2024 – No use running if you are heading in the wrong direction

Q3 2024: Swedens [industrial] dynamism in transformation

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Table of Contents

Executive summary

Unlocking the Swedish miracle: this brief dives headfirst into the astonishing paradox of Sweden's economic dynamism, where a high-tax, consensus-driven welfare state launches wave after wave of world-changing entrepreneurs and innovations. Journey through history as Sweden transforms from late-blooming industrial challenger to a global powerhouse, propelled by rapid adaptation and a culture that prizes practical ingenuity and bold decisions. Discover how the welfare state, far from smothering risk, fuels it—making entrepreneurship a smart bet rather than a gamble. Sweden's model is not just a blueprint for prosperity; it's a thrilling demonstration of how technical brilliance and social cohesion create fertile ground for disruptive ideas. Policymakers seeking to spark renewal without sacrificing stability will find inspiration in Sweden's electrifying fusion of robust social policy and relentless innovation.

The old and new conundrum

Swedish dynamism is the paradox that has long puzzled outside observers: how a high-tax, consensus-driven Nordic welfare state consistently produces an outsized share of global

entrepreneurs, unicorns, and transformative innovations. It is more than a policy outcome — it describes a structural relationship between institutions, culture, and economic renewal that has operated, in different forms, for over a century.

The Old Foundation: Industrialism as Identity

Sweden industrialized late but ferociously, compressing a century of British-style transformation into roughly fifty years between the 1870s and 1920s. Where Britain's revolution unfolded gradually, Sweden's compressed timeline demanded rapid institutional learning, pragmatic adaptation, and a willingness to let old structures fall away when better ones emerged.

That compression forged enduring habits: comfort with creative destruction, respect for engineering, and a merchant pragmatism that valued what worked over what was ideologically pure. Ericsson, SKF, ASEA, Alfa Laval, Volvo, and Saab were not accidents — they expressed a society that channeled technical ambition through disciplined organization and global reach. Per capita, Sweden became one of the most prolific generators of multinational industrial corporations in the world.

This golden age built the material foundation of the modern welfare state — and an institutional confidence that Sweden could compete globally from a small base, and that technical excellence and social cohesion were not in tension but mutually reinforcing.

The Welfare State as Risk Infrastructure

The welfare state didn't suppress this dynamism — it may have amplified it. The postwar Rehn-Meidner model used solidaristic wage policy to squeeze out inefficient firms while channeling labor and capital to productive ones: weak firms could not survive by paying low wages, and strong firms were rewarded with skilled workers freed from dying industries. It was active industrial policy disguised as labor economics.

The broader welfare architecture — universal healthcare, free university, generous parental leave, unemployment insurance — had an underappreciated secondary effect: it socialized the downside risk of entrepreneurship. When founding a company doesn't mean gambling your family's healthcare or your children's education, the calculus of risk-taking changes. The welfare state functioned as a publicly funded insurance policy for private innovation.

When Spotify, Klarna, King, and iZettle emerged from Stockholm, they did so in a society where the personal cost of failure was radically lower than in most comparable economies. Sweden's welfare infrastructure was not a drag on enterprise; it was the invisible platform that let a generation of digital entrepreneurs take extraordinary risks.

The Cultural Substrate

Sweden also combines cultural traits that, taken individually are not unique, but together create an unusually fertile environment for networked, technology-driven businesses.

High interpersonal trust lowers transaction costs and makes collaboration frictionless. Flat hierarchies let ideas travel from junior engineers to decision-makers unfiltered. Widespread English fluency — Sweden consistently ranks among the top non-native English-speaking nations — means

Swedish founders operate in the global lingua franca from day one. And early adoption of digital infrastructure, from 1990s mobile telephony to 2000s broadband, put Swedish consumers and developers in the digital future ahead of most European peers.

Then there is the constraint that became an advantage: a domestic market of ten million can't sustain major enterprises alone, forcing export orientation from the first generation of industrial companies. Swedish firms are born global because they have no alternative — an instinct that proved decisive once digital markets erased geography.

The Diminishing Returns of the Old Model

But the old engine is losing power, and the evidence has been accumulating for decades.

The industrial model that built modern Sweden — steel, timber, pulp and paper, automotive, telecom hardware — generates diminishing returns. Value captured per kilowatt-hour, per ton of raw material, per hour of skilled labor has been in structural decline. This isn't unique to Sweden; it is a feature of mature industrialism everywhere. But for a country whose identity and institutions were built on industrial prowess, the implications run deeper than economics.

Sweden has increasingly lived on institutional capital, financial reserves, and reputational momentum accumulated during a golden century of industrial expansion. The great multinationals still operate, export, and employ — but the trajectory is unmistakable. Each decade, the industrial base contributes a smaller share of GDP growth, employment, and globally significant innovation. The Wallenberg sphere, the cooperative structures, the labor market institutions were designed for an industrial economy. They have adapted impressively. But adaptation within a declining paradigm is not leadership in an emerging one.

This is not yet a crisis. Sweden remains wealthy, stable, and institutionally sophisticated. But there is a difference between a country that is rich because of what it is building and a country that is comfortable because of what it once built. The former generates compounding returns. The latter depletes reserves.

The Paradigm Shift: From Atoms to Intelligence

What is emerging now — still in its infancy but gathering force — is a fundamentally different economic paradigm: a transition as consequential as the original industrial revolution, and perhaps more so given its speed and scope.

The shift is from producing physical goods to producing and deploying intelligence. AI, machine learning, digital infrastructure, data ecosystems, and the compute beneath them are becoming the primary engines of economic value. Wealth is no longer extracted from the ground or assembled on a factory floor; it is generated from energy, compute, data, and human ingenuity — and the output is not a product that wears out but a capability that compounds.

The economics are staggering and still poorly understood by most policymakers. A kilowatt-hour routed through advanced AI compute can generate hundreds of euros of value — versus fractions of a euro when used to produce steel or heat a paper mill. This isn't a marginal improvement but an orders-of-magnitude transformation in the relationship between energy input and economic output, rewriting the equation of industrial economics that Sweden and the West have operated under for a century.

This is Erik Brynjolfsson's J-curve made tangible: a transformative general-purpose technology starts with heavy investment, restructuring, and modest visible output, then accelerates explosively as complementary innovations and institutions catch up. By most credible estimates we are still early on AI's J-curve — the full economic impact lies ahead, not behind.

Sweden's Structural Advantages in the Intelligence Economy

Sweden is unusually well positioned for this pivot, and not by coincidence. The structural advantages that defined the old dynamism — abundant low-cost energy, a technically literate population, deep engineering culture, political stability, rule of law, and instinctive export orientation — map almost precisely onto the inputs of the intelligence economy.

Consider energy. AI compute is, at bottom, an energy conversion process — turning electricity into inference and training capacity. Sweden has some of the cheapest, most abundant, and cleanest electricity in Europe, predominantly hydro and nuclear. In a world where the limiting factor for AI infrastructure is increasingly affordable, reliable, low-carbon power, this is an advantage of historic proportions — Sweden's twenty-first-century equivalent of Britain's coal or Saudi Arabia's oil, except renewable, politically stable, and carbon-free.

Add a climate naturally suited to cooling dense server arrays, cutting one of the largest operational costs of data center infrastructure. Add fiber networks that reach into rural areas. Add a regulatory environment that, for all its complexity, is predictable and grounded in the rule of law. Add EU membership, with the market access and regulatory influence that implies. These are infrastructure cards most nations simply cannot replicate, no matter how much capital they deploy.

Then there is human capital. Despite the criticism it has attracted, Sweden's education system continues to produce engineers, data scientists, and technical entrepreneurs at a rate far above what its population would predict. KTH, Chalmers, Lund, and Uppsala maintain strong programs in precisely the disciplines the intelligence economy demands. Stockholm's startup ecosystem — already the most prolific in Europe per capita — has built the networks, mentorship, and cultural norms that turn technical talent into commercial ventures.

The Global Parallel: Innovation Geographies

The historical parallels are instructive and worth examining with some care.

Silicon Valley did not emerge from nothing. It grew from a specific confluence of circumstances: Stanford's strategy of fostering industry collaboration, Cold War defense spending that funded early semiconductor and computing research, a venture capital industry willing to finance high-risk ventures over long horizons, and a culture that treated failure as a credential. The Valley's dominance was not inevitable; it was the product of choices, investments, and institutional innovations that compounded over decades.

Israel's "Startup Nation" was catalyzed by different factors: military technology transfer from elite intelligence and signals units, highly educated immigration from the former Soviet Union, government-backed venture funds that de-risked early-stage investment, and a small domestic market that, like Sweden's, forced immediate global orientation. The inputs differed; the output — a disproportionate concentration of innovation in a small geography — was structurally similar.

Shenzhen transformed from a fishing village of thirty thousand into a metropolis of nearly eighteen million — and the world's dominant hardware manufacturing ecosystem — in a single generation. The catalyst was the convergence of Chinese government policy, Hong Kong's adjacent capital and logistics networks, and entrepreneurial energy unconstrained by established institutions.

In each case, a new generation of entrepreneurs, backed by new capital and new ideas, built something the previous economic order could not have predicted. Prior endowments — Stanford's labs, Israel's military talent pipeline, Shenzhen's proximity to Hong Kong — were necessary but not sufficient. What mattered was recombination: redirecting existing assets toward an emerging paradigm with enough speed, scale, and conviction to reach critical mass.

Sweden at the Inflection Point

Sweden now stands at a comparable inflection point. A new generation of founders, engineers, and investors is beginning to build at the intersection of AI, energy infrastructure, digital sovereignty, and deep tech — not adapting the old industrial playbook but composing a new one.

The early signals are visible for those who know where to look. Sovereign AI compute ventures are emerging to serve European nations that lack the energy resources to build their own. Green data center companies are positioning Sweden as the natural home for energy-intensive AI computation. Applied ML startups are leveraging Sweden's domain expertise in healthcare, telecommunications, industrial automation, and financial services. Investors — domestic and international — are beginning to recognize that Sweden's combination of energy, talent, infrastructure, and institutional quality constitutes a platform, not just a market.

What sets this moment apart is the nature of the opportunity. The digital consumer companies of the 2000s and 2010s — Spotify, Skype, Klarna — were impressive but operated in the application layer, on infrastructure built elsewhere, largely in the United States. The emerging wave operates deeper in the stack: it builds the infrastructure itself — the compute, the energy systems, the data sovereignty frameworks — that others will build upon. This is a shift from being consumers of the global technology platform to being architects of it.

A Transition of Scope, Size, and Direction

This is a transition of scope, size, and direction, and each of those dimensions deserves unpacking.

Scope, because the intelligence economy does not displace one sector the way automobiles displaced horses or electricity displaced gas lighting. It transforms how value is created across every sector simultaneously. Healthcare, education, finance, manufacturing, public administration, defense, scientific research — none will be untouched. A country positioned at the center of this transformation is not capturing a niche; it is inserting itself into the operating system of the twenty-first-century economy.

Size, because the total addressable market for intelligence — compute, AI capability, the infrastructure that delivers it — will dwarf the industrial economy within a generation. Global AI infrastructure investment already exceeds what most nation-states spend on defense — and unlike defense spending, these investments compound. Each new model, each expansion of compute, each application built on the platform increases the value of the ecosystem as a whole.

And direction, because Sweden's role shifts qualitatively. The old model exported commodities and manufactured goods — steel, timber, trucks, telecom equipment — valuable but subject to global commodity pricing, lower-cost competition, and the secular decline in returns that characterizes mature industrial sectors. The new model exports something different: compute capacity, AI capability, sovereign digital infrastructure, and — perhaps most importantly — the institutional frameworks that make trustworthy, transparent, democratically accountable digital infrastructure possible. In a world anxious about the concentration of AI power in a few American and Chinese giants, this last export may prove Sweden's most consequential contribution.

The Unfinished Story

Swedish dynamism is not a finished story of industrial success to be admired in retrospect. It is an unfinished story of reinvention — in which the old foundations of trust, talent, energy abundance, institutional pragmatism, and global orientation are being repurposed for an era whose contours we can only begin to discern.

The foundation is strong. The cultural instincts are right. The structural assets are, in many cases, world-leading. But foundations don't build themselves into buildings. What is required now is what was required in the 1870s, the 1940s, and the 1990s: recognition that a new era demands new institutions, new forms of capital, new kinds of leadership — and above all, the courage to invest in a future that cannot yet be fully described.

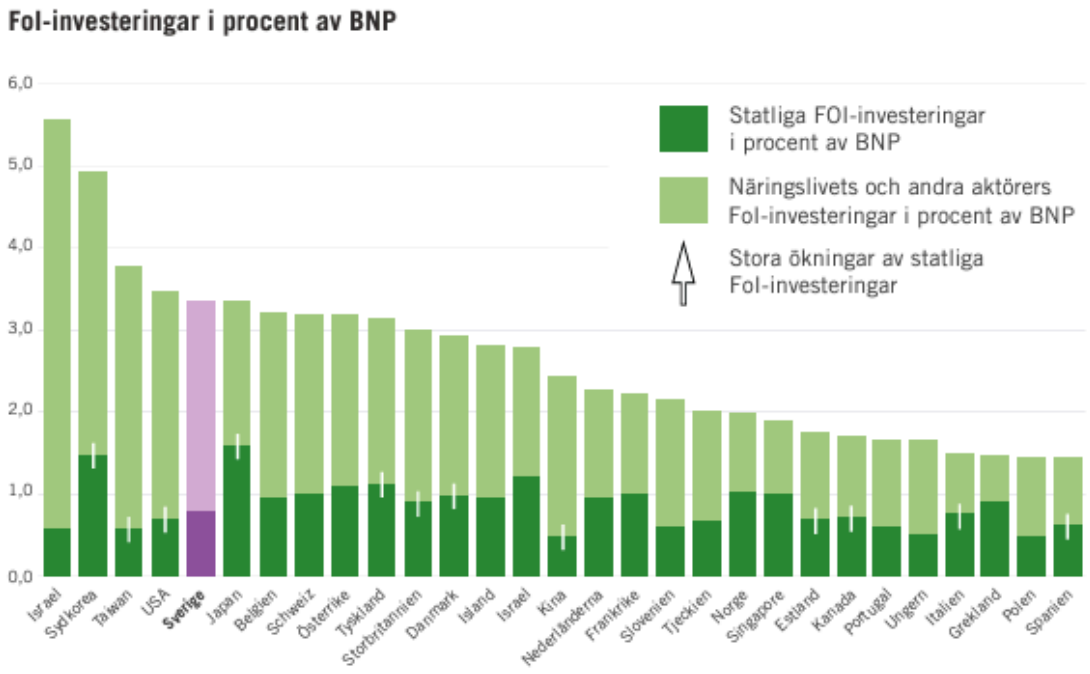
The question is not whether Sweden has the assets. It is whether it will move with the urgency, ambition, and strategic clarity the moment demands. The entrepreneurs of the old dynamism did not wait for permission or consensus. They saw what was coming, and they built. The new generation must do the same — faster, and at a scale that matches the transformation underway.

History does not wait for nations that deliberate too long, but it rewards generously those that move decisively when the moment is right. Sweden's moment is now — and how we invest in this new direction will be a clear sign of how we, as a leading society, choose to act.

Investing in R&D

Sweden invests roughly 3.5% of GDP in research and development. Taxpayers' money accounts for a significant share of this investment — about 7.2 billion SEK (see Graph 1 below). One priority area is AI.

Graph 1



Investing in AI means protecting innovation through patents. In the newly published Stanford AI Index (see Graph 2 below), Sweden doesn't make the top 15 — surpassed by countries like Germany, Denmark, and Finland.

Graph 2

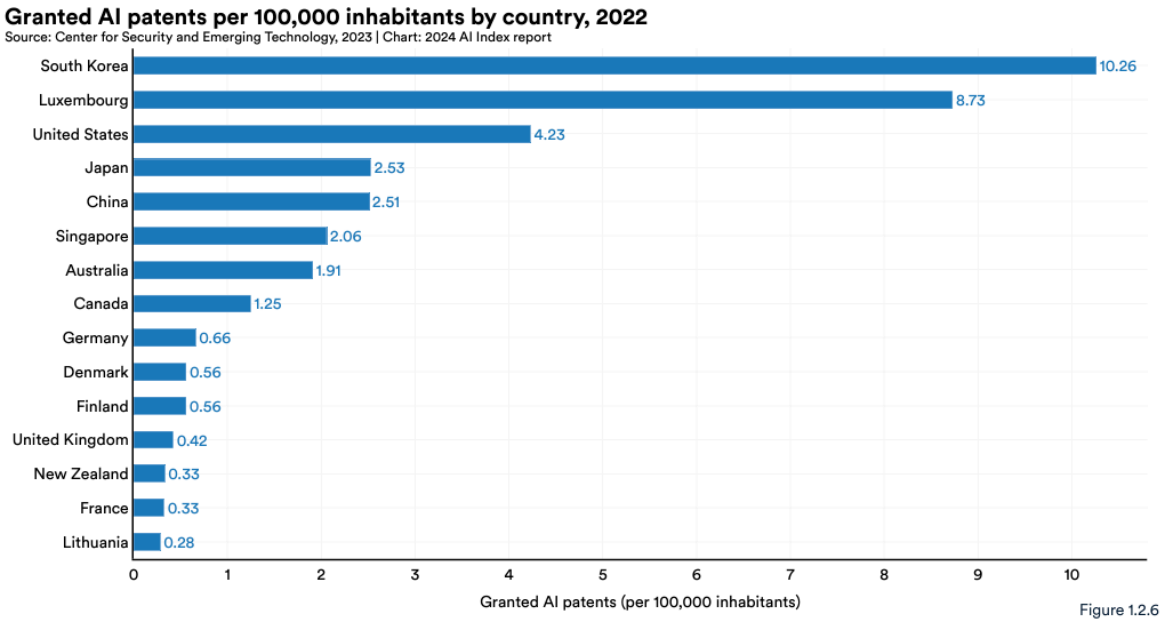
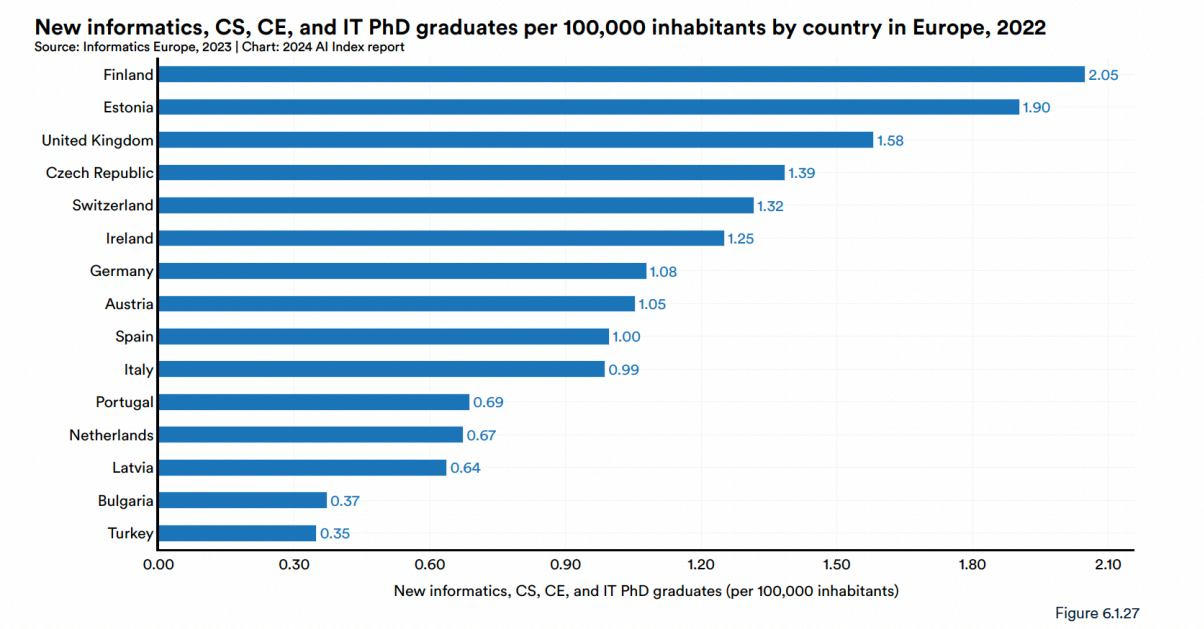


Figure 1.2.6

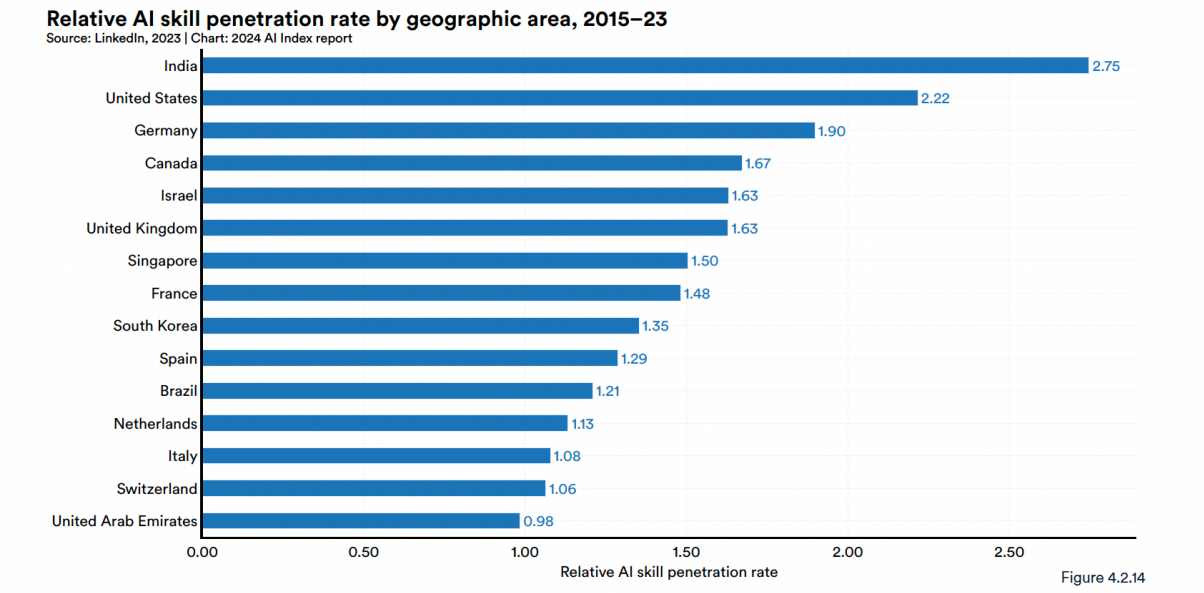
Despite the honest effort to spend taxpayers' money, education in relevant fields — such as PhD studies in computer-related subjects — tells the same story (see Graph 3).

Graph 3



AI skill penetration over the past 10 years tells a similar story (Graph 4) — Sweden isn't even on the list. Again.

Graph 4



Could relevant migration help us catch up? Graph 5 says others are ahead — way ahead.

Graph 5

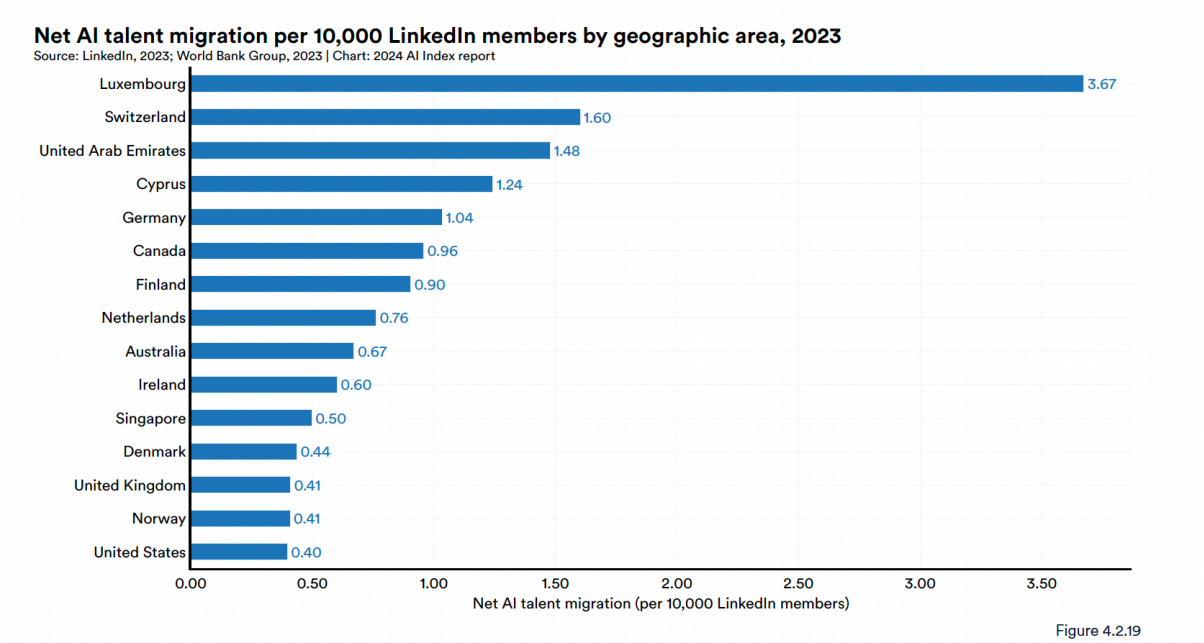


Figure 4.2.19

Are we industrializing through robotics? Not that either — despite having one of the world's leading robotics companies on our soil (Graph 6).

Graph 6

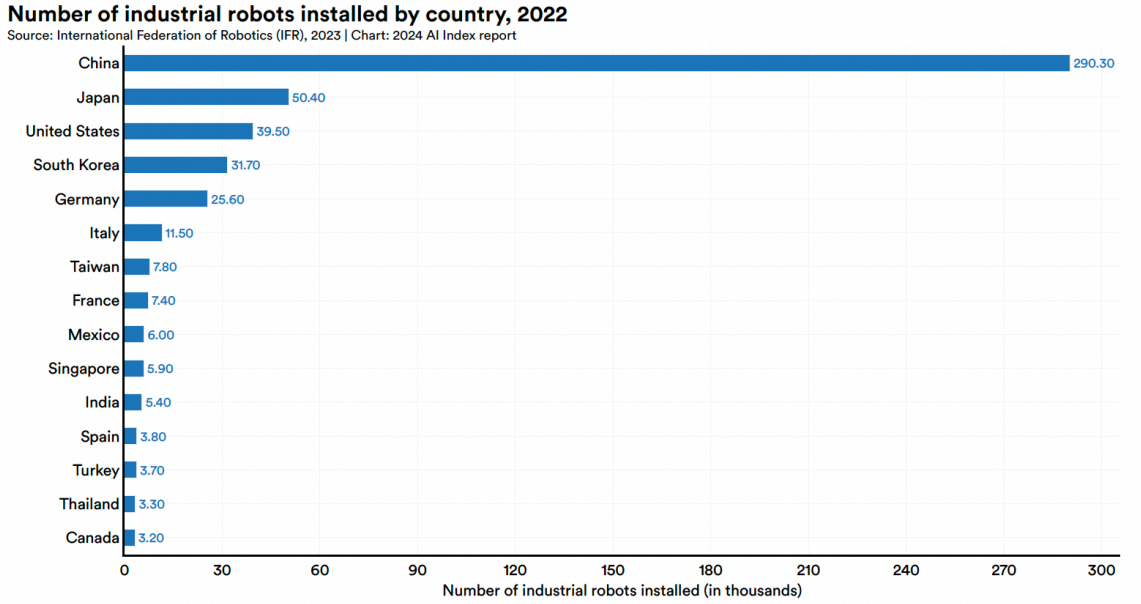


Figure 4.5.4

Maybe Graph 7 offers hope — since we are so keen on regulating and "controlling" AI. Sad to disappoint: we are only marginally better than Sub-Saharan Africa.

Graph 7

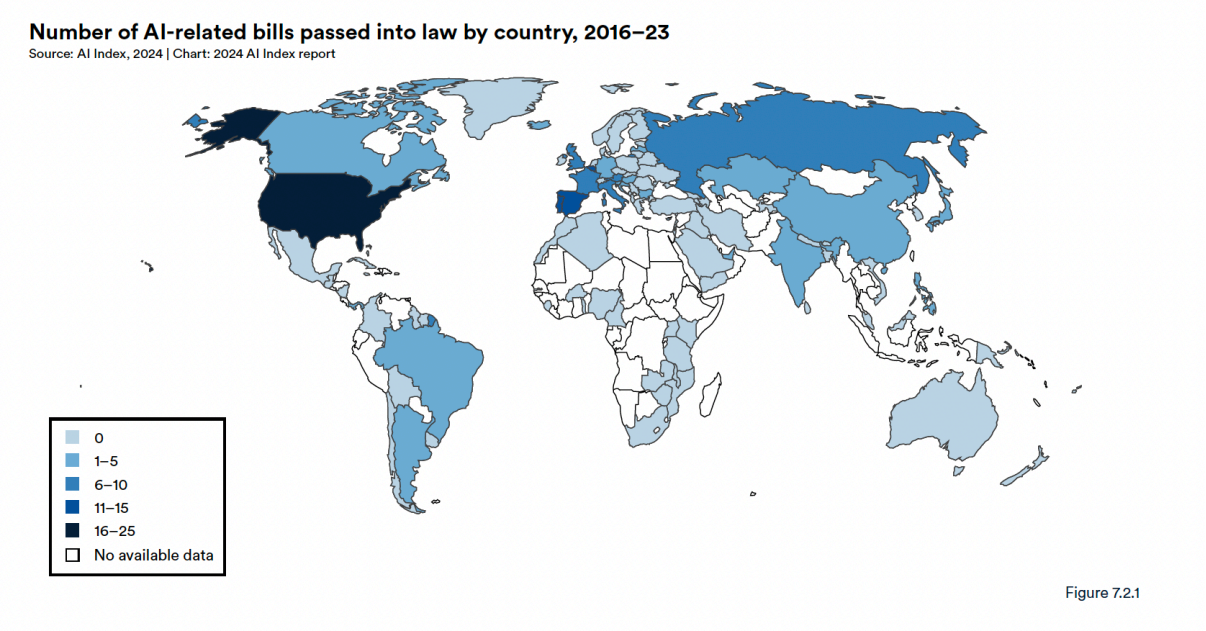


Figure 7.2.1

Talk and walk are not aligned

As a country we are clearly falling behind in areas where we should excel globally. The belief that we could run faster in our historical direction might work — but looking at other countries, I have my doubts.

Despite the honest efforts of our "Innovation" agency, we don't measure up, despite the enormous sums spent. Normally in situations like this, you let others take over and drive something different. The text below (in Swedish) is taken from Sweden's Innovation Agency (monopoly) submission to the government in 2023, requesting more money to continue its work in the area.

It doesn’t help running if you are heading in the wrong direction.

Satsningar på banbrytande teknik och deeptech-företag

Banbrytande teknik som AI, avancerade material, syntetisk biologi och kvantteknik förändrar värdekedjor och marknader, och gör det möjligt att lösa stora samhälls- och klimatutmaningar. Lösningarna skapas ofta av nya så kallade deeptech-bolag. Den snabba utvecklingen och andra länders satsningar på banbrytande teknikforskning och deeptech-företagande gör att Sverige och svenska företag behöver göra stora, fokuserade insatser och investeringar i forskning och innovation.

För att möjliggöra för offentliga aktörer att bygga AI-lösningar som effektiviserar och förbättrar servicen till medborgarna behövs utveckling av nationella AI-modeller. Därmed behövs en nationell och statlig finansierad satsning som möjliggör för myndigheter, regioner och kommuner att träna språkmodeller med relevanta data som kan användas för att utveckla applikationer för slutanvändarna.

Political talk is easy

I am curious what the follow-up will be to the clear message from Prime Minister Ulf Kristersson and Jessica Rosencrantz that Sweden should again be a digital leader.

Political walk is hard

Erik Slottner will tell us at the upcoming Stockholm Tech Show just how Sweden should take the lead in AI development.

Erik Slottner – Så här tar Sverige täten i AI-utvecklingen

We need to get this right, for Sweden's sake. The alternative is a grim future that turns us into a digital third-world country — the digital equivalent of what Bangladesh is to the garment industry. If we don't like the answer, there's a Swedish election in two years.

In the end, this is what leadership comes down to: making hard choices, setting a direction — hopefully the right one — and getting going. The world doesn't wait for politicians to act. It moves with or without them, and those who hesitate simply to forfeit their role. Alexander Stubb in Finland is a reminder of what genuine political leadership looks like: clear-eyed, decisive, willing to choose. Sweden needs the same. The choices we make now, or fail to make, will define which country we become in the decade ahead.

Jonas Kjellstrand is a senior strategic adviser operating through UCC AB, based between Stockholm and Palo Alto. He advises at the intersection of European sovereign AI infrastructure, Nordic energy economics, government relations, and Silicon Valley technology partnerships. He holds an MBA from Stanford GSB (joint with Stockholm School of Economics) and business administration from MIT Sloan.