

A pound of compute, a penny of productivity

The economics of AI, security and human adaptation over the next decade

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Agenda

1 A penny of productivity

2 A pound of compute

3 The price before the payoff

4 The security premium

5 The human factor

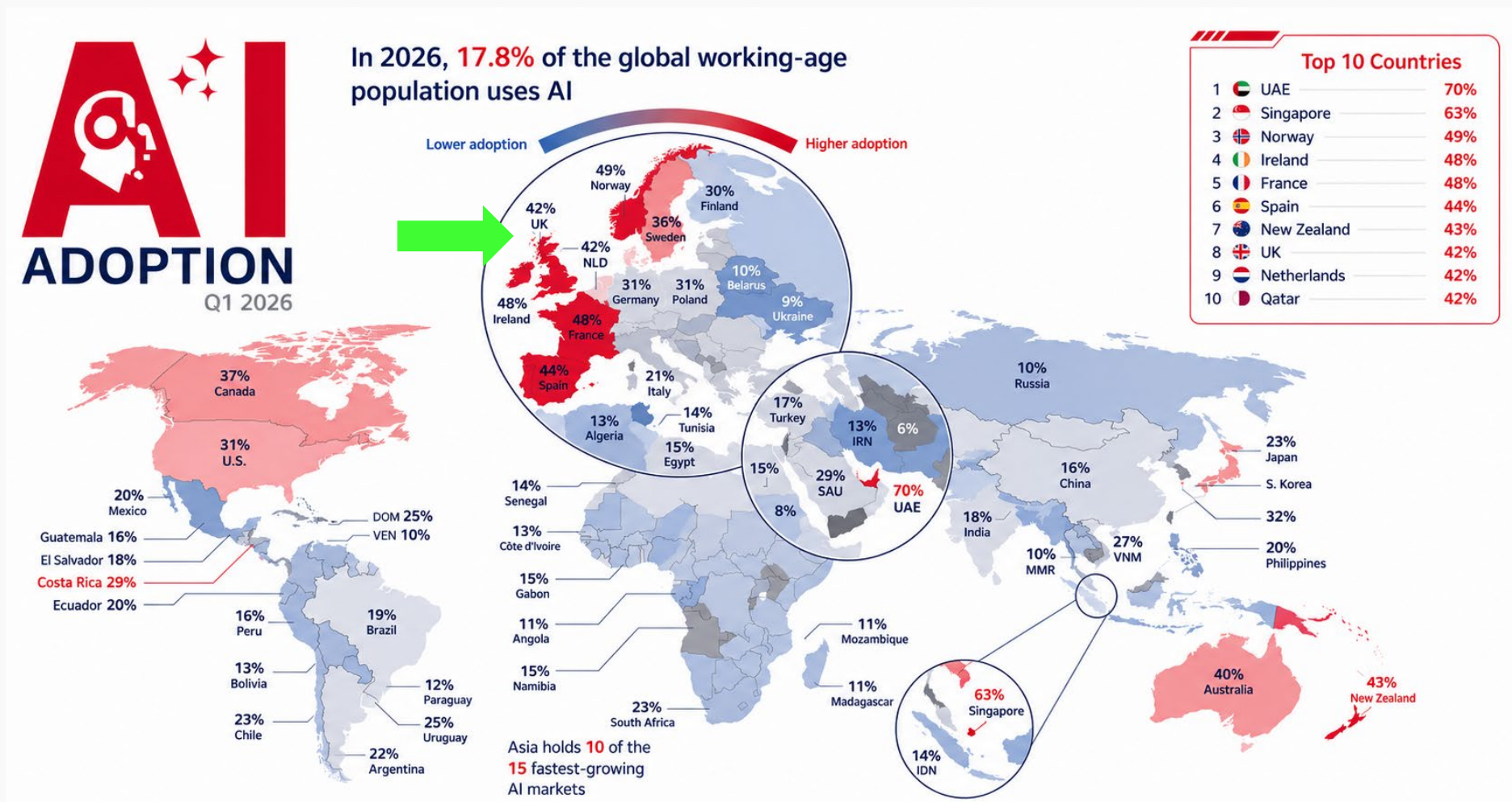


A penny of **productivity**

AI adoption is moving faster than
the measured economic dividend

Adoption is accelerating ahead of productivity

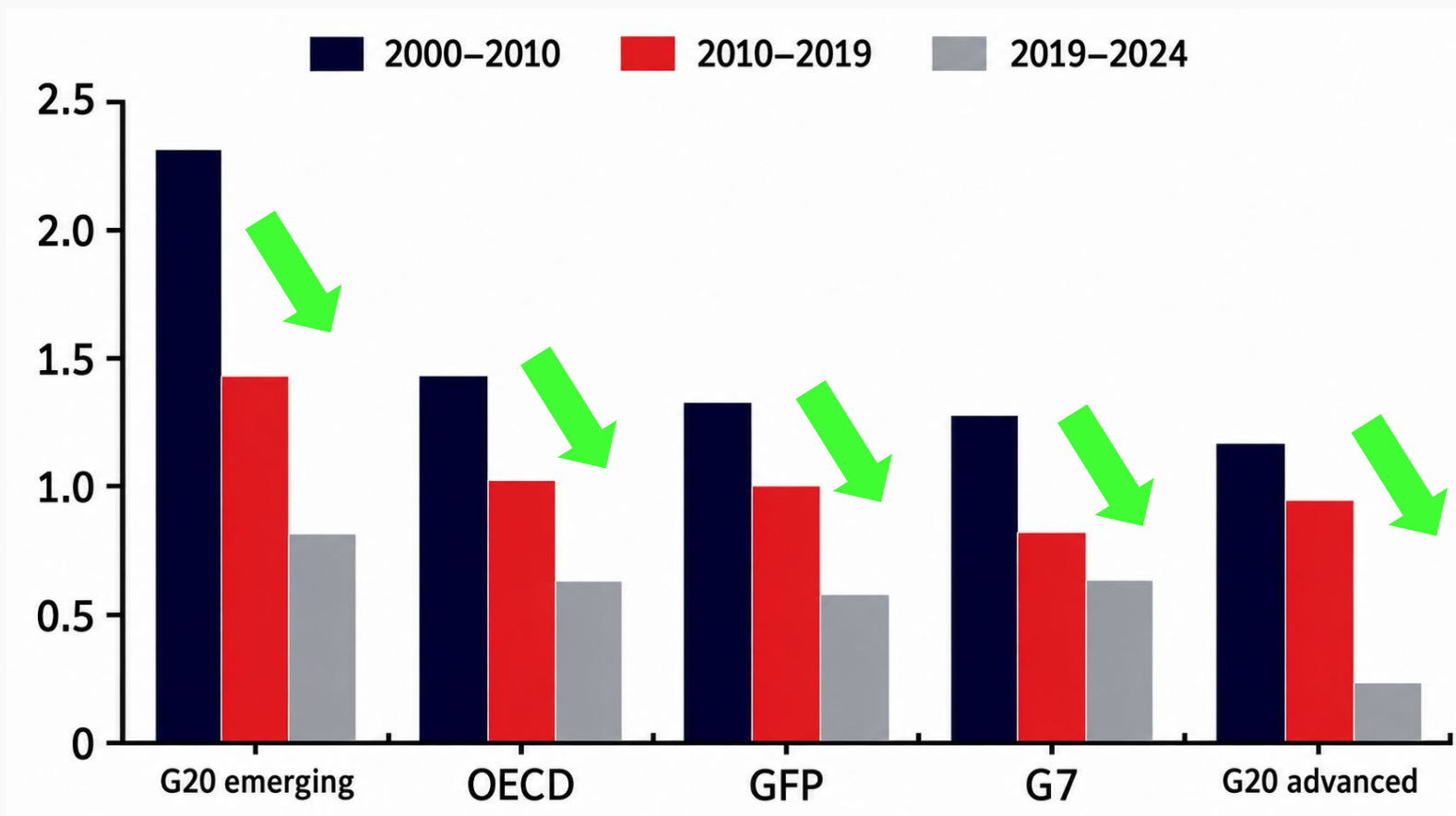
Adoption rates have climbed but productivity levels have yet to react



The missing **productivity dividend**

Measurement problems and implementation lags obscure the early gains

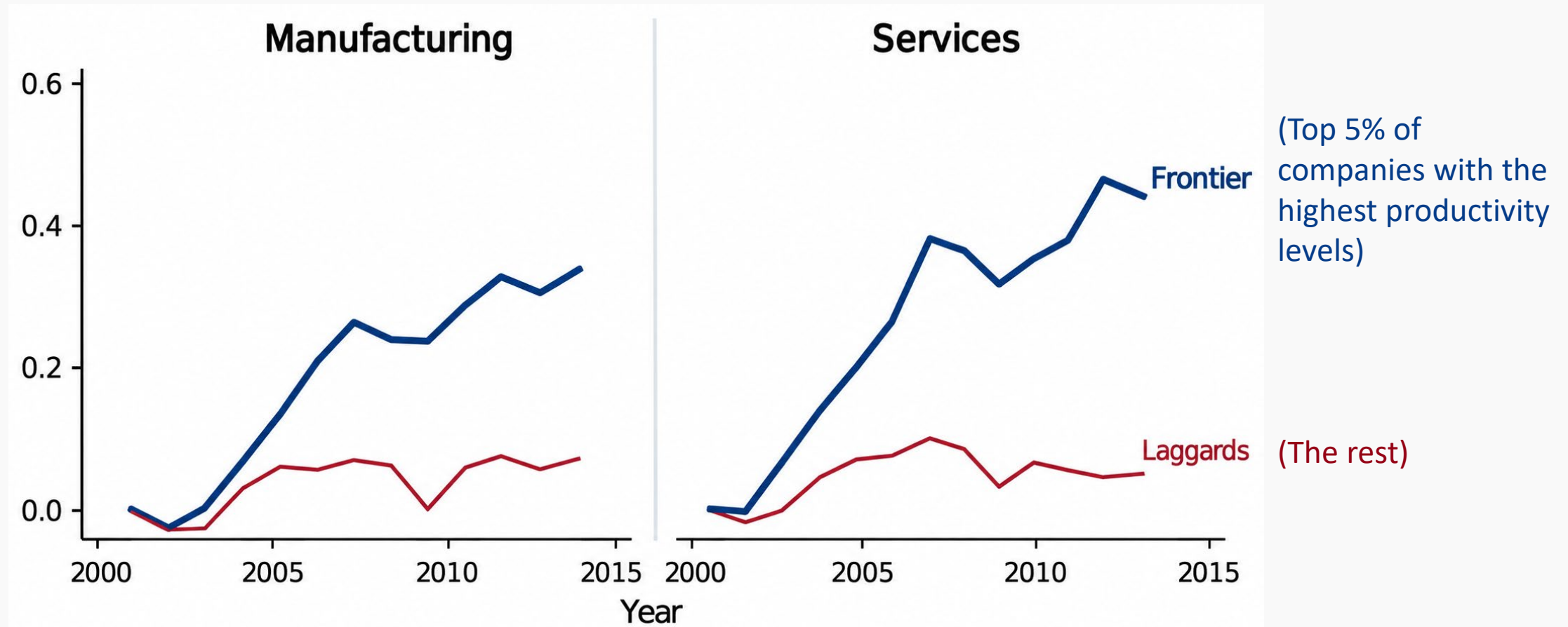
GDP per hour worked (annual growth, constant prices)



A few reach the summit, the rest **climb slowly**

Management quality and organisational flexibility separate the leaders from the rest

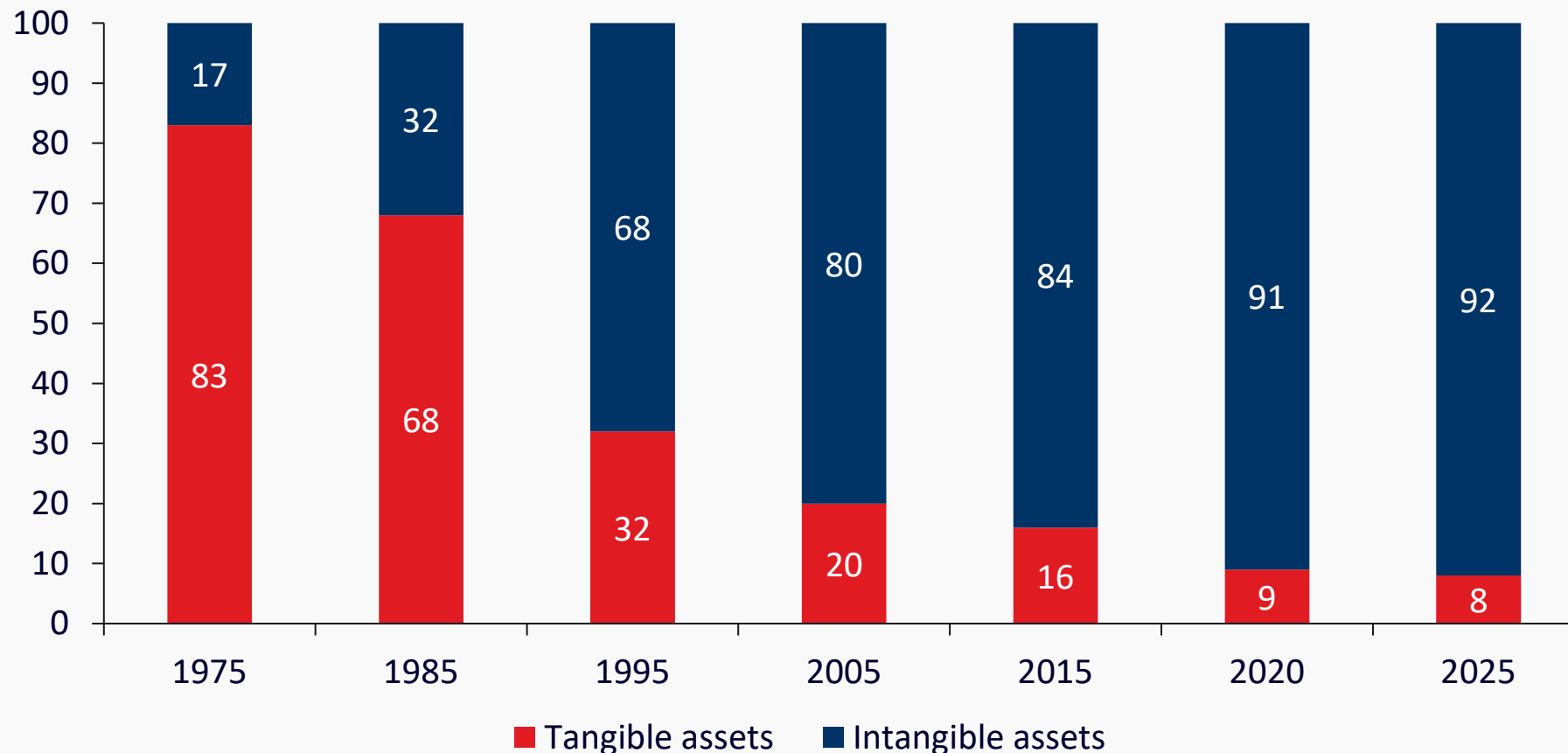
Labour productivity (value added per worker) - log differences from the starting year



The engines of productivity are largely **becoming invisible**

The world's most valuable productive assets are increasingly those you cannot see

Components of S&P 500 Index market value (%)





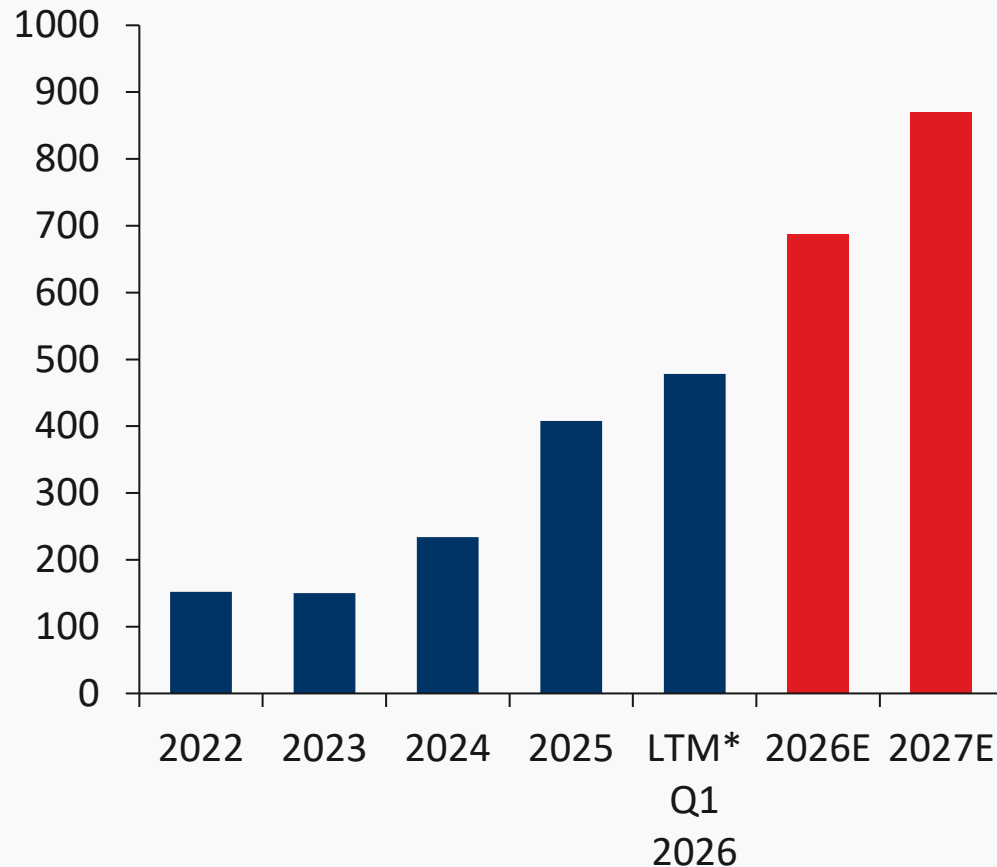
A pound of **compute**

The infrastructure bill is arriving
before the economic return

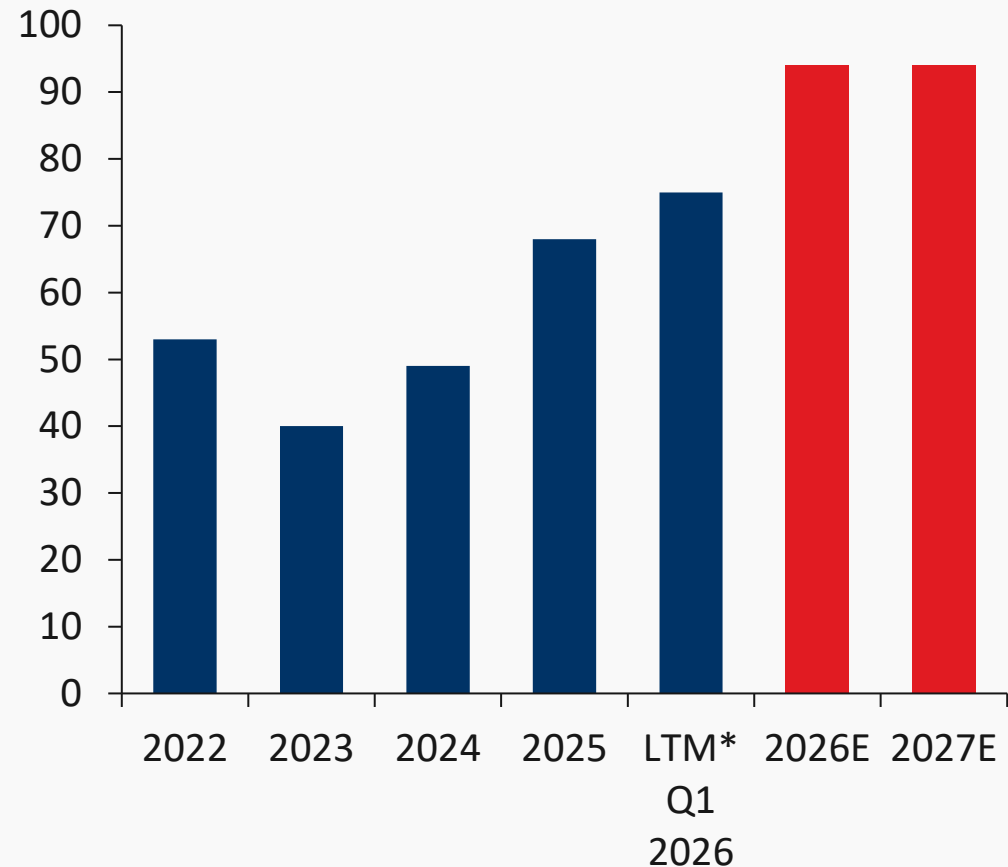
Betting the balance sheet on **future demand**

Hyperscalers are paying for capacity before the revenue model has fully matured

Capital spending across major AI hyperscalers with consensus estimates (US\$ billion)



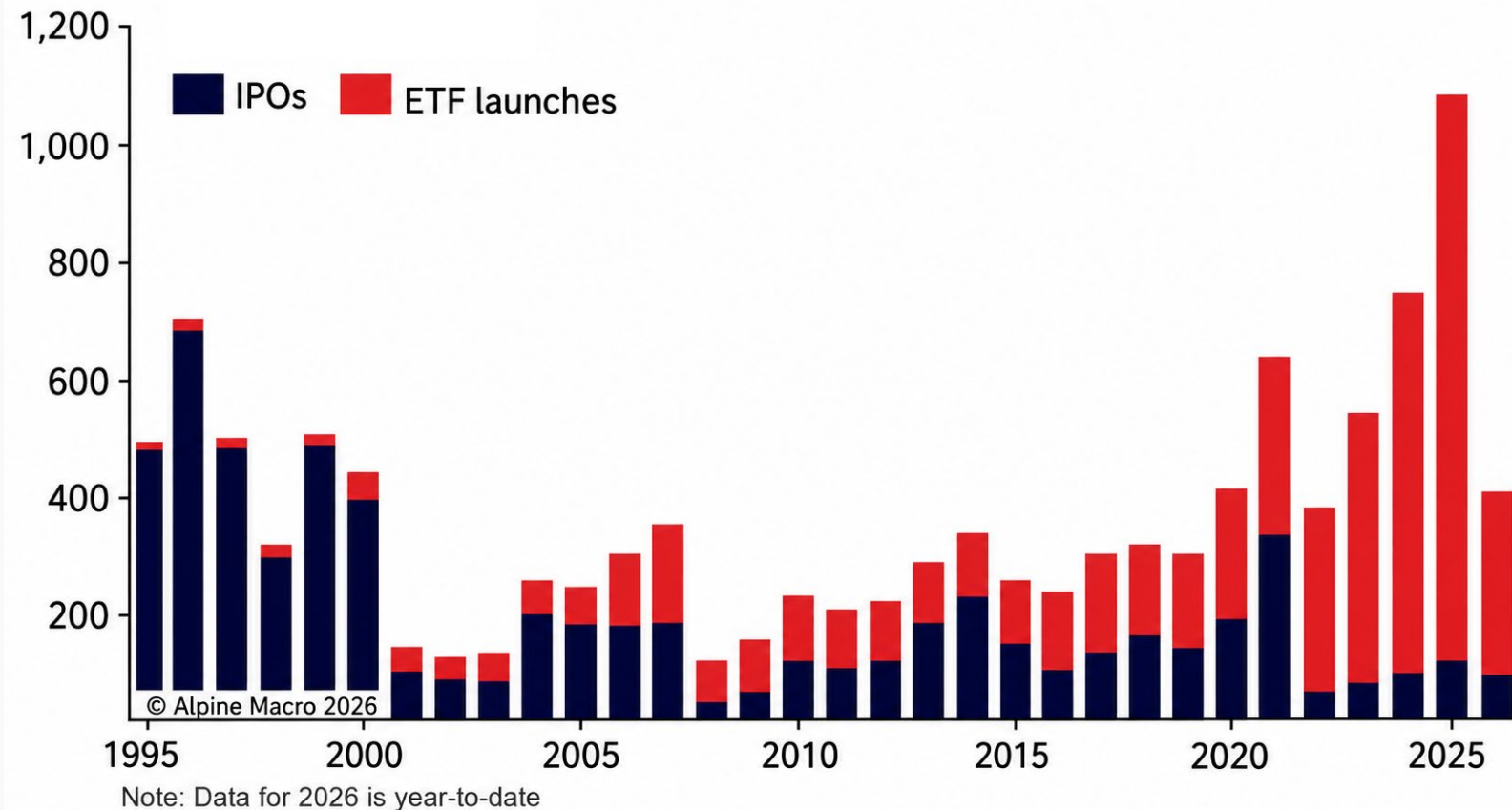
AI hyperscaler capex as a share of operating cash flow (%)



A surge in **new listings**

More capital is coming to the market, just as cash flow comes under pressure

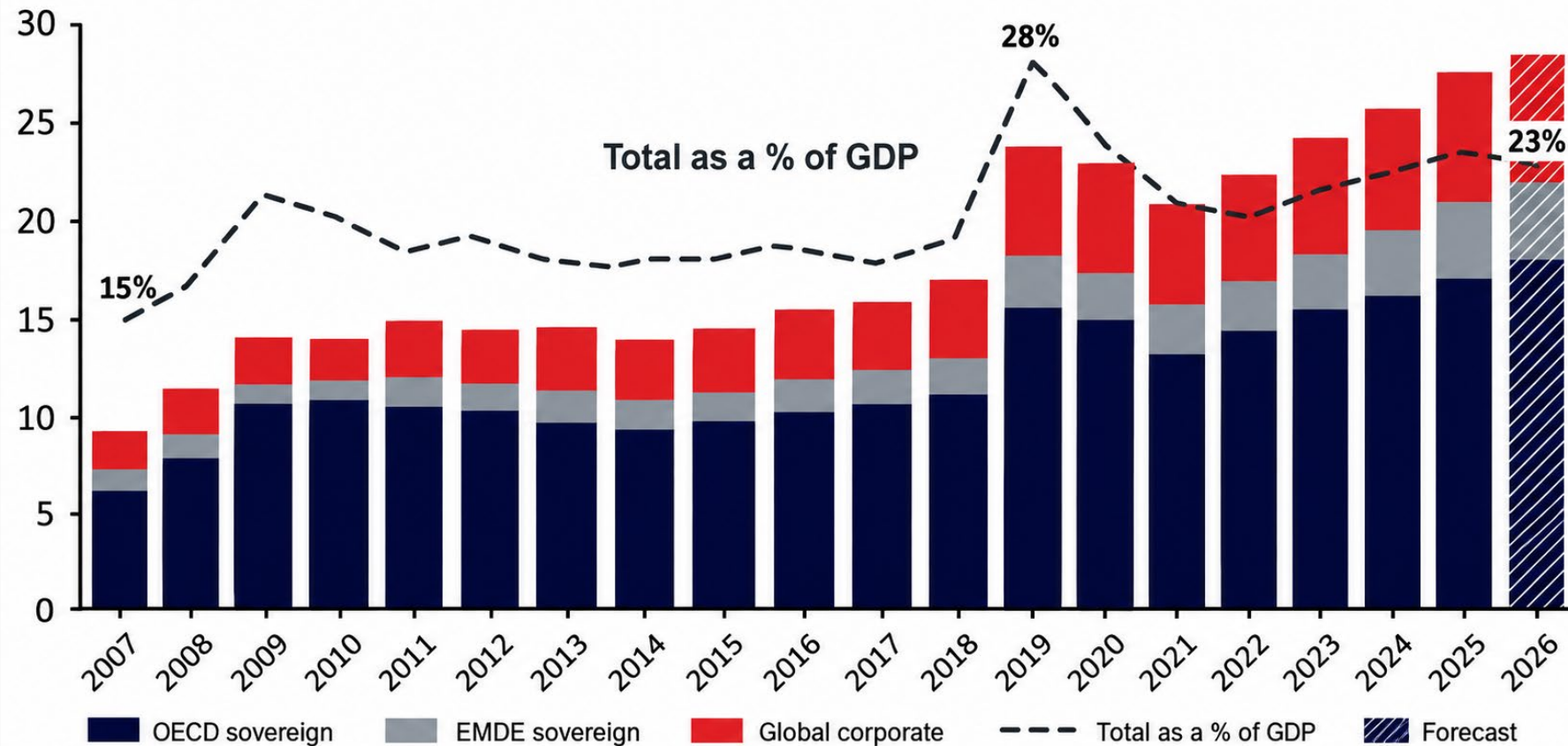
United States IPOs and ETF launches (number)



AI is **competing with governments** for capital

Heavy sovereign issuance raises the hurdle rate for long-duration investment

Global bond issuance (US\$ trillion)



The cost of capital will separate the durable **from the speculative**



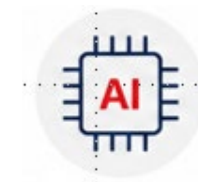
Capital is **scarcer**

Cheap money is over. Governments, corporates and private markets now compete for limited investor capital.



Government debt drives **higher yields**

Large fiscal deficits require more debt issuance, crowding out private capital and pushing bond yields higher.



AI is absorbing **capital**

Corporate debt issuance hit record levels in 2025, driven by enormous capital needs for AI expansion.



Credit spreads stay **tight**

Credit spreads near historic lows despite high debt levels, supported by strong earnings and credit quality.



Debt behaves more like **equity**

Debt markets are increasingly financing growth and innovation, converging with equity markets.



Private credit is becoming **systemic**

The sector's rapid growth has increased leverage and financial system interconnectedness.



The price before the **payoff**

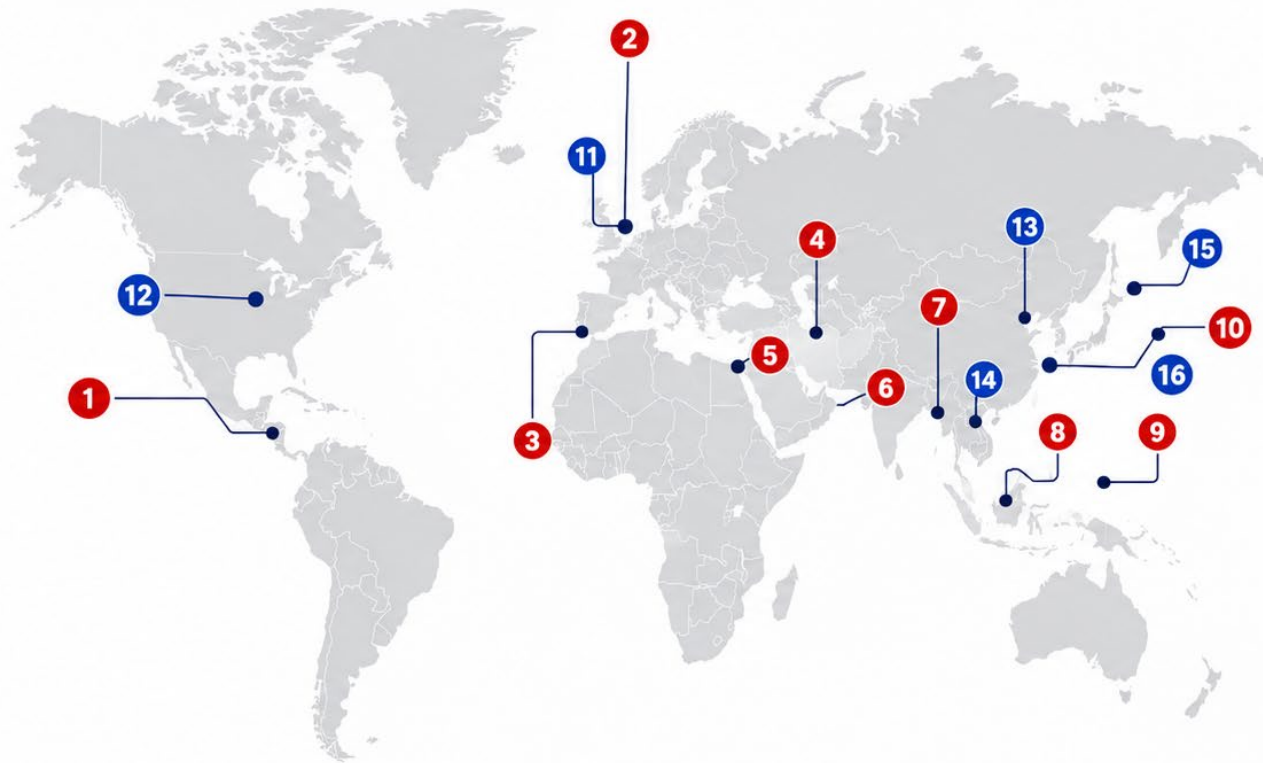
The build-out may add cost before
AI reduces it

Resilience carries an **insurance premium**

Supply chains designed for security may cost more than supply chains designed for efficiency

SHIPPING CHOKEPOINTS

Key straits and canals by shipping traffic, trade volume



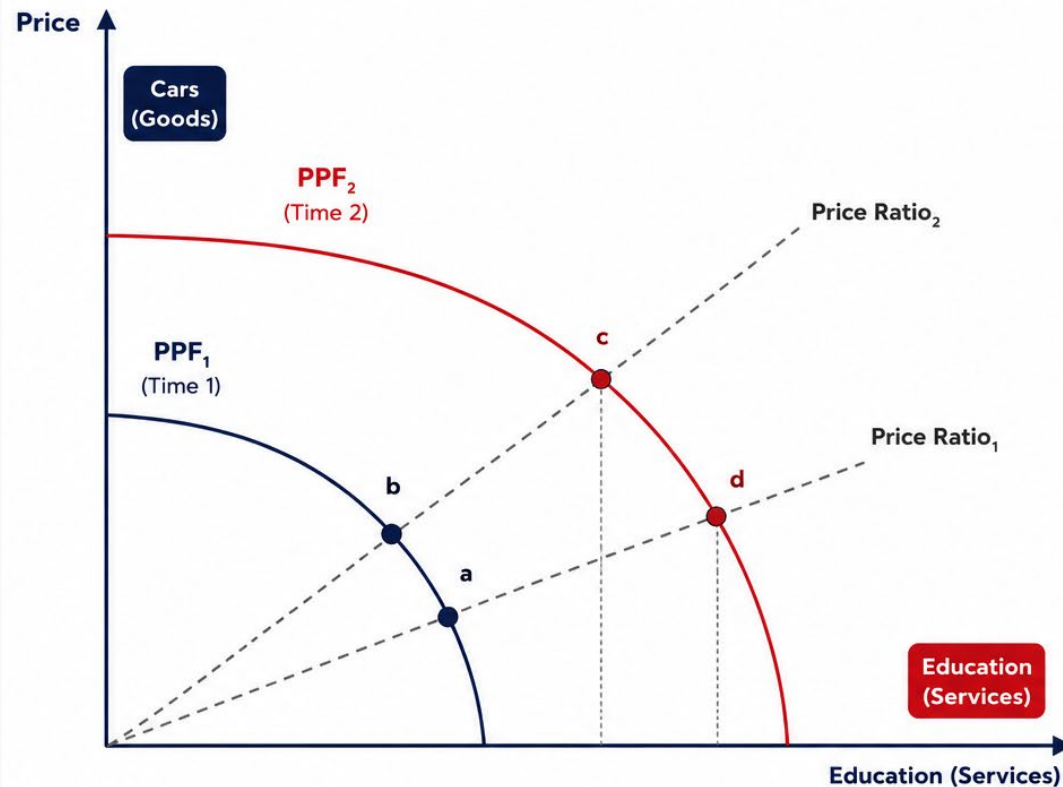
- 1 Panama Canal**
Connects the Atlantic and Pacific Oceans
- 2 English Channel**
Connects the North Sea and the Atlantic Ocean
- 3 Strait of Gibraltar**
Connects the Mediterranean Sea and the Atlantic Ocean
- 4 Turkish Straits**
Bosphorus and Dardanelles connect the Black Sea with the Mediterranean Sea
- 5 Suez Canal**
An artificial waterway between the Mediterranean and the Red Sea
- 6 Bab al-Mandab Strait**
Links the Red Sea and the Indian Ocean
- 7 Strait of Hormuz**
A narrow passage on the way out of the Persian Gulf
- 8 Strait of Malacca**
Links the Indian Ocean and the South China Sea
- 9 South China Sea**
- 10 East China Sea**

SEMICONDUCTOR POWER CENTRES

- 11 Netherlands**
Lithography equipment — 100% market share of EUV machines (ASML)
- 12 United States**
Chip design & software — ~45% of global semiconductor design revenue
- 13 China**
Mature nodes & investment — \$150B+ state investment to reduce import reliance
- 14 India**
Design talent & growth — \$100B+ projected market by 2030; 24 design startups under the DLI Scheme (as of January 2026)
- 15 South Korea**
Memory chips — ~65% global market share (DRAM/NAND)
- 16 Taiwan**
Advanced manufacturing — ~90% of global <10nm foundry capacity

Can AI bend the cost curve in **services**?

The largest productivity opportunity may sit in sectors where output has been difficult to scale



- **PPF (Production Possibility Frontier):** shows the maximum possible combinations of cars (goods) and education (services) an economy can produce.
- - - **Price Ratio:** relative price of services (education) to goods (cars). A steeper line means services are more expensive relative to goods.

1

Time 1



The economy can produce any combination of cars (goods) and education (services) along PPF₁. Point (a) shows the initial combination and relative price (Price Ratio₁).

2

Time 2



Productivity grows much faster in cars (goods) than in education (services). The PPF shifts outward to PPF₂.

3

Rising relative price of services



To keep the same mix as at (a), we must move to (b). Education becomes more expensive relative to cars.

4

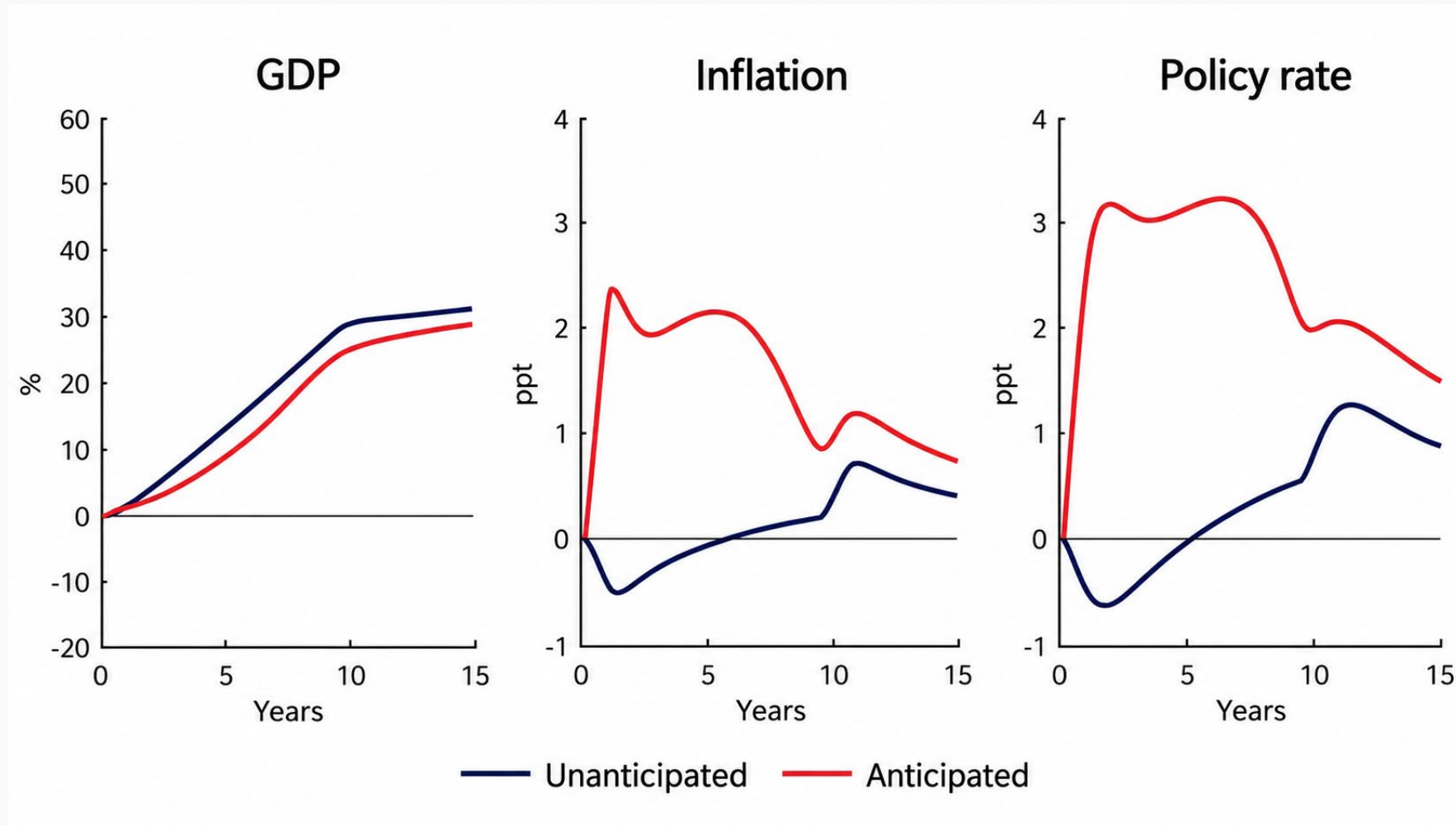
Even more consumption of both



If we want more of both, we move to (d). This requires an even higher relative price of education. Services become progressively more expensive than goods.

Inflationary today and **disinflationary tomorrow**

The largest productivity opportunity may sit in sectors where output has been difficult to scale





The **security** premium

Compute, data and technological capability have become instruments of national power

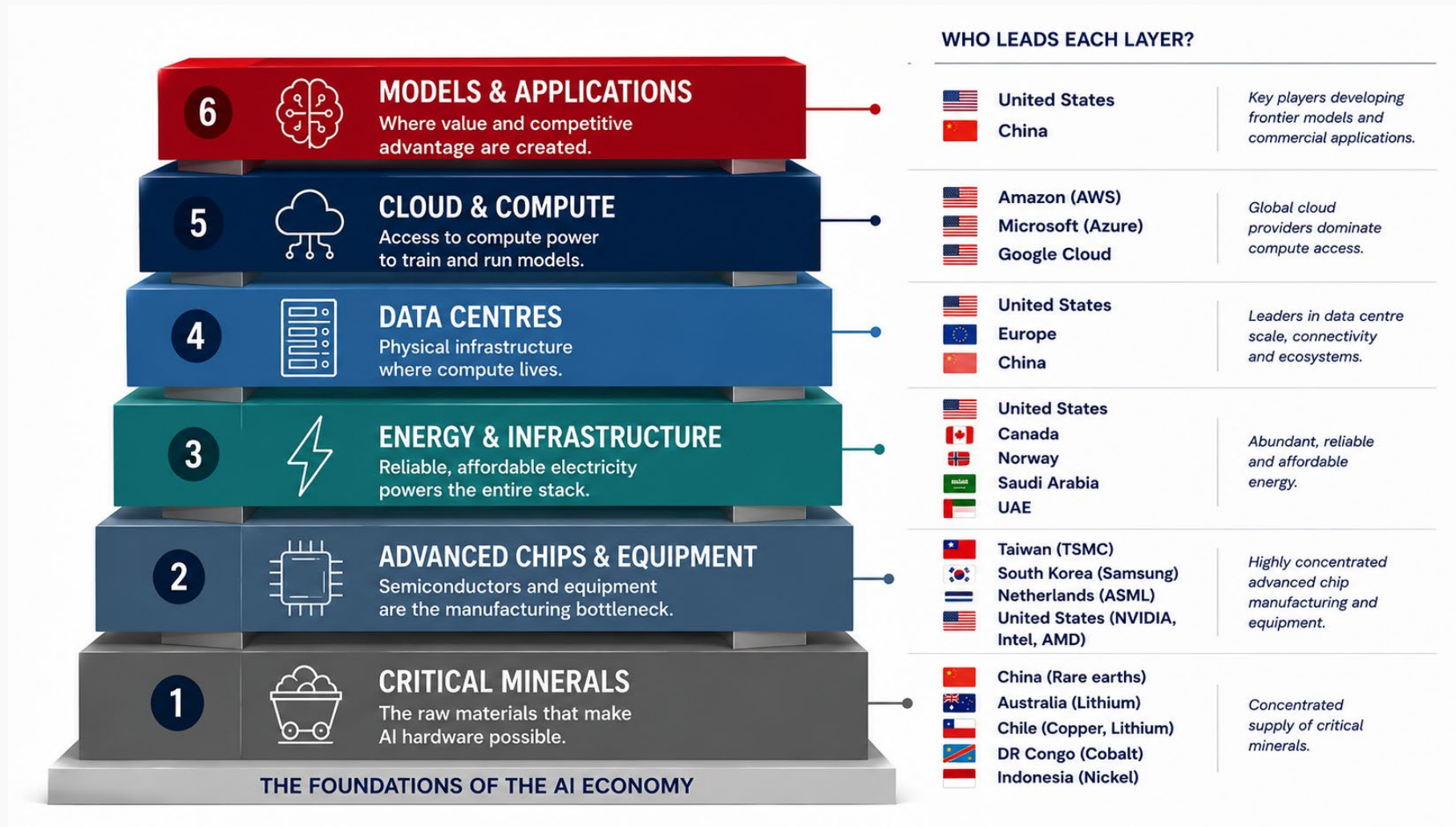
Comparative advantage is being redefined

Britain's advantage lies in specialised intelligence, which must compensate for limited scale in frontier compute

UK foundations	What the AI era requires
 Factor endowments Universities, research institutions and specialist talent	 Intangible assets and innovation Turning research into intellectual property, models and commercial businesses
 Physical infrastructure Established financial, communications and institutional networks	 Digital infrastructure and agility Compute, data centres, cloud capacity, reliable electricity and secure data access
 Mass production Historically less central to the UK's services-led model	 Adoption at scale Diffusing AI into finance, healthcare, government and smaller businesses
 Macroeconomic stability Deep capital markets, credible institutions and the rule of law	 Patient capital and policy consistency Financing scale-ups and long-duration AI infrastructure
 International trade An open economy with strong global services links	 Strategic openness and resilience Remaining connected while reducing exposure to chips, critical minerals and imported hardware

The AI stack is **strategic terrain**

Control of one scarce layer can create economic and geopolitical leverage

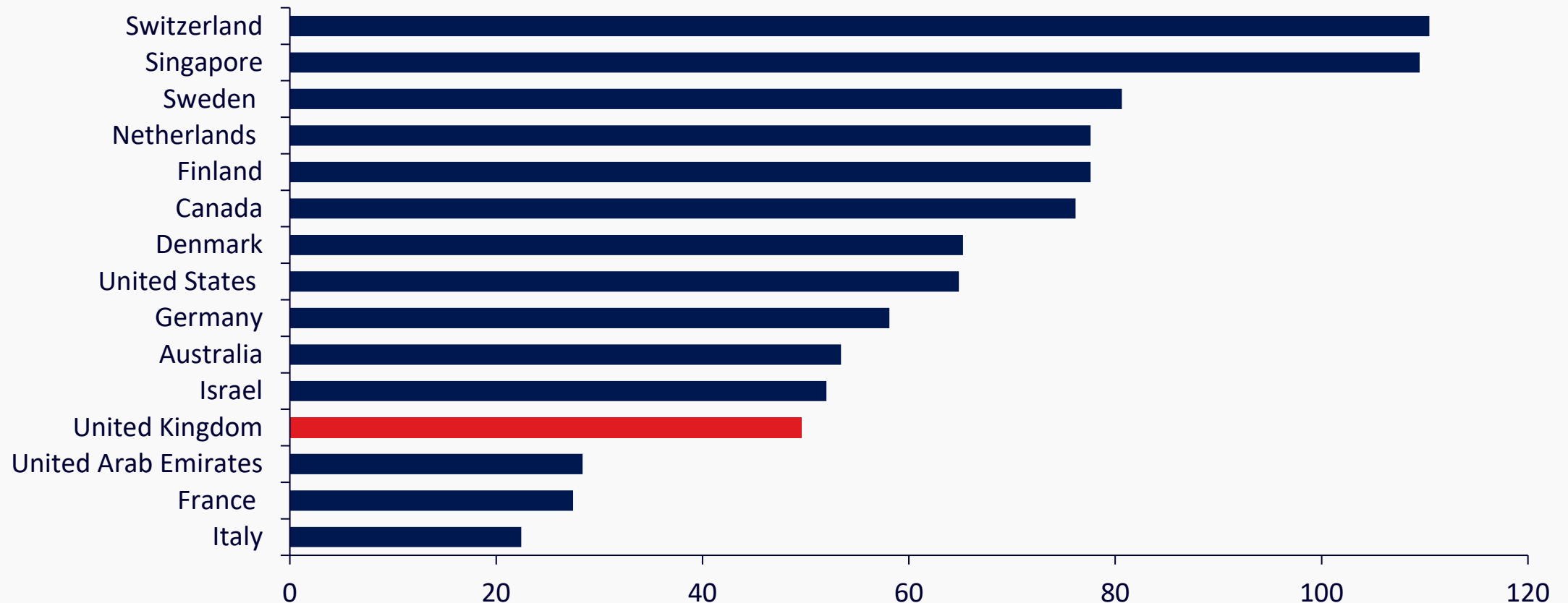


Which layer retains pricing power as intelligence becomes cheaper?

Talent is becoming the new **geopolitical currency**

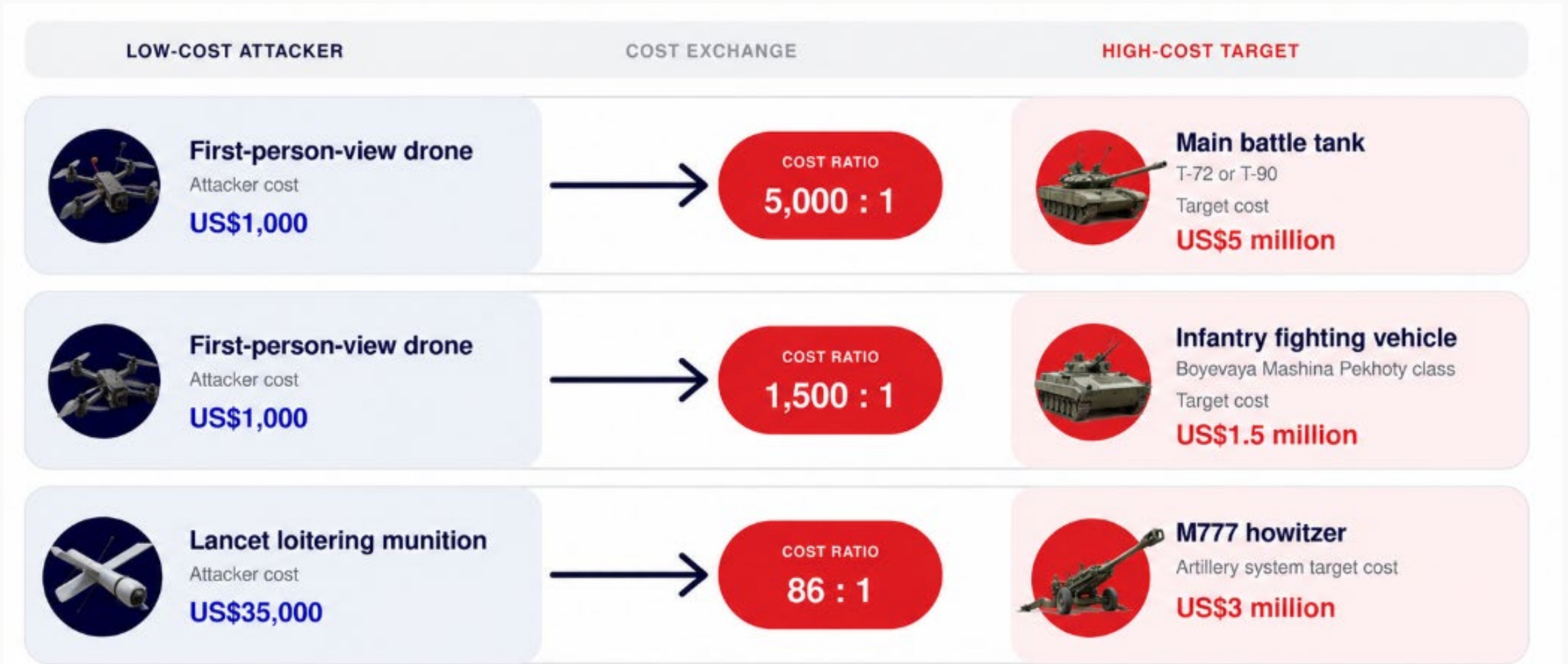
Countries with the deepest AI pools are more likely to create frontier technologies and commercialise innovation

Top AI authors and inventors per 100 000 inhabitants by country (2025)



The battlefield is becoming an exercise in **cost asymmetry**

Low cost, replaceable systems can impose losses of thousands of times greater than their own purchase price



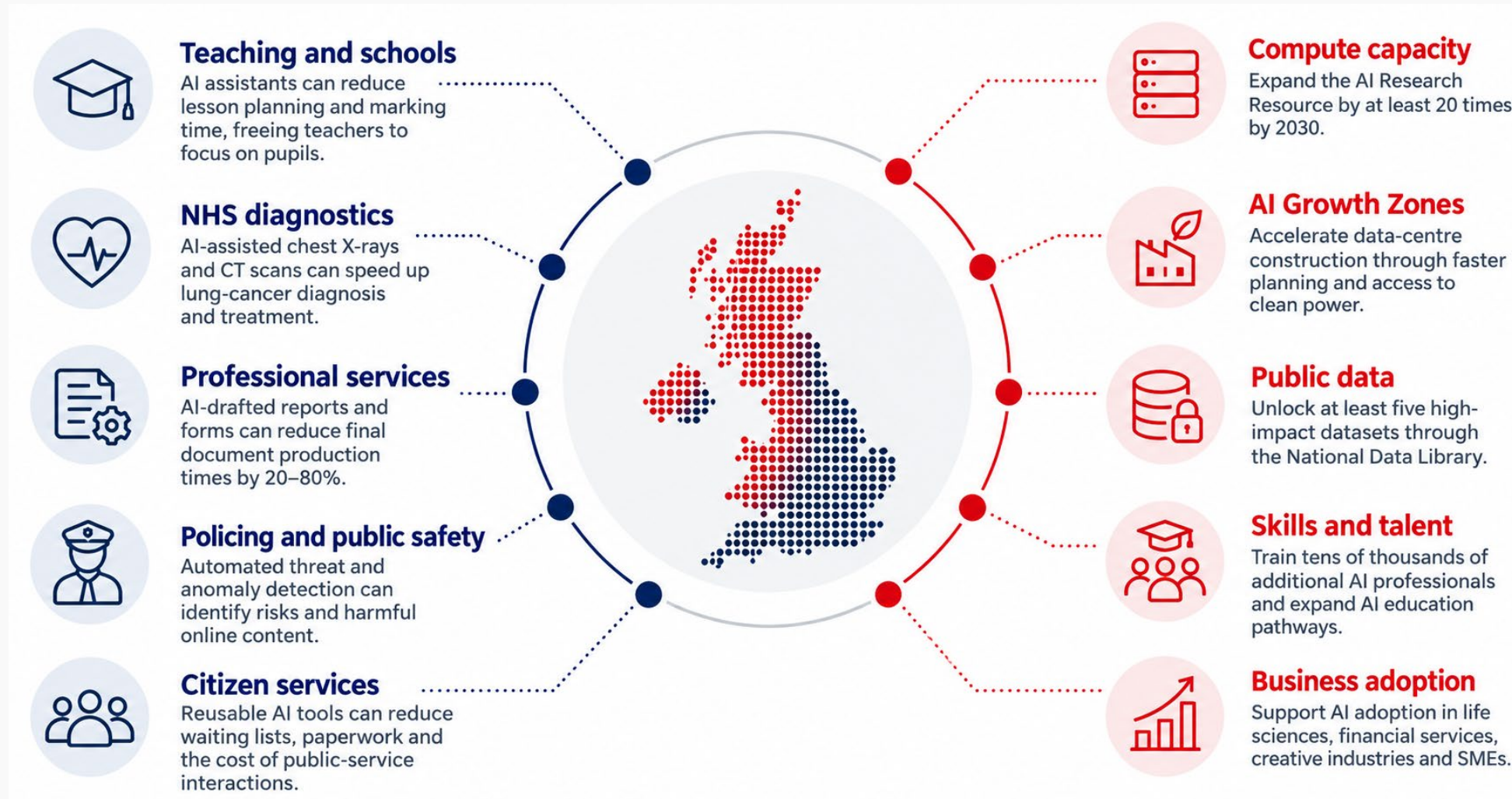


The **human** factor

Technology becomes productive only when people can use, trust and govern it

Building AI capacity and spreading the **benefits**

Public and private productivity depends on redesign, not simply digitisation



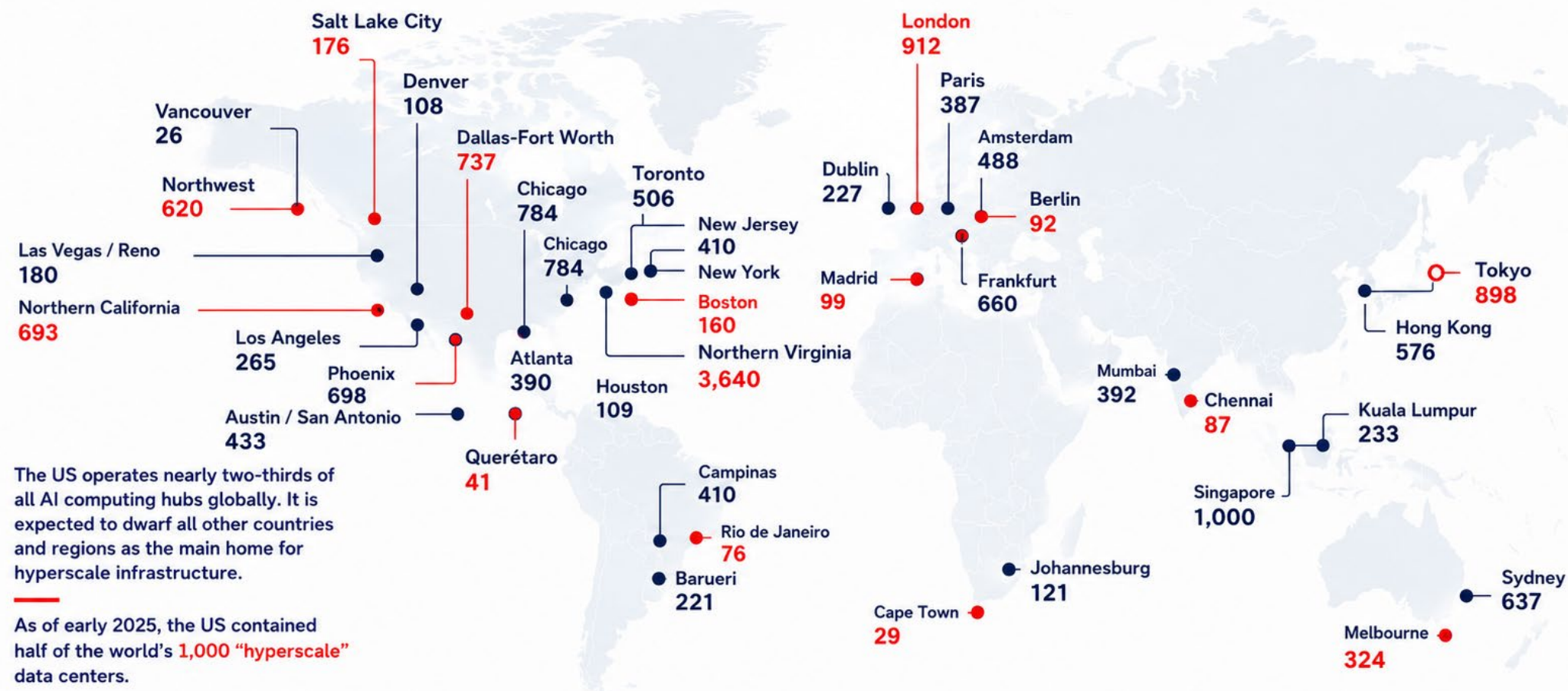
Will AI increase competition or **concentrate power**?

Data centres cluster around electricity, grid capacity, land and cooling

Only 32 nations, mostly in the Northern Hemisphere, have AI-Specialized data center

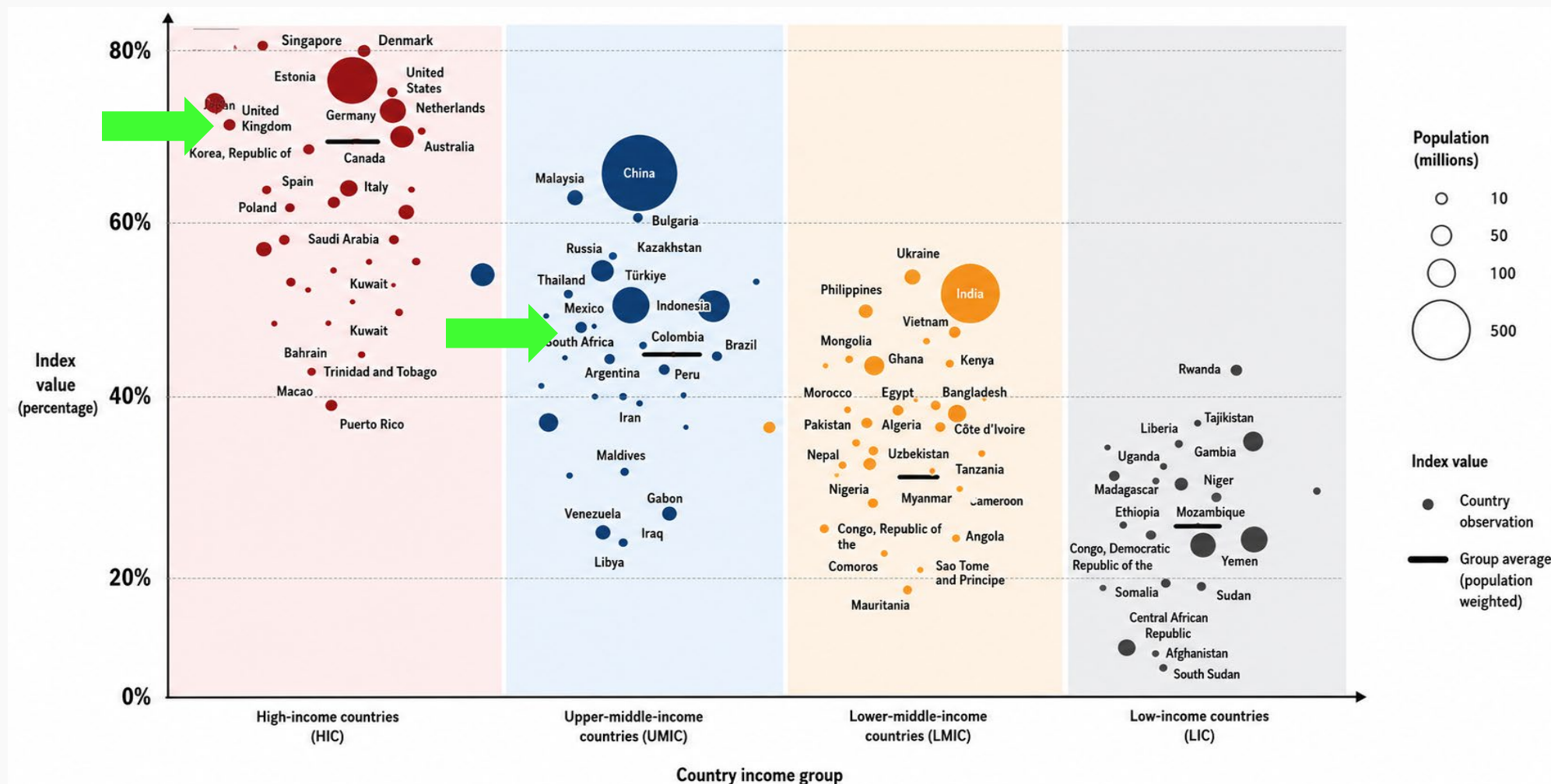
AI could contribute up to \$15.7 trillion to the global economy in 2030, more than the current output of China and India combined.

Of this, \$6.6 trillion is likely to come from increased productivity and \$9.1 trillion is likely to come from consumption-side effects.



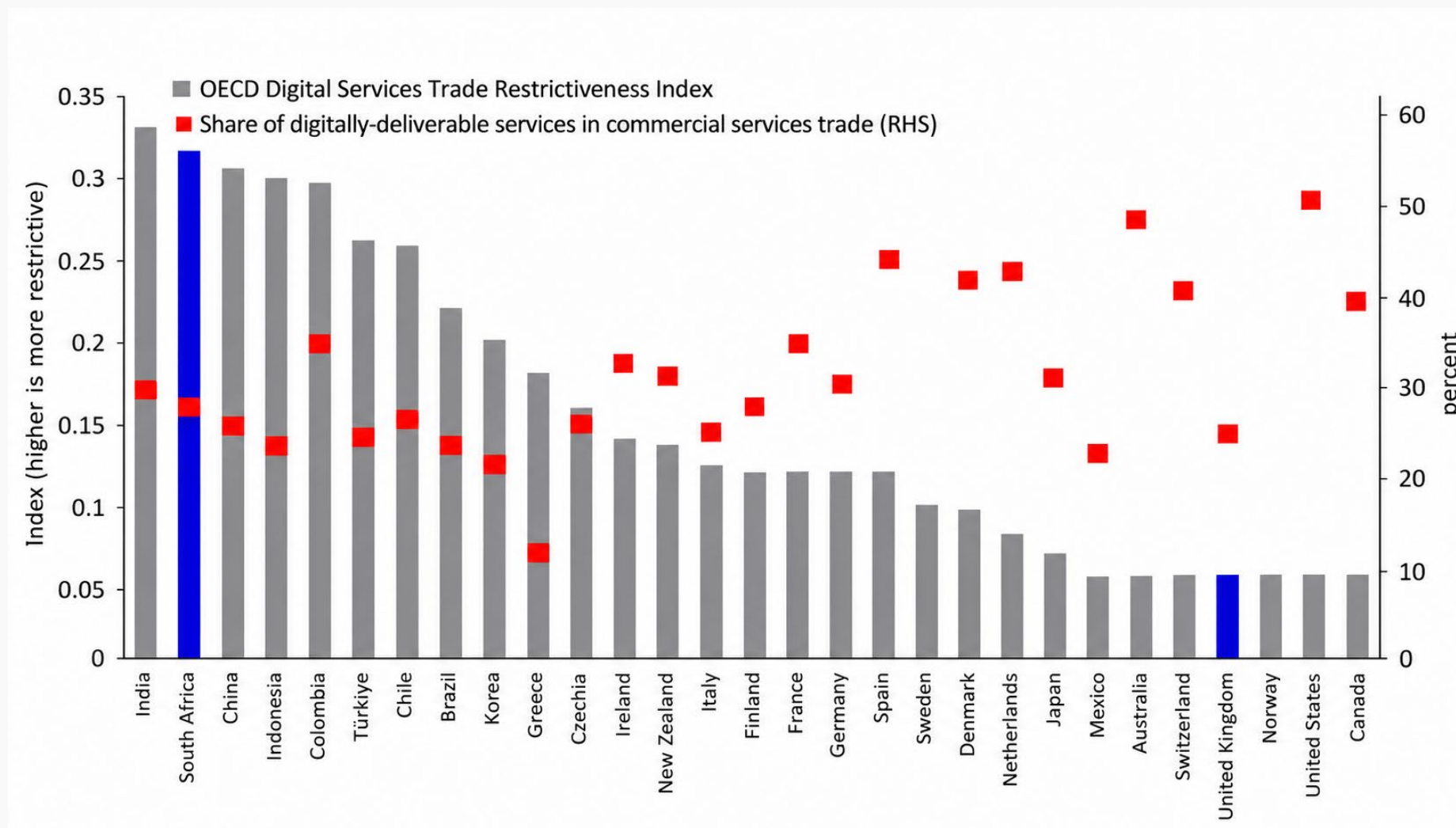
The AI dividend will be **distributed unevenly**

Access to capital, infrastructure and complementary skills shapes who gains



When guardrails become **trade barriers**

Divergent AI rules can raise compliance costs, restrict market access and fragment digital trade



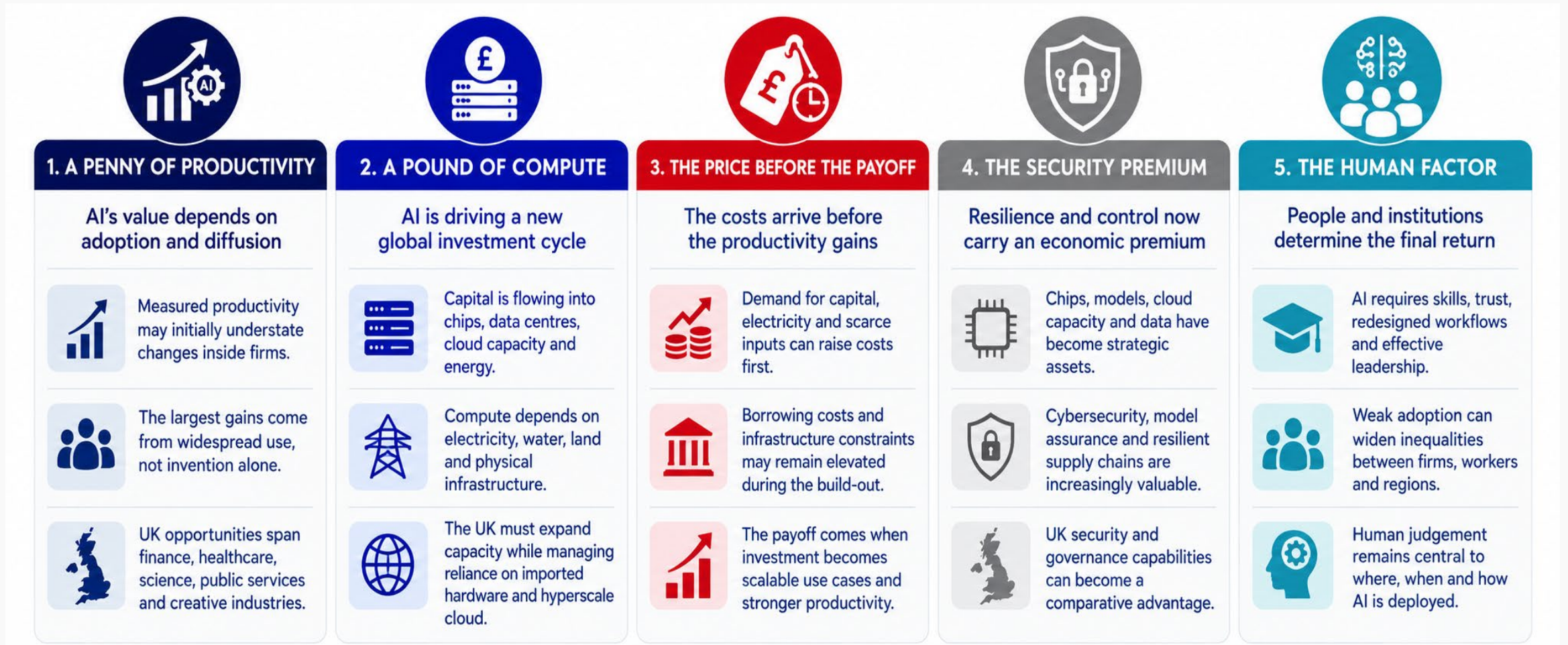


In **summary**

Counting the real return on AI

In summary

AI's economic payoff depends on turning costly infrastructure into secure adoption, better decisions and measurable productivity





Thank you