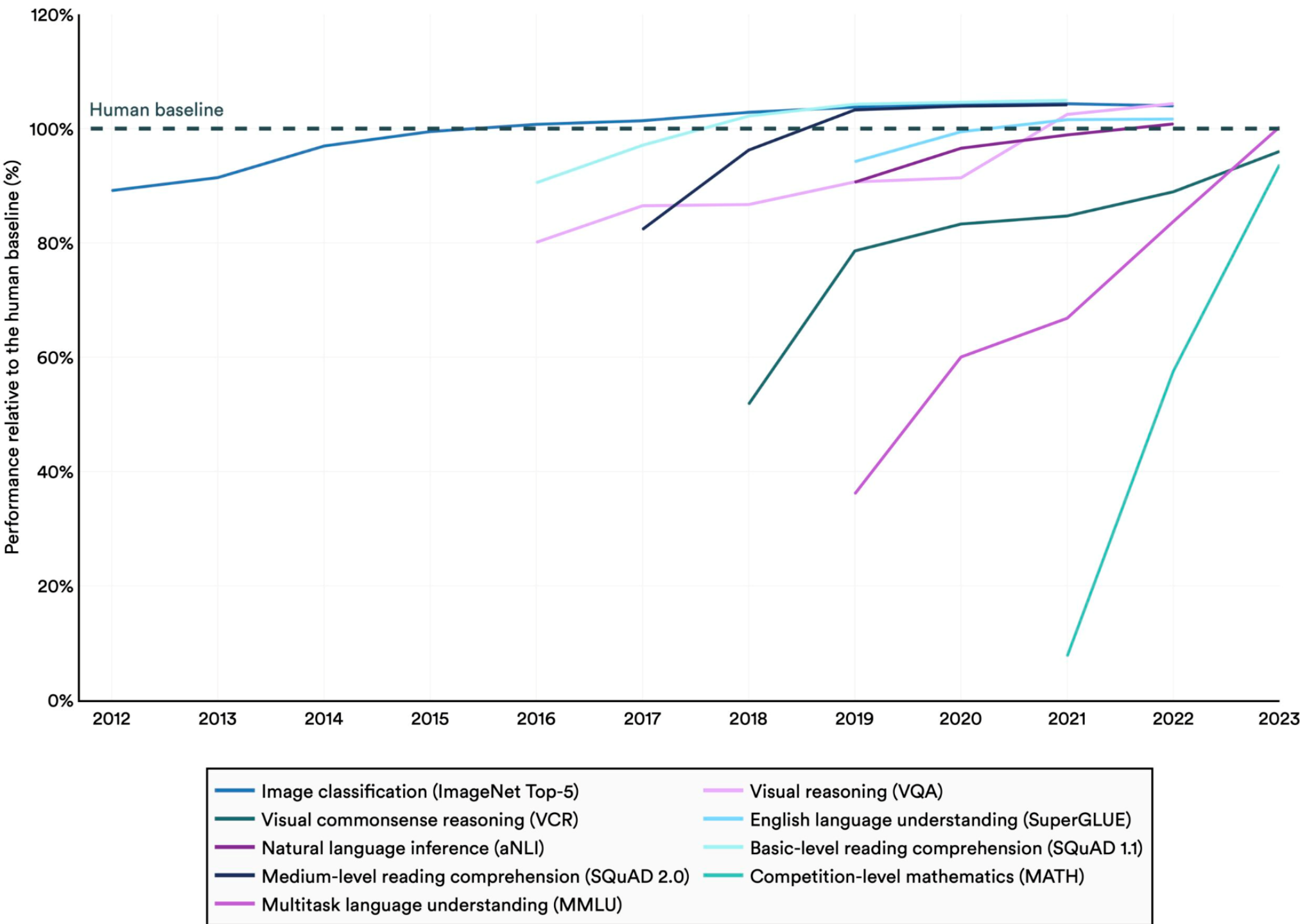


Stanford Research on AI abilities

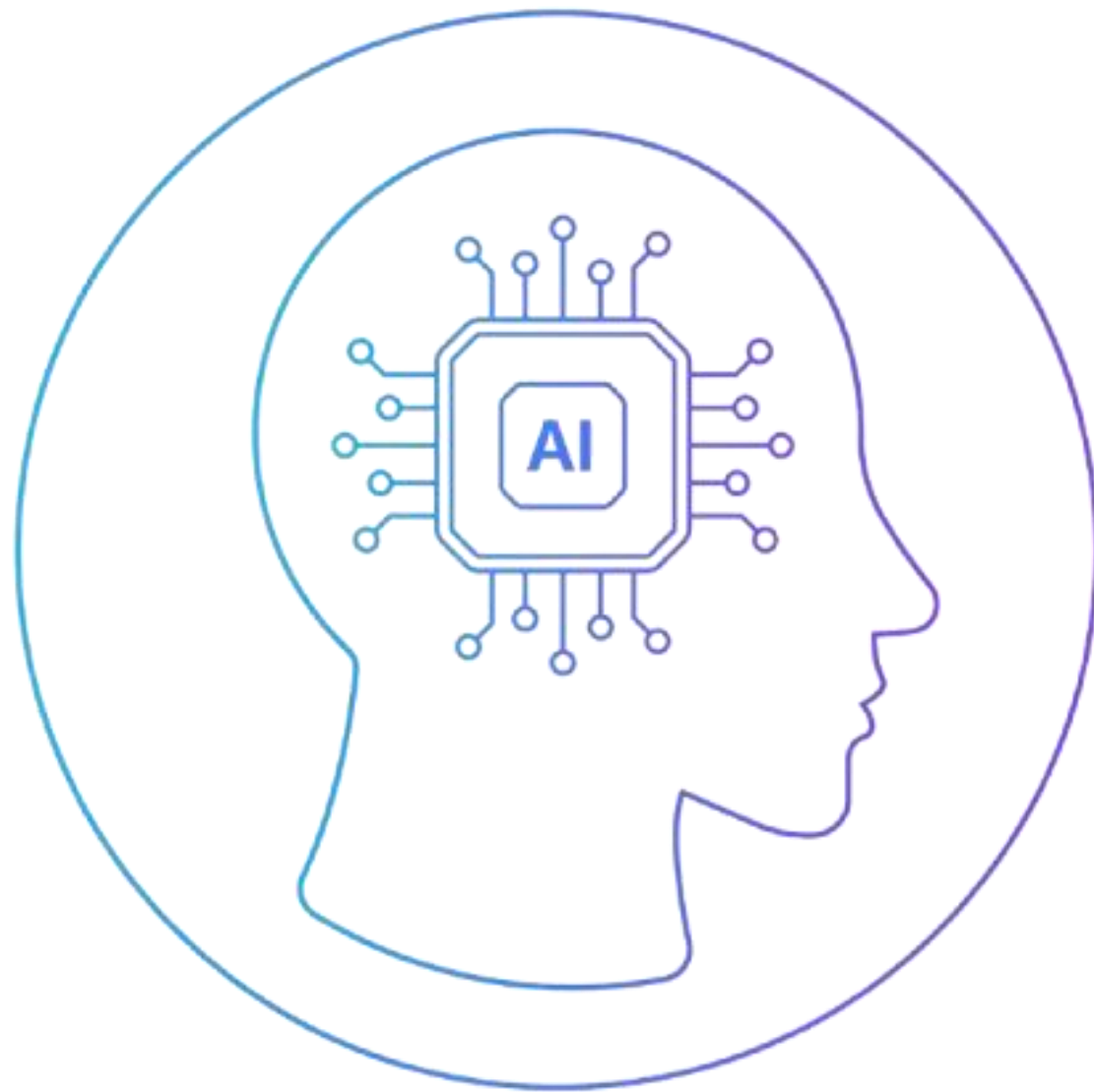
“AI trails behind on more complex tasks like advanced mathematics, visual commonsense reasoning and planning”

Select AI Index technical performance benchmarks vs. human performance

Source: AI Index, 2024 | Chart: 2024 AI Index report



Leveraging AI led automation for ESG (Use Case)



Data profiling & cleansing

Identifies inconsistencies, errors, missing values, resolves duplicates. AI learns from historical data

Real time Data quality monitoring

Monitor data pipelines in real-time, flag anomalies and data pattern shifts

LLM combined with RAG

Systematic extraction and analysis of ESG data from corporate reports

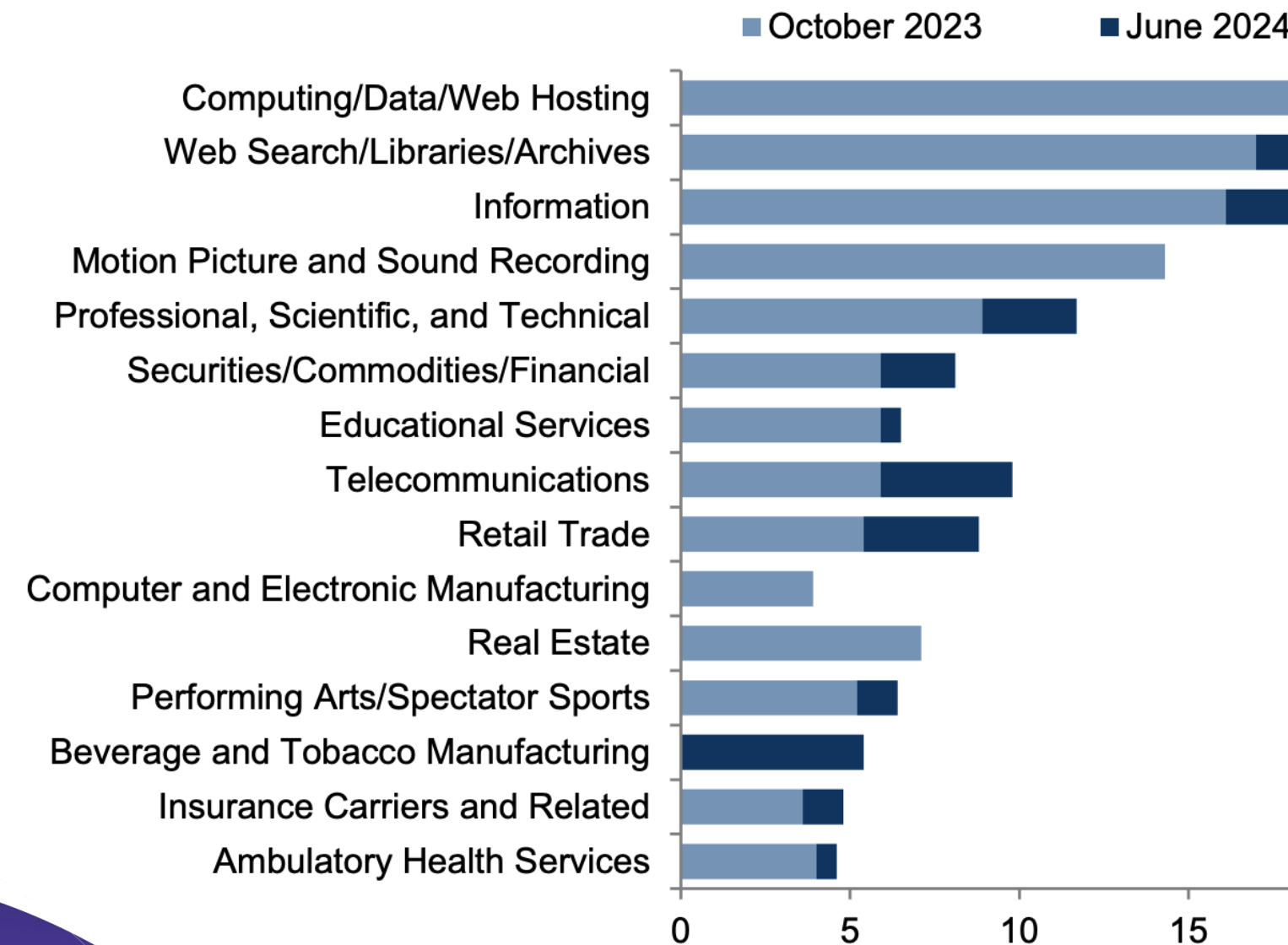
Data driven audits

Classify and audit data against environmental regulations

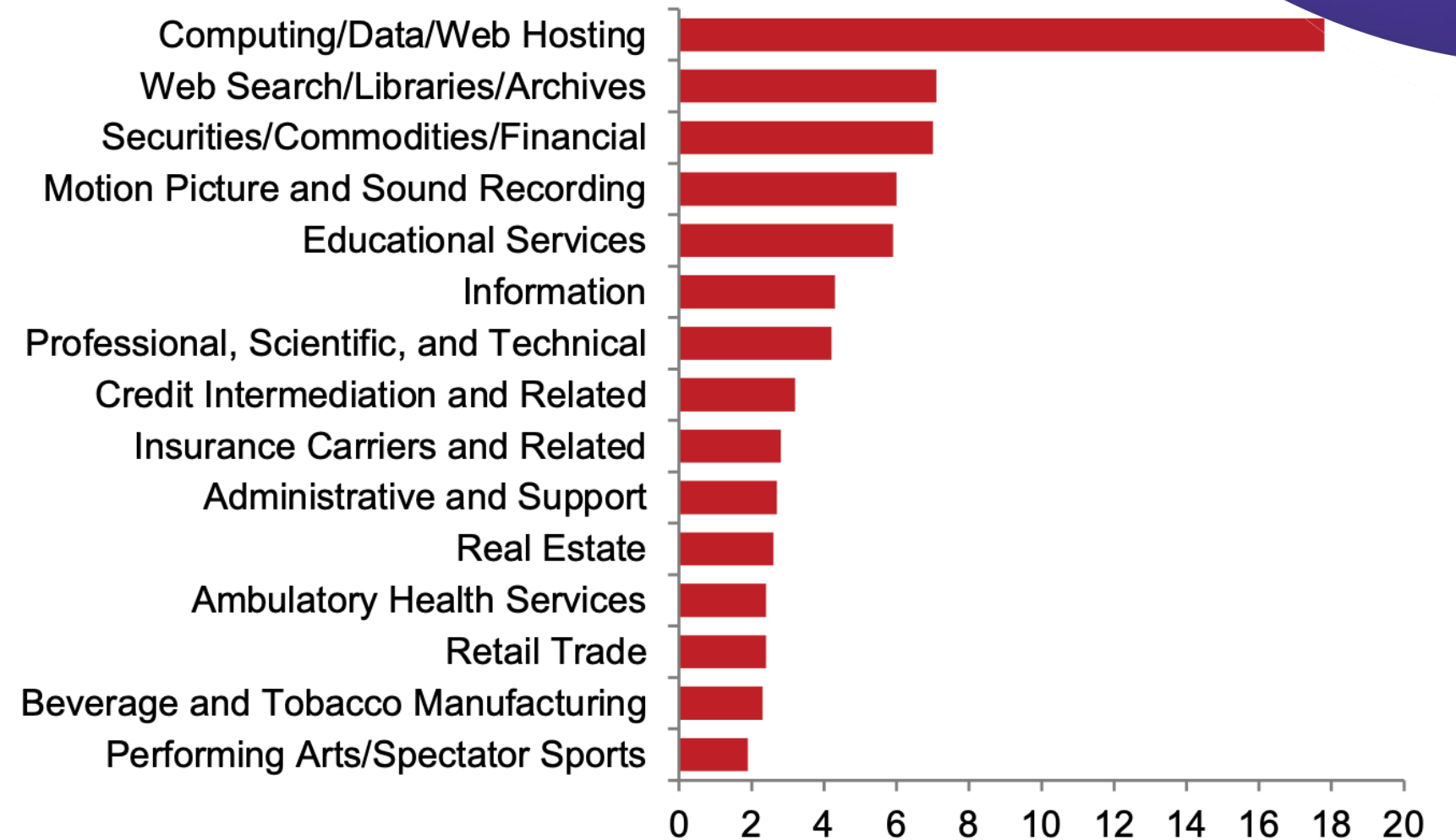
Enhanced scenario modeling

Creating simulations for multiple ESG scenarios

Top industry sectors use of AI & ESG: current vs projected



Census Bureau, Goldman Sachs GIR.

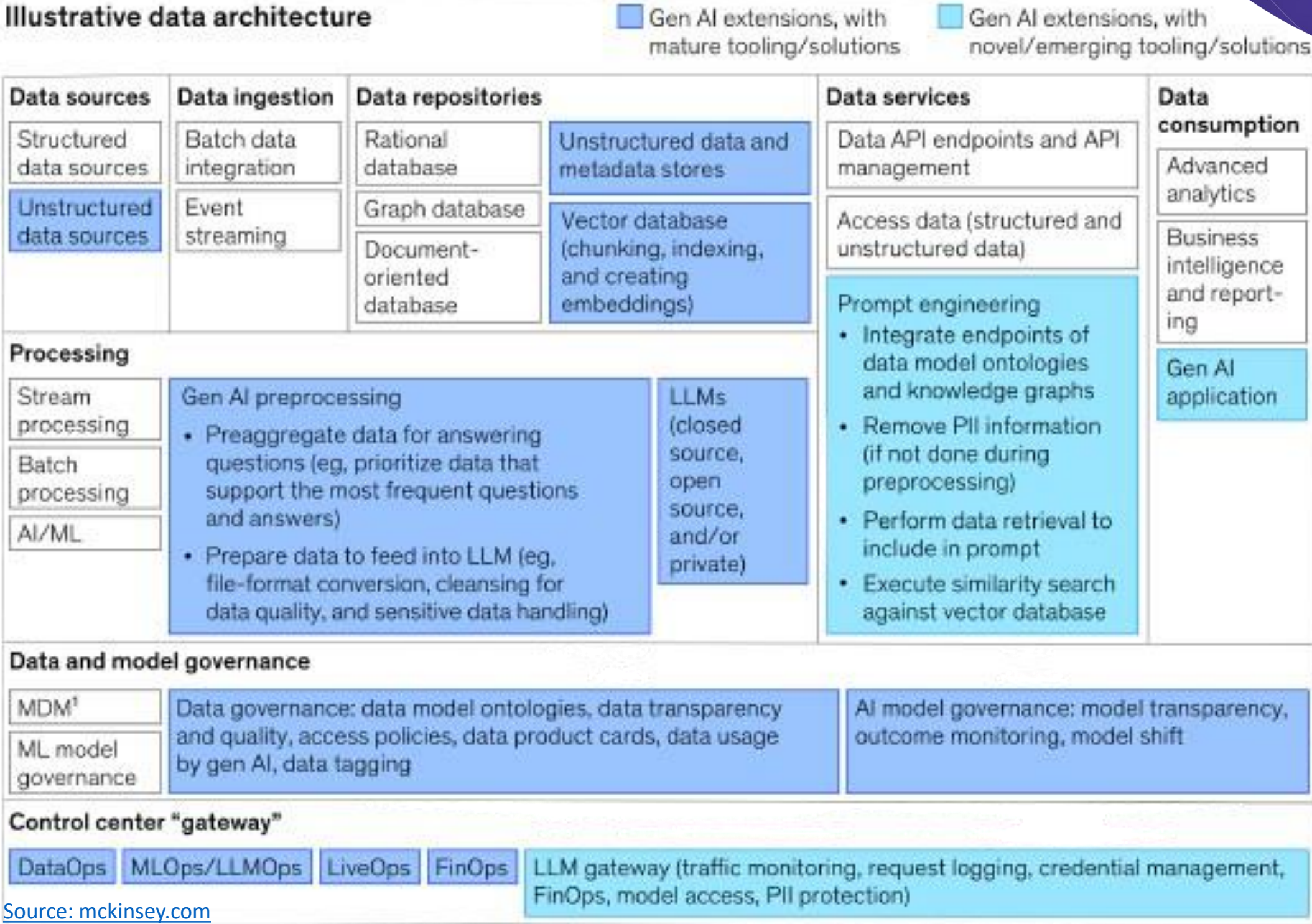


Source: Census Bureau, Goldman Sachs GIR.

Evolving ESG data architecture in age of AI

Data Architecture takeaways:

- Gen AI pre-processing
- LLMs
- Prompt Engineering

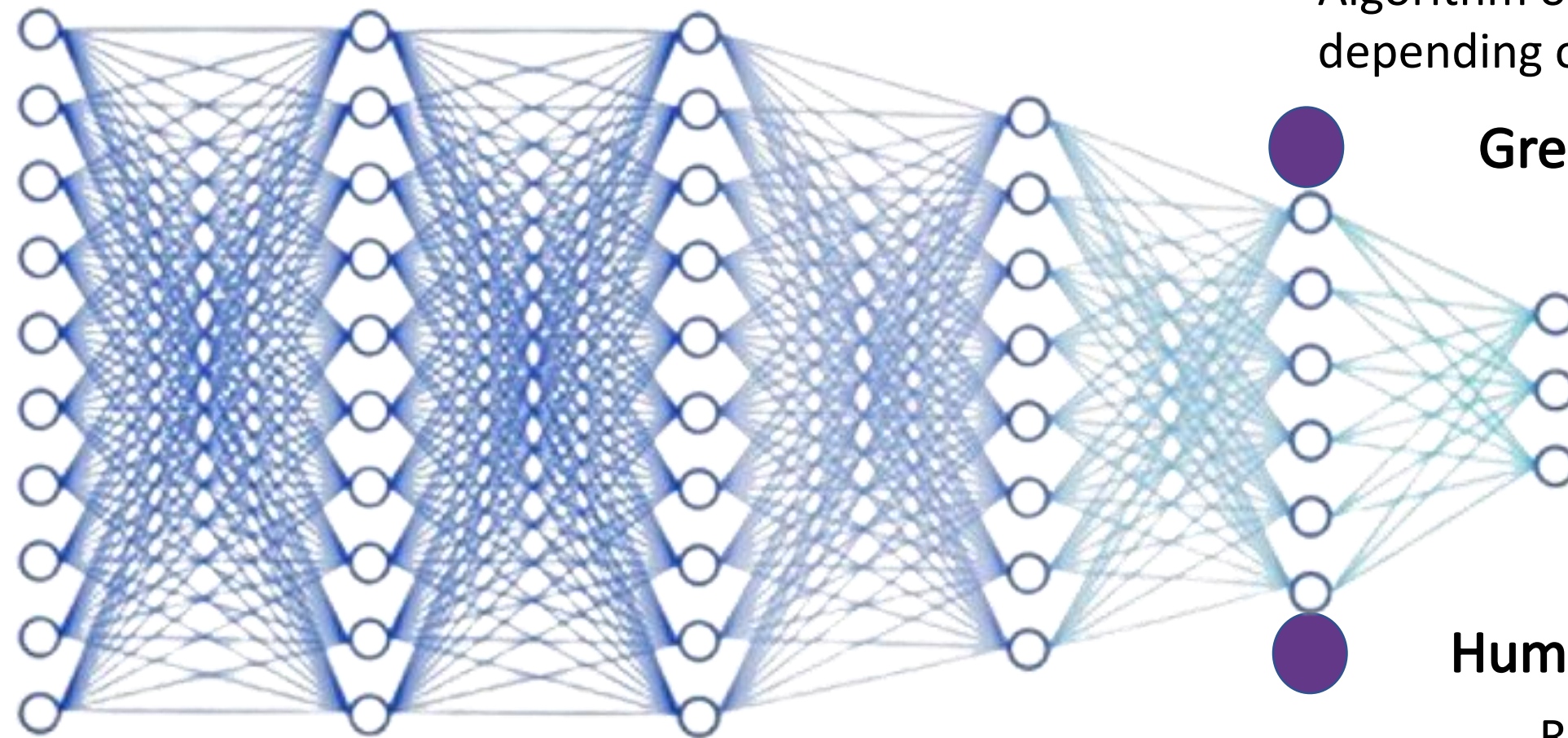


Is use of AI an Irony on ESG ???

- **Energy Consumption**
Huge energy consumption to train and run LLM contradicting carbon emission
- **Resource intensive**
Data centers to collect, process ESG data using LLM are impacting sustainability
- **Job displacement**
Automation impacting 'Social' pillar in terms of human employment
- **Ethical concerns & AI Bias**
AI models can inherit and perpetuate ethical bias based on data fed
- **Governance Challenges**
LLM lack transparency and traceability from stakeholder perspective



The future balance of AI & ESG



Energy efficient AI models

Algorithm optimization and computational less usage depending on renewable sources

Green AI

Renewable energy grids, prioritizing energy efficiency and improve climate modeling

Human centered AI

Reducing inequality, workforce reskilling and DEI monitoring

Ethical AI

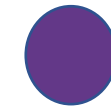
Explainable AI building transparency in governance

ESG Data architecture – Today and future



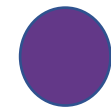
Autonomous Data Architecture

Self-managing, self-optimizing, and self-healing systems



Federated Data Architecture

Data stays in its original location but can be queried, processed, and integrated across environments



Edge AI Architecture

Data processing will be performed at the edge of the network



Data Fabric

Integrate AI seamlessly with SASB, GRI and TFCDD
For optimal reporting



Block chain Integration

Immutable ESG ledger, transparency in data



Data Governance & Privacy

Evolving privacy-aware architectures that use AI to automatically ensure compliance

CLOUD
NATIVE/HYBRID

CLOUD
AGNOSTIC/
CONTAINERIZED

DATA MESH
APPROACH

LEVERAGE API
&
MICROSERVICES

Are we doing enough?



Understanding the topic better.

