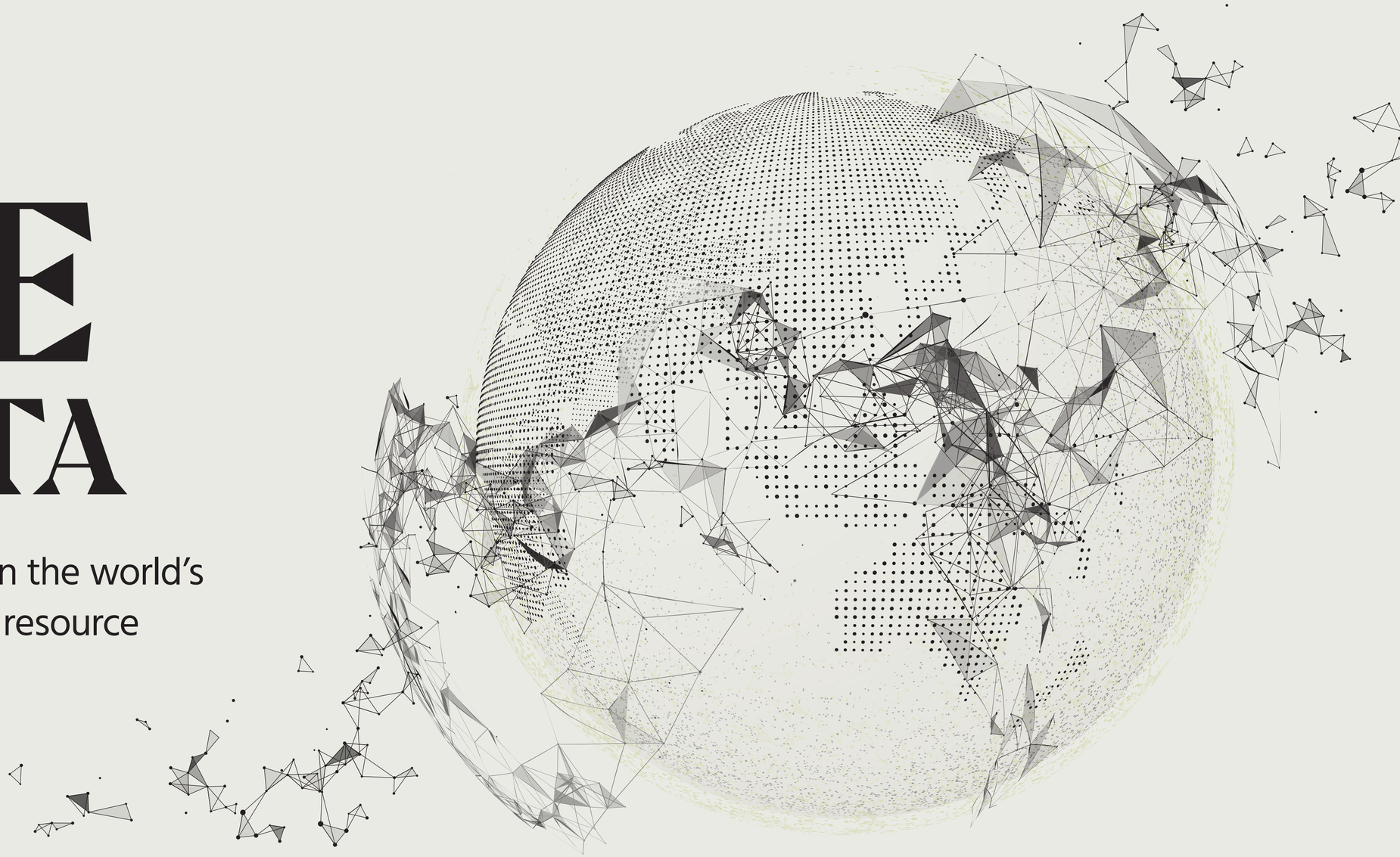
hinrich foundation
advancing sustainable global trade

THE AGE OF DATA

Data-driven perspectives on the world's most abundant and critical resource



IN COLLABORATION WITH

VISUAL CAPITALIST

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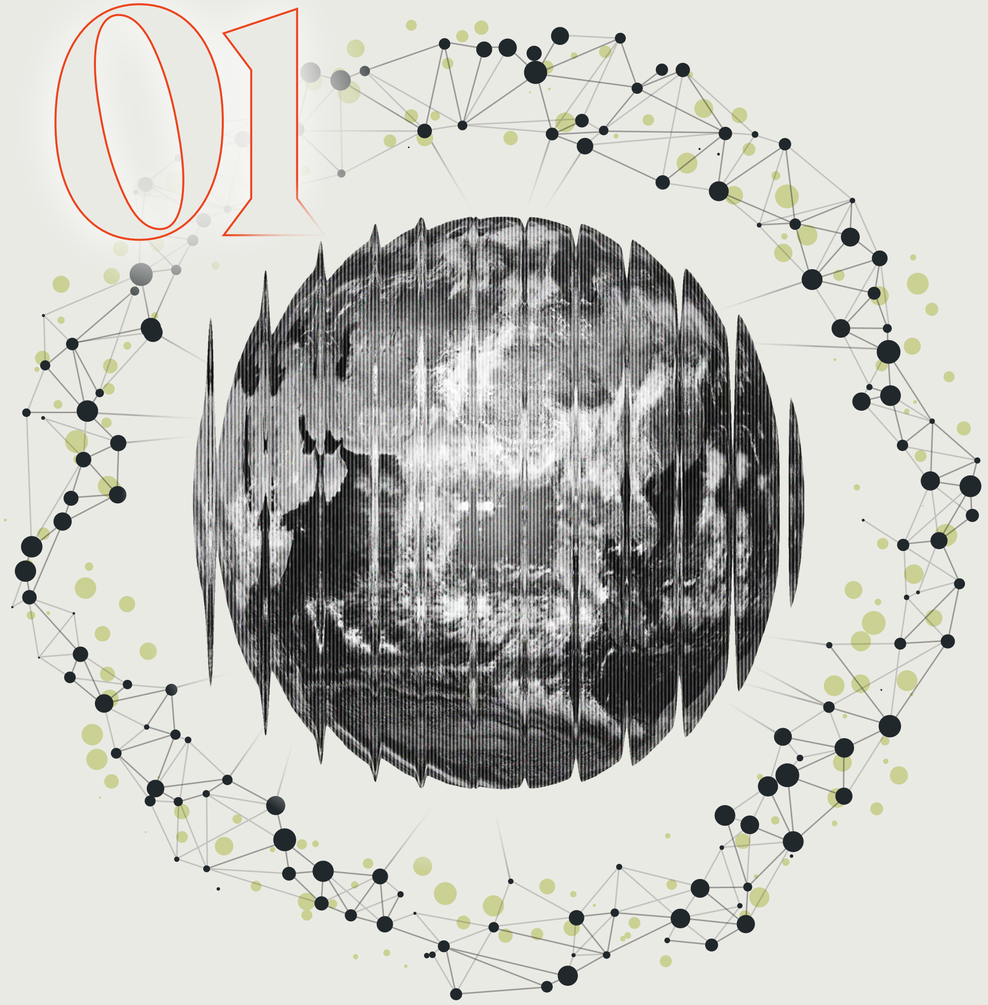


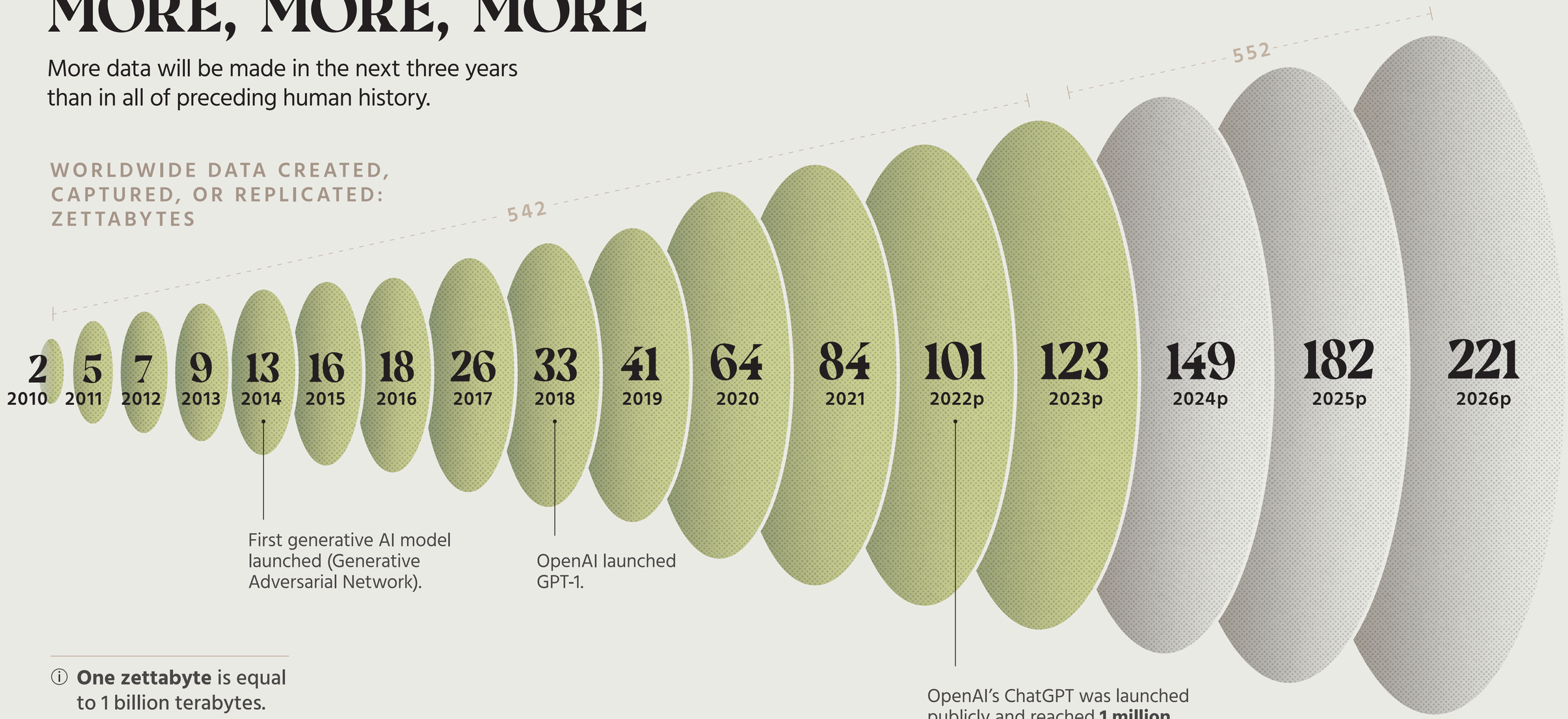
ALL THE WORLD'S DATA

Data's rising influence on decision-making continues to deepen as ever-increasing amounts are collected and analyzed. More data will be generated in the next three years than in the rest of human history, driven largely by advances in artificial intelligence.

This explosive growth brings a combination of opportunities and challenges that nations, businesses, and individuals must learn to navigate carefully, shaping the future of innovation, governance, and daily life.

MORE, MORE, MORE

More data will be made in the next three years than in all of preceding human history.



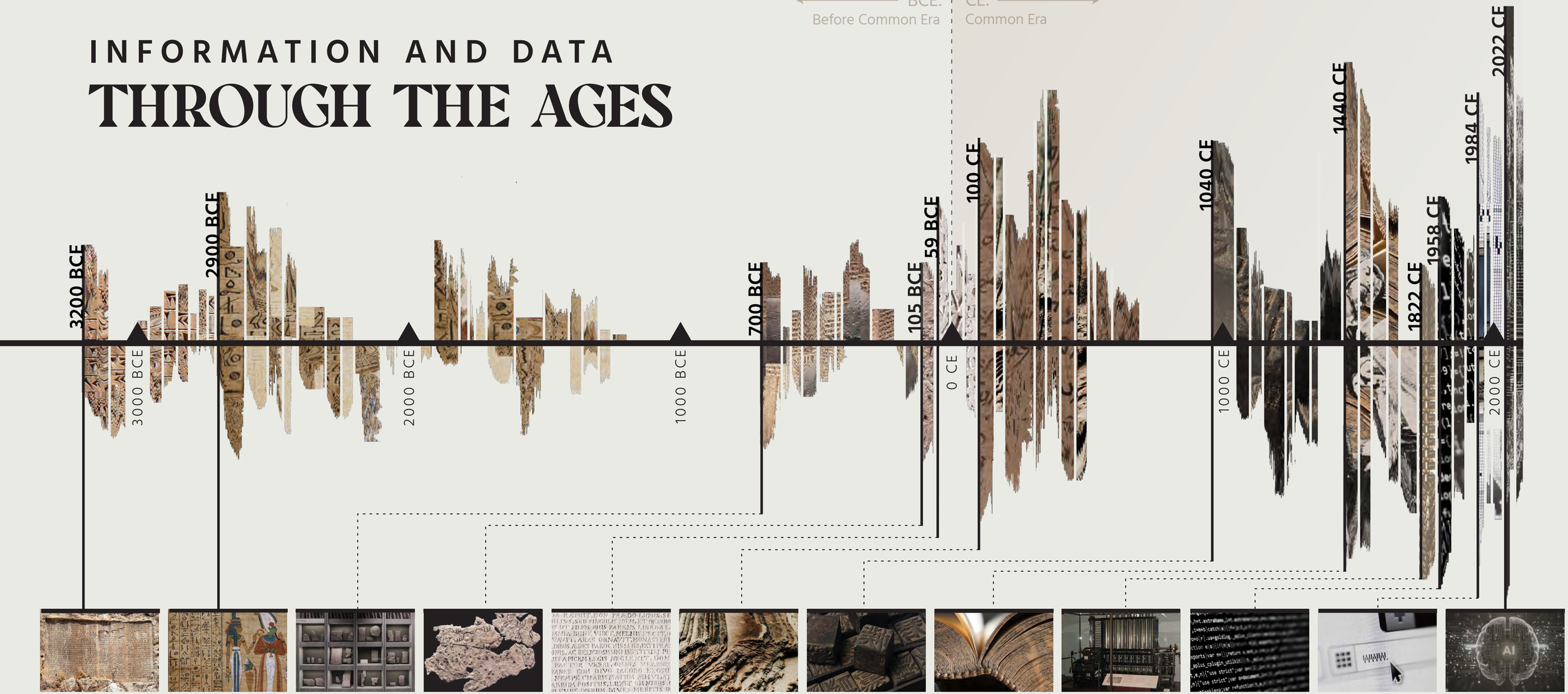
ⓘ **One zettabyte** is equal to 1 billion terabytes.

Sources: AVANT by Avison Young, IDC Global DataSphere Forecast (2022–2026)
*Note: "p" refers to projected statistics

BCE: Before Common Era
CE: Common Era

INFORMATION AND DATA

THROUGH THE AGES



3200 BCE
First writing system developed in Mesopotamia.

2900 BCE
First known roll of papyrus created in Egypt.

700 BCE
Earliest known artifacts library established in Assyria.

105 BCE
Earliest known paper invented in China.

59 BCE
First newspaper invented in ancient Rome.

100 CE
Invention of parchment in Greece.

1040 CE
Movable type invented in China.

1440 CE
Invention of the Gutenberg printing press.

1822 CE
Charles Babbage created the Difference Engine, considered the first computer.

1958 CE
John McCarthy developed Lisp, the first programming language for AI.

1984 CE
The birth of the internet.

2022 CE
OpenAI released ChatGPT.

Sources: UTexas, History.com

HOW IS YOUR DATA BEING USED?

Data is now the backbone of decision-making in both public and private spheres, driving policy, strategy, and innovation.

GOVERNMENTS

Improve service delivery
(e.g. health care, emergency services)

Reduce crime, fraud, and cybersecurity threats

Inform government policy

Enhance productivity

National security

CORPORATIONS

Increase sales and boost profits

Improve products and service offerings

Refine marketing strategies

Set pricing for demand and risk

Secure transactions and trade

Enhance productivity

Sources: Business News Daily, Data Science Central

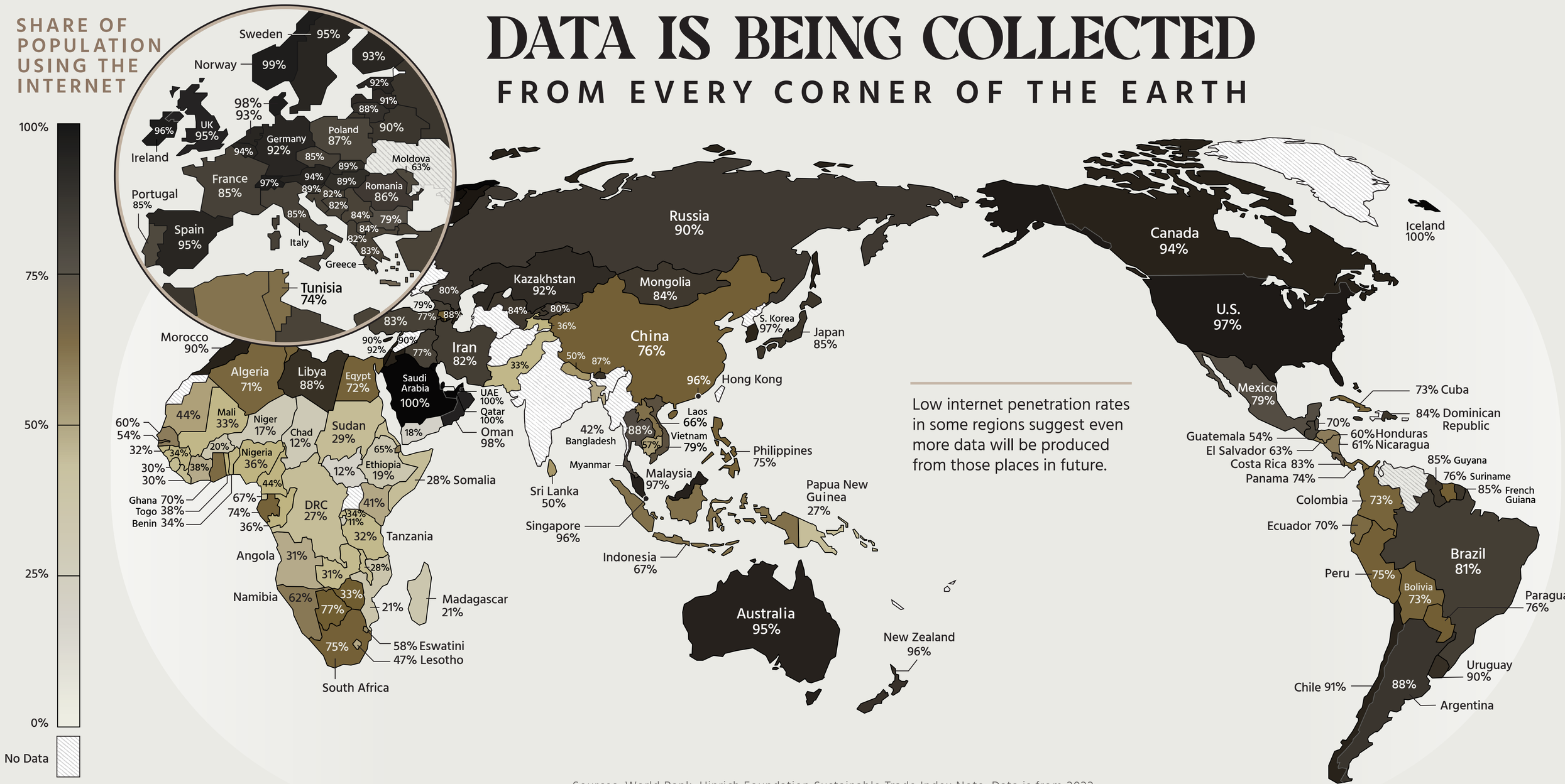
UNLOCKING

THE VALUE OF DATA

Data has become one of the most valuable resources in the modern world, driving innovation, economic growth, and power dynamics on a global scale. Countries and companies that use data strategically can gain important advantages in innovation, investment, and global influence.

DATA IS BEING COLLECTED

FROM EVERY CORNER OF THE EARTH



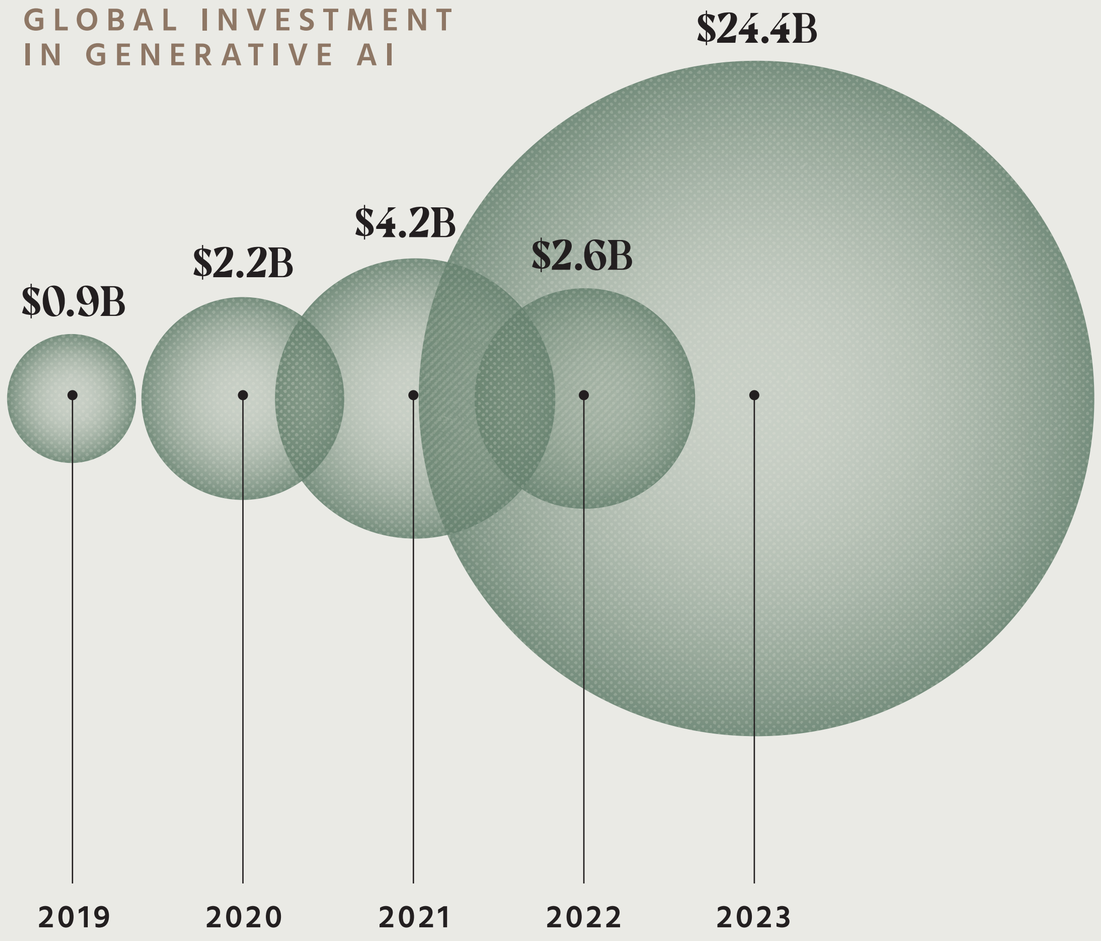
Low internet penetration rates in some regions suggest even more data will be produced from those places in future.

Sources: World Bank, Hinrich Foundation Sustainable Trade Index Note: Data is from 2022.

THE AI REVOLUTION
MEANS MORE DATA

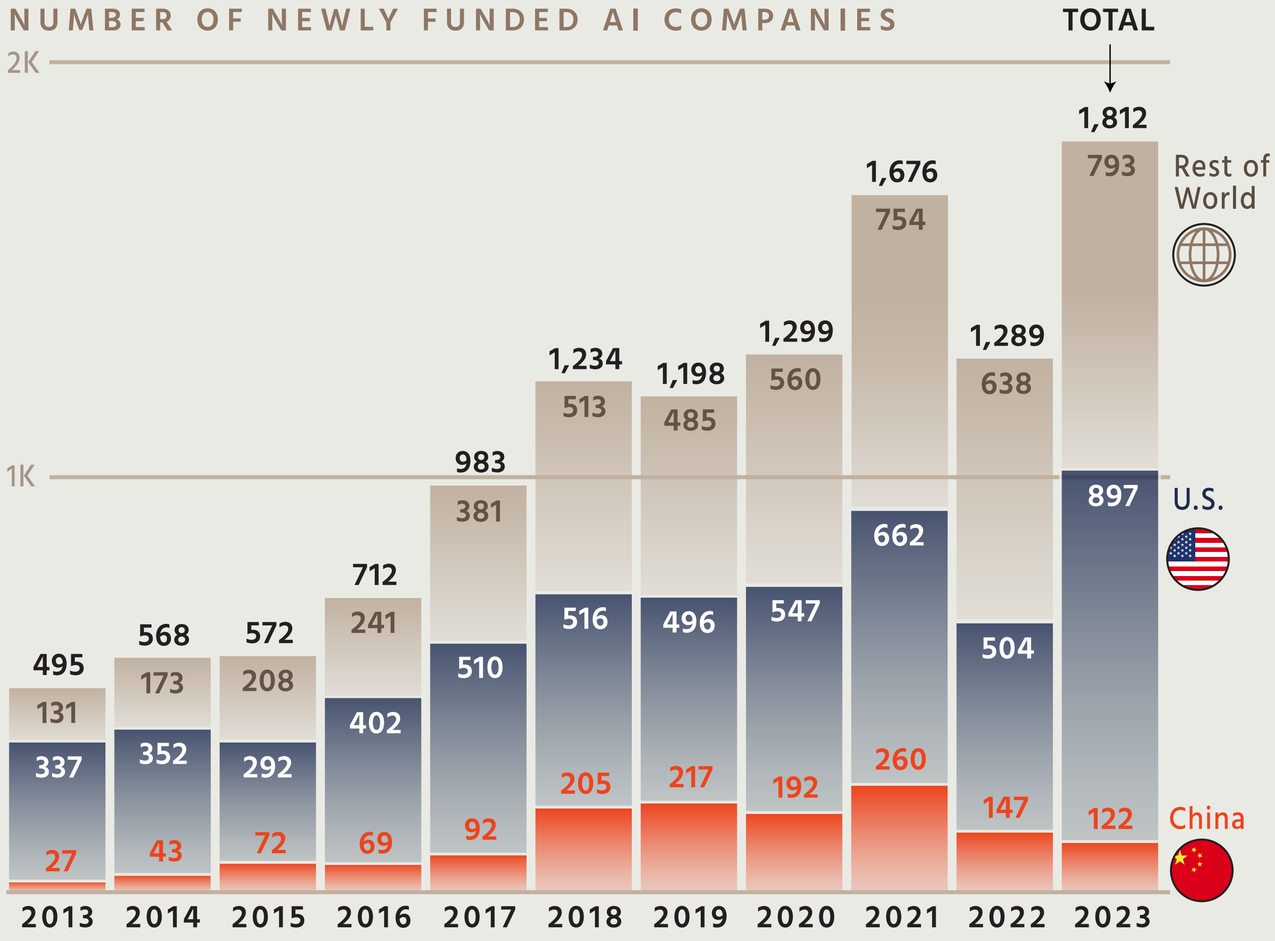
The rapid growth of AI technologies is driving the collection, analysis, and storage of more data than ever before. As AI becomes integrated into everyday tools and systems, it fuels a cycle where increasing amounts of data, including from its analytical processes, are needed to train models, improve performance, and develop new applications.

GLOBAL INVESTMENT IN GENERATIVE AI



Source: Stanford University Human-Centered Artificial Intelligence (2024)

NUMBER OF NEWLY FUNDED AI COMPANIES



Source: Stanford University Human-Centered Artificial Intelligence (2024)

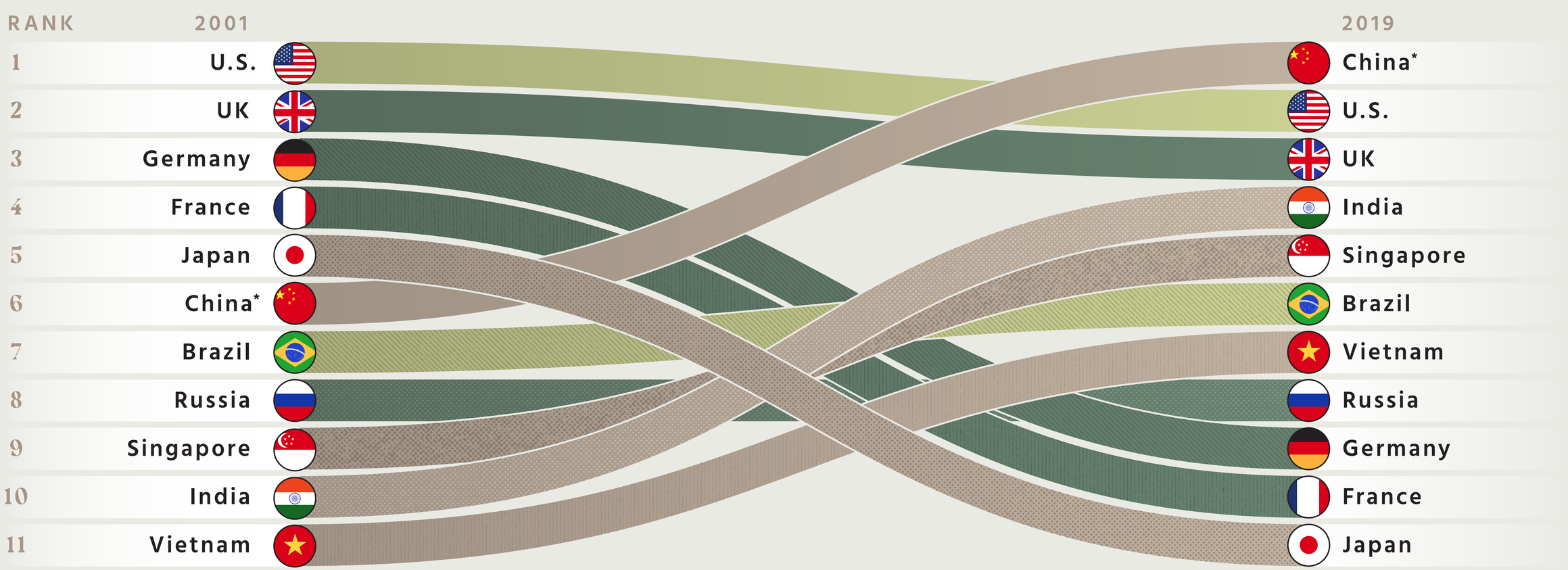
DATA IS POWER

WHICH COUNTRIES CONTROL THE MOST?

Cross-border data refers to the flow of digital information across national boundaries, driving global trade, communication, and innovation. Geopolitically, it's vital for economic competitiveness, cybersecurity, and technological sovereignty, as nations balance fostering digital trade with protecting sensitive data and asserting control in a connected world.

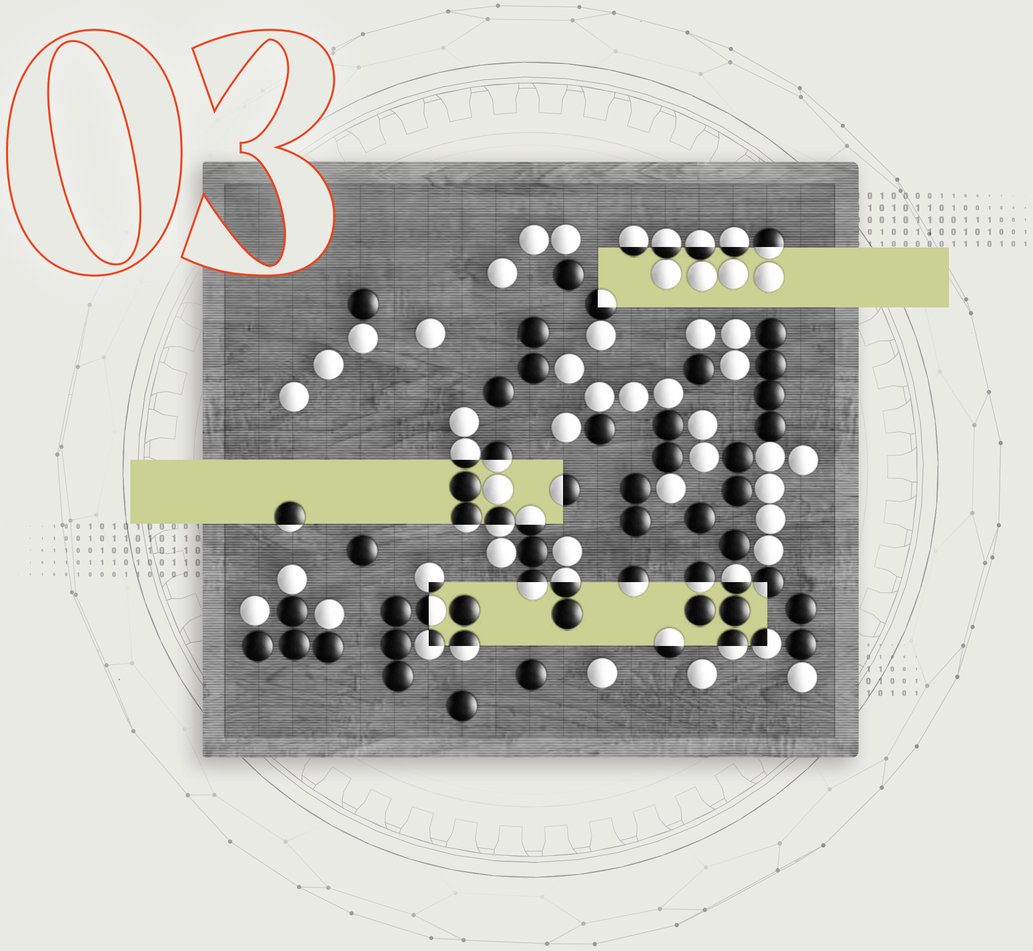
TOP COUNTRIES SENDING AND RECEIVING CROSS-BORDER DATA

Americas Europe Asia



Source: Nikkei (2019). *China includes Hong Kong.
Comparisons are of the amount of data going in and out of a country or region in megabits per second or Mbps.

03



OPPORTUNITIES AND CHALLENGES

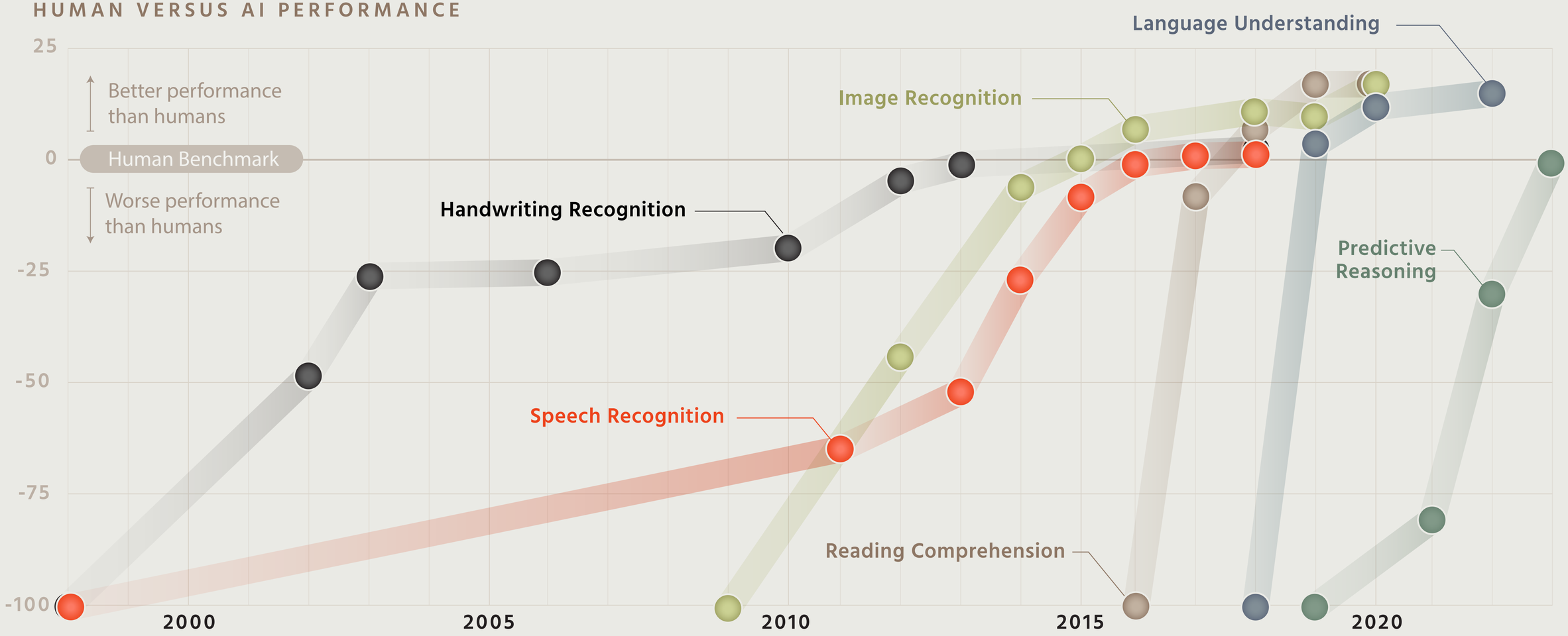
Data and AI are transforming industries and driving economic growth, but challenges like privacy, security, and environmental impact are becoming increasingly critical.

Geopolitical tensions and a mosaic of competing regulatory regimes further complicate the future of our interconnected world.

THE SUPERHUMAN POWER OF AI

AI has rapidly advanced and has begun to surpass human capabilities in areas like language understanding, image recognition, and predictive reasoning. This progression could unlock new opportunities for innovation and drive significant gains in productivity.

HUMAN VERSUS AI PERFORMANCE

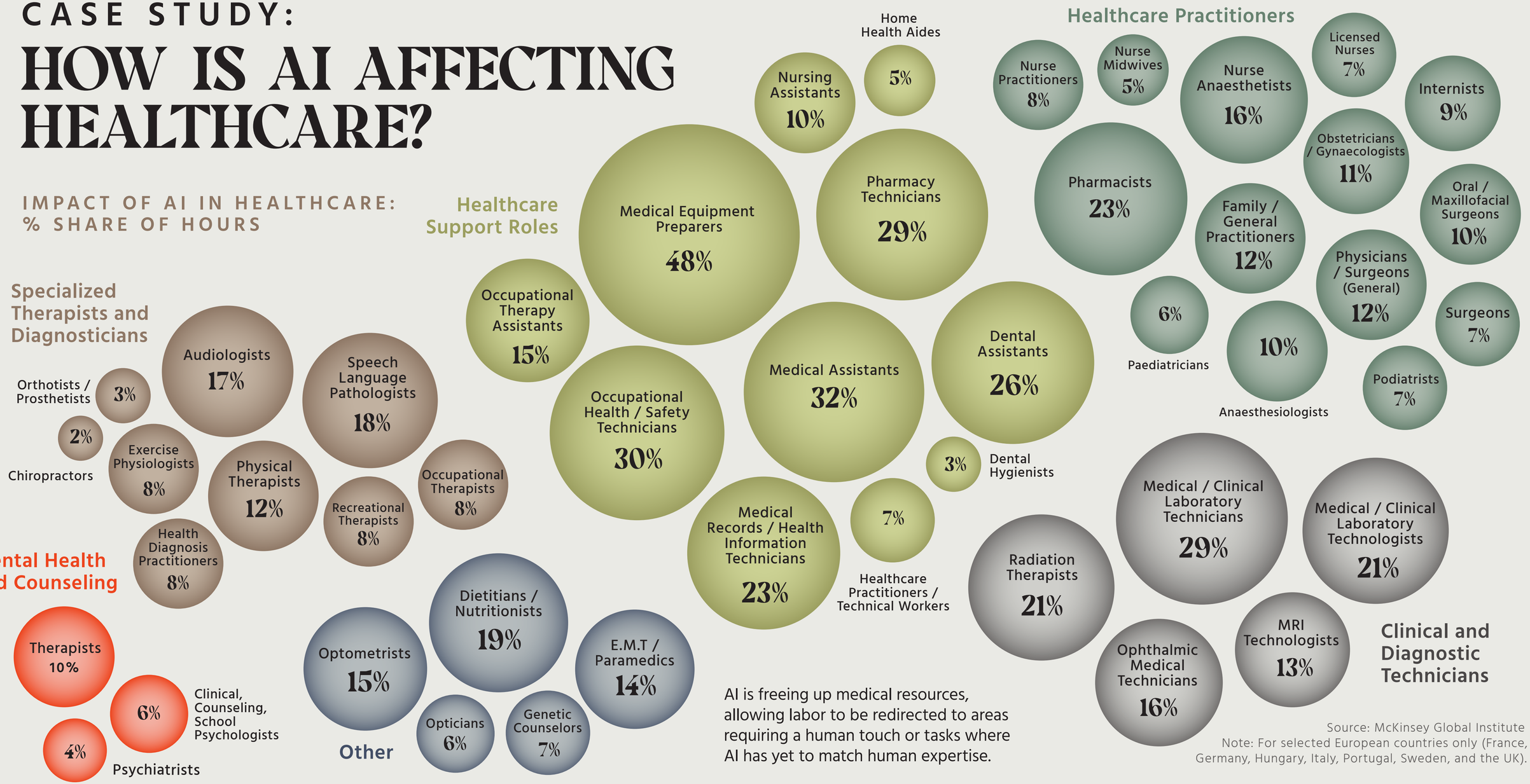


Source: contextual.ai (2023)

OPPORTUNITIES

CASE STUDY:
HOW IS AI AFFECTING HEALTHCARE?

IMPACT OF AI IN HEALTHCARE:
% SHARE OF HOURS

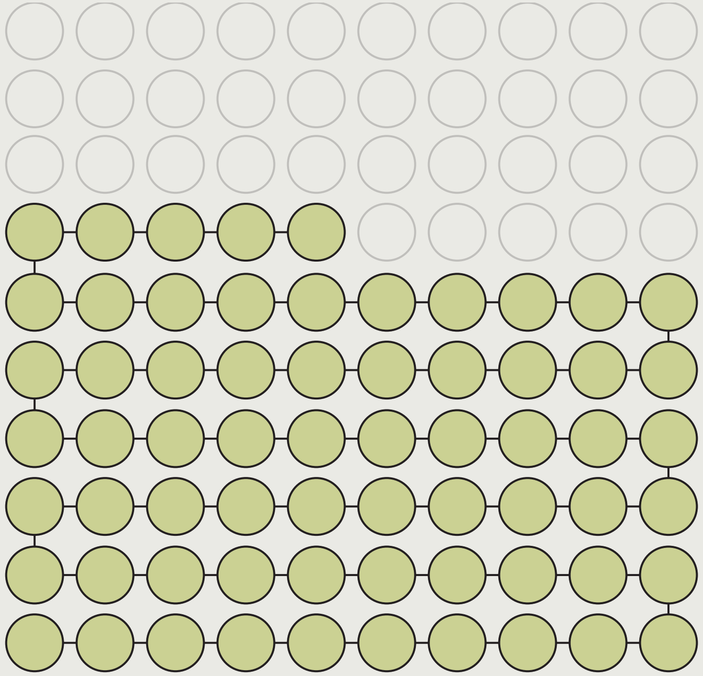


AI is freeing up medical resources, allowing labor to be redirected to areas requiring a human touch or tasks where AI has yet to match human expertise.

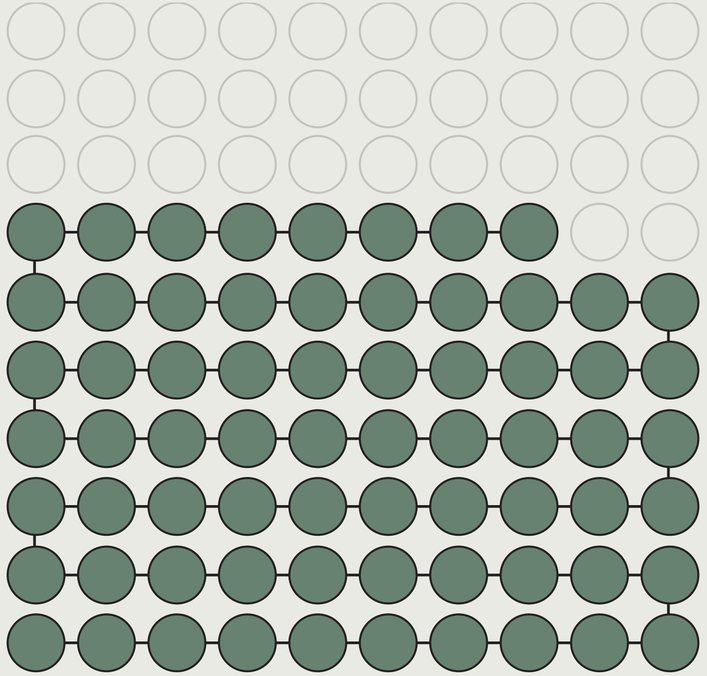
Source: McKinsey Global Institute
Note: For selected European countries only (France, Germany, Hungary, Italy, Portugal, Sweden, and the UK).

MORE AI = MORE SALES?

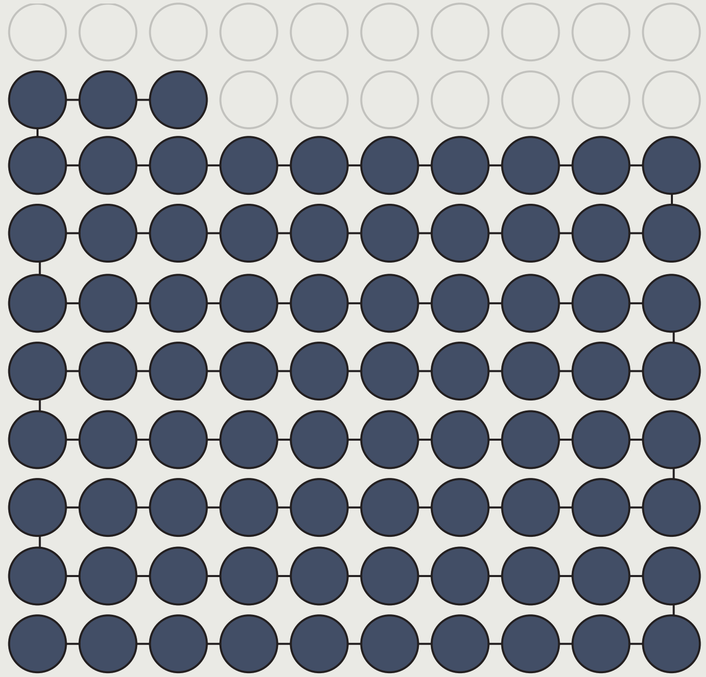
AI is transforming marketing and search engine optimization (SEO) by automating tasks, optimizing strategies, and delivering personalized experiences at scale.



65% of businesses achieve better SEO results with AI.



68% see higher content marketing return on investment (ROI) with AI.



83% of sales teams with AI saw revenue growth in the last year versus 66% without AI.

Source: SEMRUSH, Salesforce

CHALLENGES

CYBERSECURITY: HOW BAD CAN DATA BREACHES GET?

With billions of people online, the impact of data breaches can be massive. As cyberattacks grow more sophisticated, cybersecurity has evolved to keep pace. Yet, history has seen major breaches that slipped through the cracks, costing companies billions of dollars and exposing the personal information of billions worldwide.

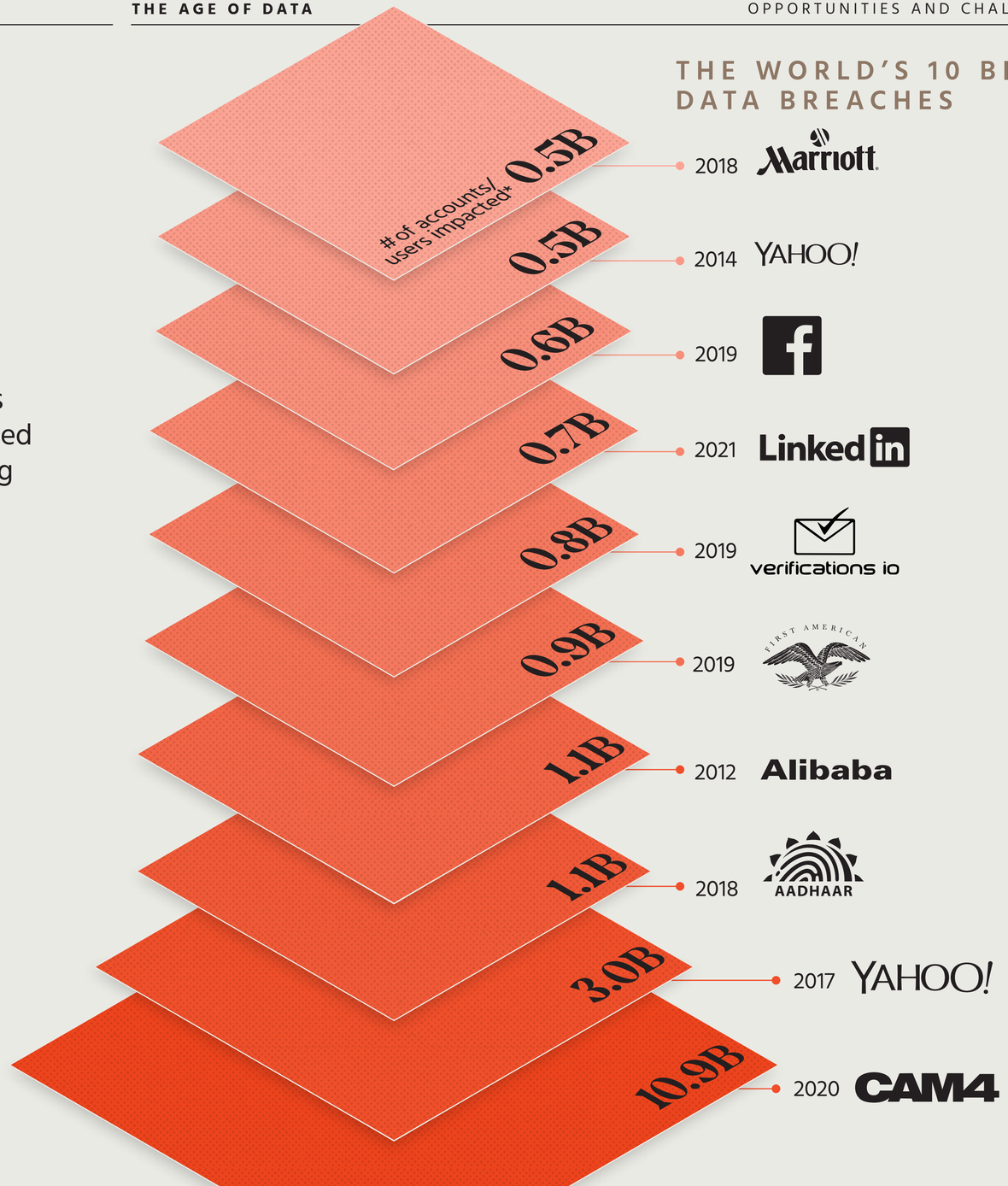
GLOBAL AVERAGE COST OF A DATA BREACH: USD

2018	$3.9M
2020	$3.9M
2022	$4.4M
2024	$4.9M

Sources: UpGuard, IBM

*Impact can be measured in the number of accounts, users, records, or people affected by the data breach.

THE WORLD'S 10 BIGGEST DATA BREACHES

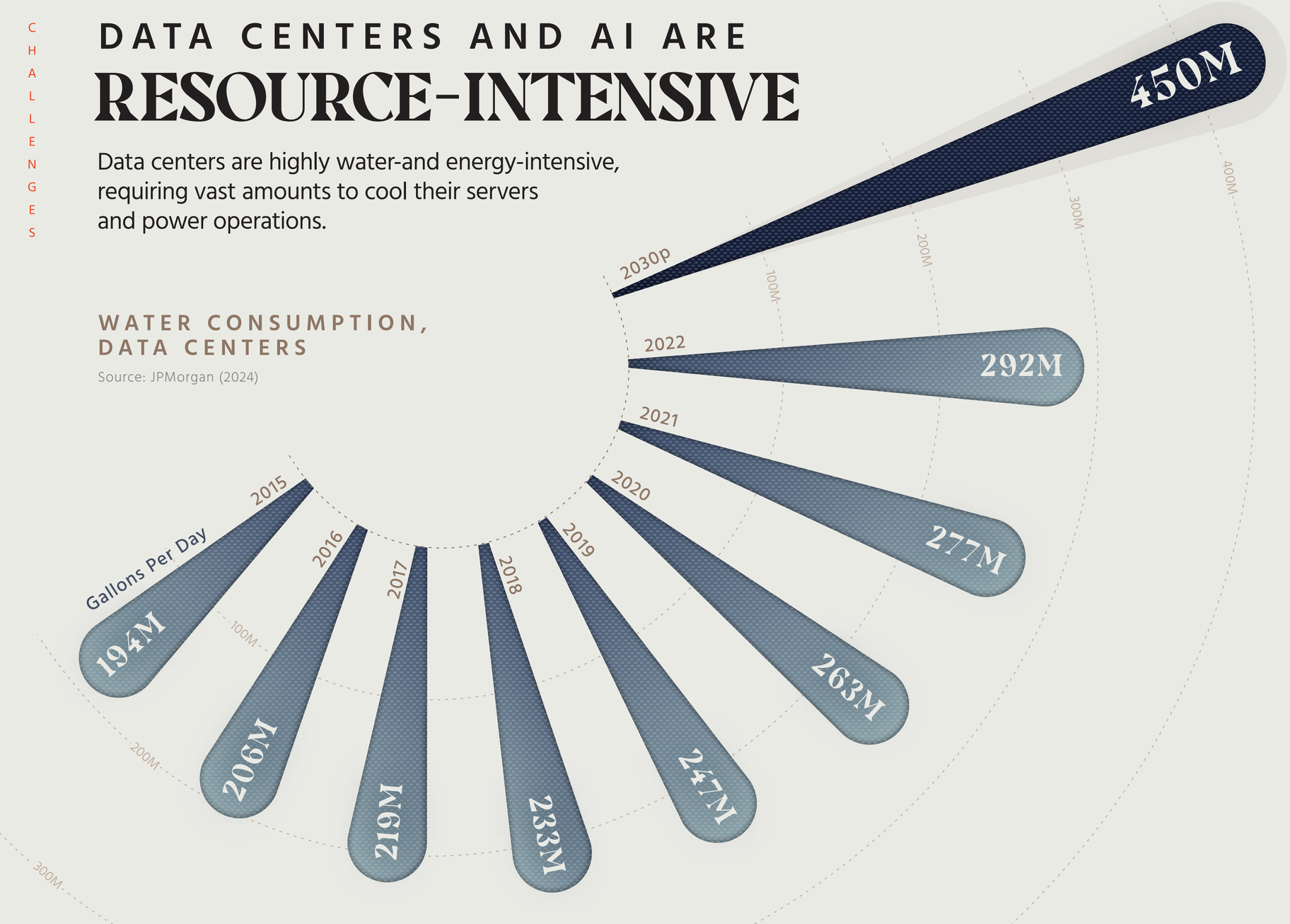


DATA CENTERS AND AI ARE RESOURCE-INTENSIVE

Data centers are highly water-and energy-intensive, requiring vast amounts to cool their servers and power operations.

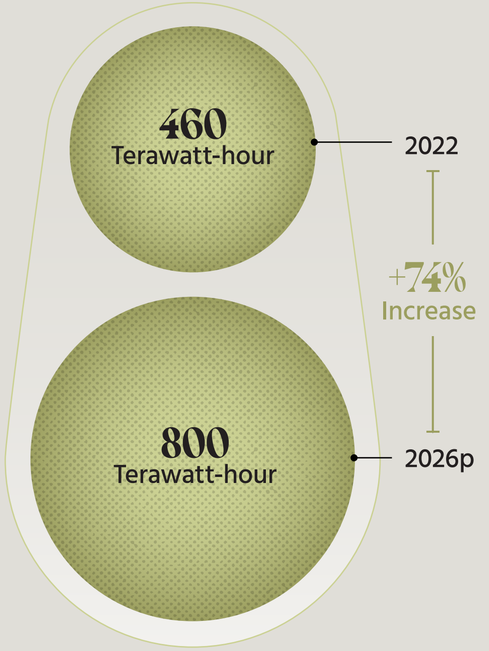
WATER CONSUMPTION, DATA CENTERS

Source: JPMorgan (2024)



By 2030, data centers are projected to consume 450 million gallons of water daily—enough to meet half of New York City's current demand—as their footprint continues to expand globally.

ELECTRICITY CONSUMPTION, DATA CENTERS AND AI



Projection based on the IEA's base case scenario.
Source: International Energy Agency (2024)

DIVERGING DATA

PROTECTION REGULATIONS

Data regulations vary widely across regions, reflecting differences in legal frameworks, cultural values, and economic priorities. This patchwork of rules creates significant challenges for businesses operating internationally, as they must navigate complex and varied compliance requirements while balancing business operations in a global scale.

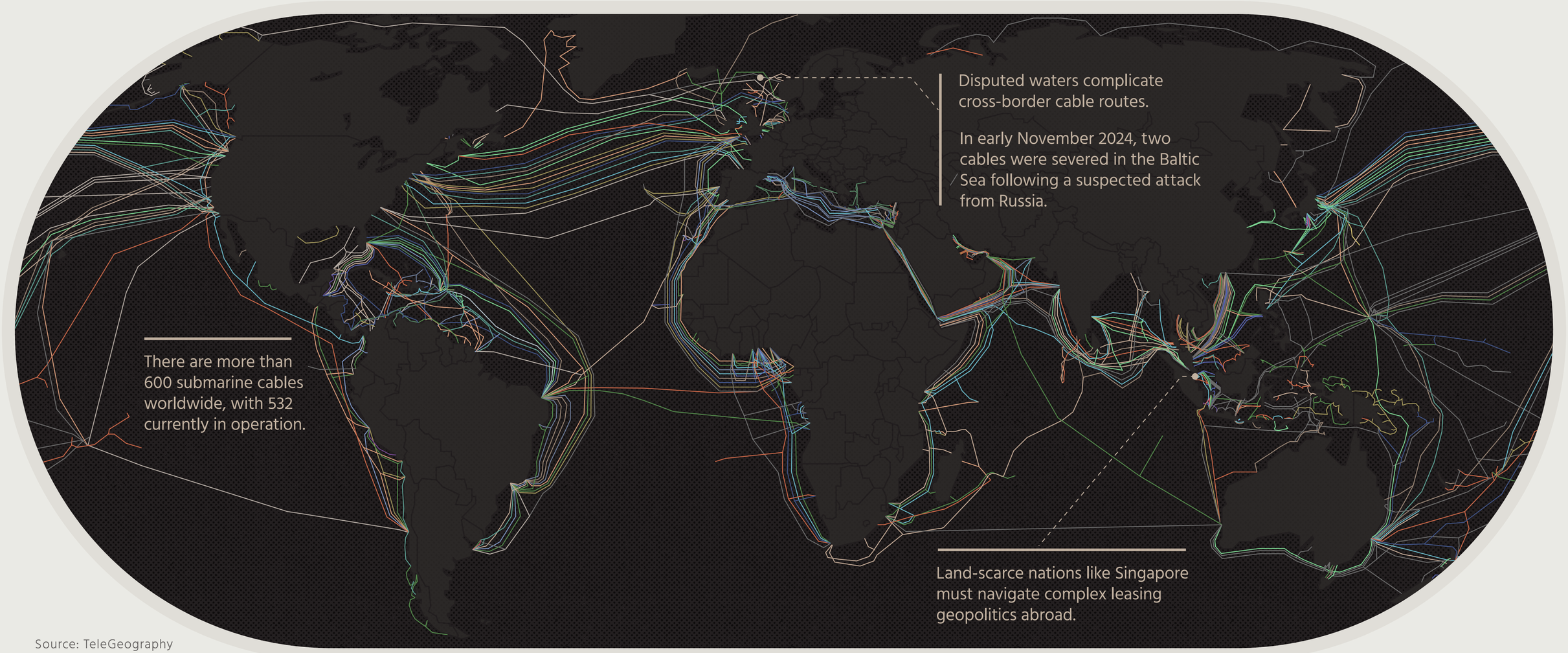
Source: UN

Note: Number includes a combination of draft legislation and those enacted in law, as of December 14, 2021.

HOW DOES DATA MOVE AROUND THE GLOBE?

Subsea data cables connect continents, enabling the transmission of data and power across vast distances. They are vital for handling the growing volume of global data, but their expansion faces significant geopolitical and environmental challenges.

GLOBAL SUBMARINE CABLE MAP



Source: TeleGeography

04

THE WAR ON DATA

As data becomes an increasingly valuable asset, nations are tightening controls over its movement and usage, shaping the global digital landscape.

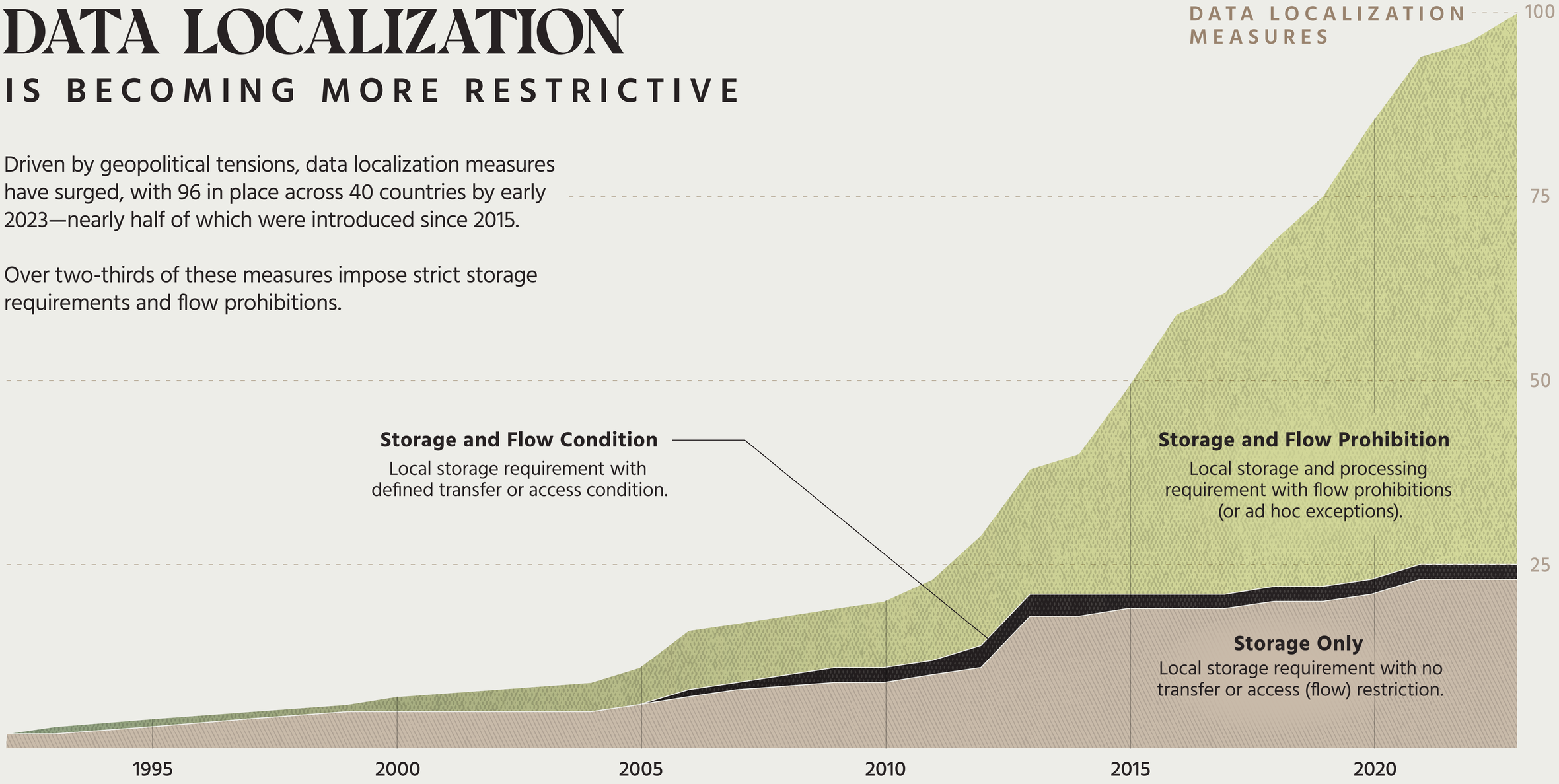
From rising data localization measures to cross-border flow restrictions and proactive AI regulations, the policies reflect a growing emphasis on sovereignty, security, and competitive advantage in the digital age.

DATA LOCALIZATION

IS BECOMING MORE RESTRICTIVE

Driven by geopolitical tensions, data localization measures have surged, with 96 in place across 40 countries by early 2023—nearly half of which were introduced since 2015.

Over two-thirds of these measures impose strict storage requirements and flow prohibitions.

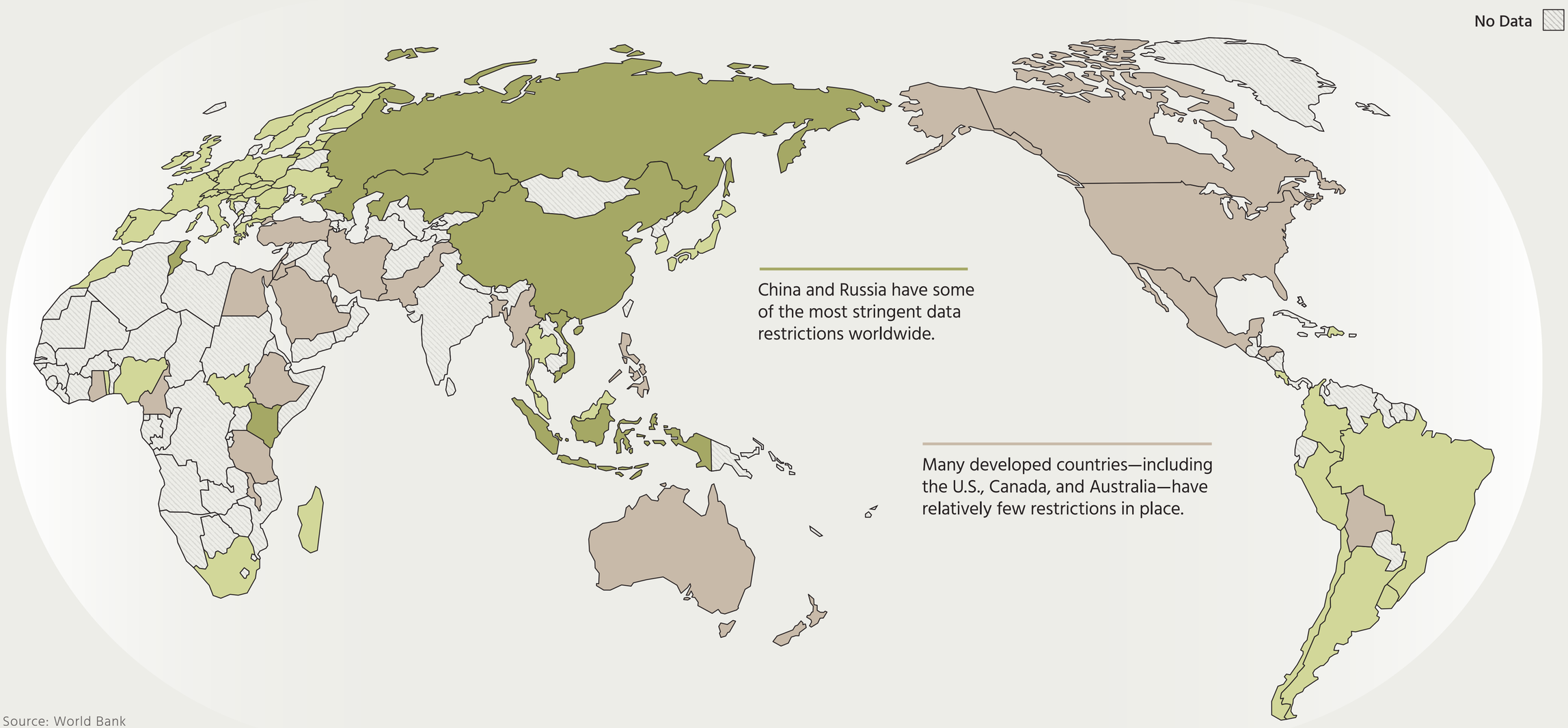


Source: Organisation for Economic Co-operation and Development (OECD)

HOW DOES DATA RESTRICTION VARY BY COUNTRY?

RESTRICTIONS ON CROSS-BORDER DATA FLOWS

Low	Medium	High
27	58	8



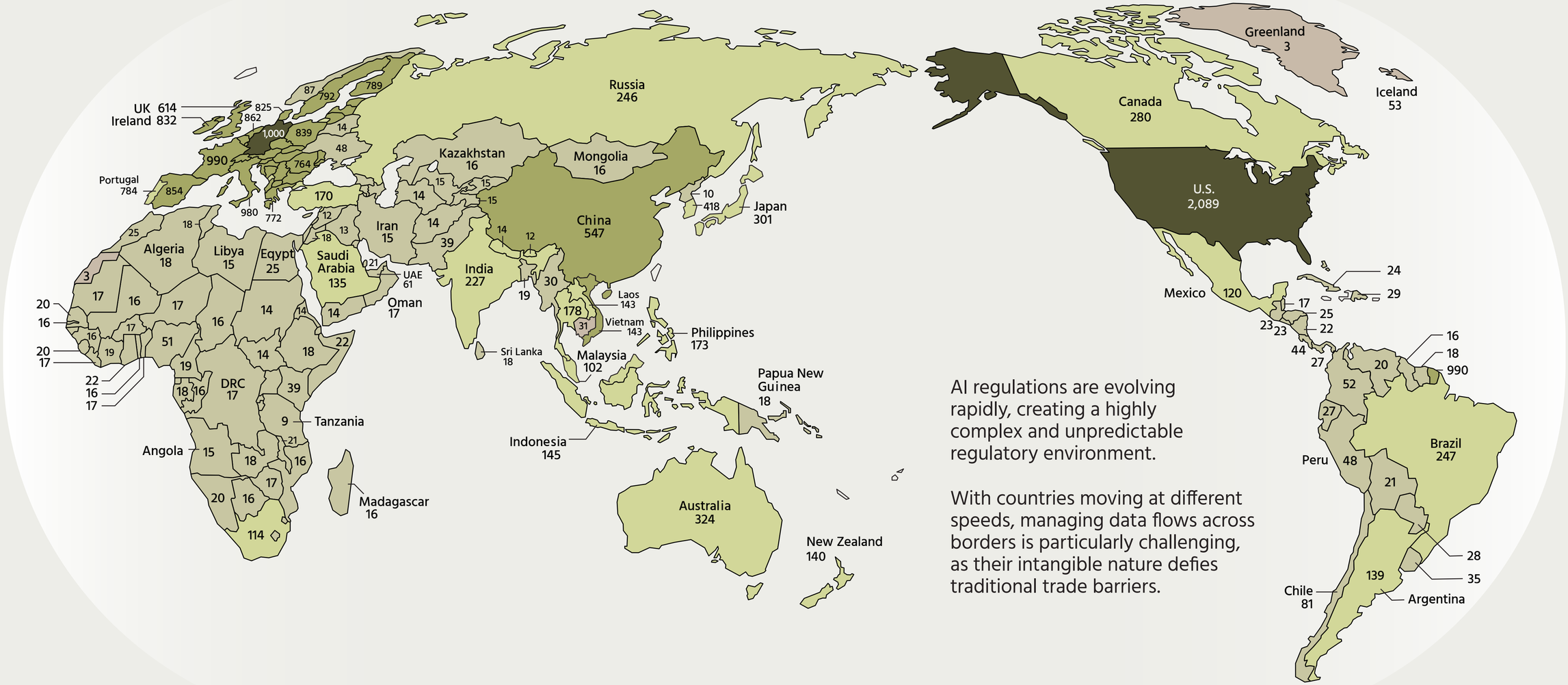
Source: World Bank

THE EVOLVING AI REGULATION LANDSCAPE

NUMBER OF INTERVENTIONS BY COUNTRY

Under 10	10-100	100-500	500-1000	Over 1,000
40	143	20	28	2

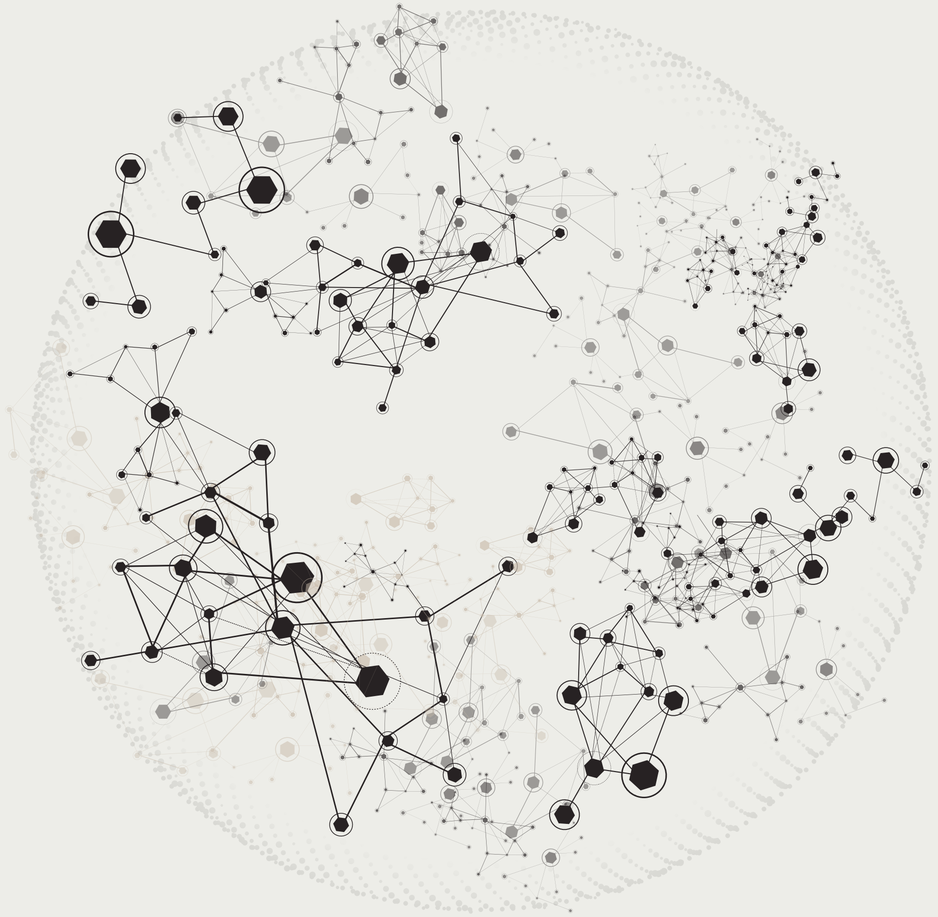
Number of countries



AI regulations are evolving rapidly, creating a highly complex and unpredictable regulatory environment.

With countries moving at different speeds, managing data flows across borders is particularly challenging, as their intangible nature defies traditional trade barriers.

Source: Digital Policy Alert



STAY INFORMED

AI is here to stay, transforming the way we work, communicate, and innovate across industries. However, the regulatory and ethical landscape for AI and data remains complex and uncertain as it struggles to keep pace with how fast the technology is changing and the rising global geopolitical tensions surrounding it.

ABOUT US

hinrich foundation

advancing sustainable global trade

The Hinrich Foundation is an Asia-based philanthropic organization that works to advance mutually beneficial and sustainable global trade. It supports original research and education programs that build understanding and leadership in global trade. It provides thought leadership and analysis for policymakers, business, media, and scholars engaged in global trade.

HINRICH-IMD
Sustainable Trade Index 2024

The Hinrich-IMD Sustainable Trade Index (STI) evaluates the ability of 30 global trading economies to engage sustainably in trade using 72 economic, societal, and environmental indicators. The 2024 Index emphasizes the need for building resilience in trade.

VISUAL CAPITALIST

Visual Capitalist is one of the fastest growing online publishers in the world, with an audience of approximately 120 million readers. Their mission is to simplify complex data to help people become more knowledgeable about the things that matter.