NOKIA

AI is too big for the European internet

Without a stronger digital backbone, from networks to data centers and beyond, Europe risks missing its greatest growth opportunity: the AI supercycle.

Executive summary

While the AI supercycle is still in its early stages, it is already changing the way we work, do business, and deliver services. Nokia surveyed over 1,000 European business leaders across industries and telecommunication providers to understand how AI is taking root: where adoption stands, how scaling ambitions look, and what obstacles lie ahead.

What came back was striking: AI is too big for the European internet and the digital backbone that supports it. Not too ambitious, but too big. Too power-dense for the substations we've built, too latency-sensitive for the internet links that connect our cities and countries, too data-hungry for fragmented cloud services, and too challenging for an underprepared industry workforce.

Our survey shows the tension at the heart of Europe's AI story:

- **Adoption is racing ahead.** Two-thirds (67%) of European enterprises already use AI in some form, and another 15% are piloting.
- **Infrastructure is falling behind.** More than half (54%) of businesses report poor network performance, raising deep doubts about whether Europe's digital backbone can sustain AI traffic. Among CSPs, 81% say customers are asking for AI services their networks cannot yet deliver.
- **Security fears are mounting.** More than 80% of firms across sectors believe AI is introducing new or evolving risks. Cybersecurity has emerged as the single most important AI use case, specifically concerning threat detection
- **Competitiveness is at stake.** Nearly a third (29%) of enterprise leaders warn that infrastructure limits may force them to move workloads abroad, eroding Europe's sovereignty in the process.

The conclusion is stark. If Europe wants to capture AI's promise on its own terms, competitive, sovereign, and sustainable, it must act now:

- **Policy must move from vision to capital.** Incentives for pooled investment, cross-border coordination, and joint ventures can unlock scale and accelerate deployment of capital for vital infrastructure such as data center capacity, data center connectivity and last mile connectivity.
- **Enterprises and telecommunication providers must collaborate.** Real AI-scale infrastructure will only emerge if enterprises and telecommunication providers coordinate deployment and innovation, backed by policy frameworks that enable cross-border scalability and resilience.
- **Sovereignty must be defended.** Europe cannot afford to be dependent on less trusted, less resilient networks. Trusted connectivity is not optional, it is the foundation of competitiveness.

Every technological revolution has required infrastructure to carry it forward. Europe must recognize this and prioritize the build-out of capacity and connectivity, if it is to turn ambition into reality. Otherwise, AI will remain simply too big for the European internet.

Nokia recently surveyed telecommunication providers and leaders from Europe's ten largest and fastest-growing industries to understand how they view AI: how ready they are, how they plan to scale, and how they feel about what is coming. Where are the limits to ramping up AI adoption? What would it take to lift those limits? Can Europe do it on its own terms?

What came back was striking: AI is too big for the European internet and the digital backbone that supports it. Not too ambitious, but too big. Too power dense for the substations we've built, too latency sensitive for the internet links that connect our cities and countries, too data hungry for fragmented cloud services, and too challenging for an underprepared industry workforce.

This paper lays out that finding and calls us to act on it. If Europe wants to succeed in the AI supercycle, in a way that is competitive, sovereign, and sustainable, it must act urgently. As Mario Draghi recently warned, "growth has been slowing down for a long time in Europe, but we've ignored it…Now we cannot ignore it any longer." The same holds true for Europe's AI readiness: the era of delay is over.

The AI supercycle has begun. Europe can't afford to miss out.

Every era of sustained economic growth has been driven by infrastructure that spreads new technology to boost productivity. Electricity transformed manufacturing through reliable grids, not just the lightbulb. Oil revolutionized logistics once pipelines, roads, and refineries were built. AI can do the same if backed by a similar web of infrastructure.

Europe desperately needs this to happen, because the continent's productivity growth has plateaued. In a 2024 European Union report, The Future of European Competitiveness, special rapporteur Mario Draghi warned that "If Europe cannot become more productive, we will be forced to choose. We will not be able to become, at once, a leader in new technologies, a beacon of climate responsibility and an independent player on the world stage." Over the past 25 years, Europe's productivity has grown at barely half the pace of the United States, 0.8% per year versus 1.5%, and the gap is widening. Integrating AI vertically into European industry, Draghi argues, "will be a critical factor in unlocking higher productivity".[1]

Business leaders agree. In Nokia's survey of more than 1,000 European executives responsible for AI investment, 92% of decision makers described AI as immediately or incrementally "transformational" for their business, while only 7% said it was "overhyped". Across the continent, businesses are investing heavily in vertically integrating AI into their operations. The early movers are already seeing the benefits. In the automotive sector, Mercedes-Benz is deploying a self-learning AI model in its MO360 plant in Sindelfingen, reducing energy use by 20% and accelerating ramp-up times compared to conventional processes.[2] In pharmaceuticals, Roche has unified its global data platform across 80+ countries, cutting costs by 70% and enabling AI applications from physician recommendations to automated regulatory compliance.[3] In manufacturing, Schneider Electric's AI- powered energy platform has delivered $1 million in annual savings and reduced carbon emissions by 10,000 tons per plant.[4]

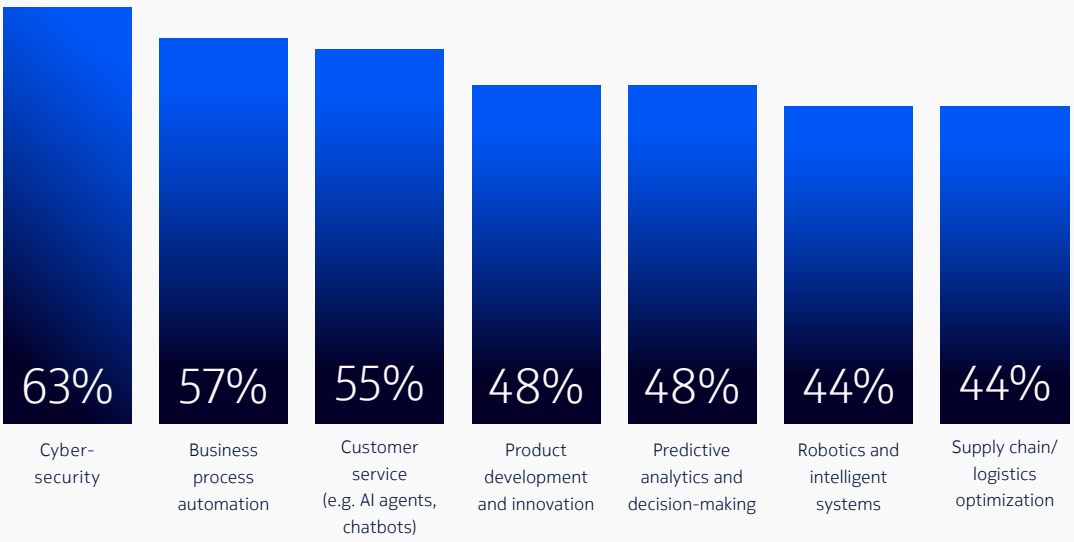
Europe is also witnessing the birth of a new generation of firms whose entire business model is built on AI infrastructure. Paris-based Mistral, founded in 2023 by former Meta and DeepMind researchers, reached a $6 billion valuation within a year of launch, and agreed a €100 million partnership with shipping giant CMA CGM to embed AI across logistics and energy operations.[5,6] Sweden's Lovable, a generative web design company, surpassed $100 million in annual recurring revenue just eight months after launch, and hit a $1.8 billion valuation following a $200 million Series A.[7] Helsing, a German-founded AI defense firm, is now valued at more than €12 billion only four years after launching.[8]

Forecasts suggest this is only the beginning. Google predicts that generative AI could add €1.2–1.4 trillion to Europe's GDP over the next decade.9 Accenture estimates that if large European firms adopted AI at the pace of today's global leaders, revenues could rise by nearly €200 billion annually.10

Our survey agrees: European enterprises see AI as crucial for increasing productivity and innovation. Two-thirds (67%) of businesses already have AI at least partially in use, and another 15% are doing AI pilot schemes. Executives are aiming for AI-powered transformations of multiple fields: cybersecurity, customer service, business process automation, product development, predictive analytics, robotics and intelligent systems, and supply chain optimization. Across every level of operation, businesses are beginning to imagine and build a future transformed by AI.

Europe's leaders are bullish on AI. But reality lags behind them. Our survey found that executives are wary of significant, wide-ranging challenges facing Europe's AI future. These challenges divide into facilitating factors (investment, talent and power) and issues related building the actual infrastructure (connectivity and security).

AI short term application areas in European firms*



*Source: Gemic for Nokia, 2025 survey of European executives in communication services and the top 10 growth industries. (N=1,024).

Despite the ambition, Europe is already falling behind

Investment is the most visible of Europe's challenges, but it is not the only one. Inside organizations, a significant share of leaders also point to scarce AI-skilled talent, cultural resistance to adoption, and increasing power constraints, all of which can slow progress just as much as a lack of capital.

These factors add up to a drag on Europe's AI ambitions that is less visible than physical bottlenecks but nearly as damaging over the long run. One year one from his Future of European Competitiveness report, Mario Draghi warning has struck an even more urgent tone: Mario Draghi warning has struck an even more urgent tone: "Europe is in a harder place. Our growth model is fading. Vulnerabilities are mounting... and we have been reminded, painfully, that inaction threatens not only our competitiveness but our sovereignty itself."[11]

Investment

Europe is finally shifting from circulating strategy papers to circulating actual money. At the AI Action Summit in Paris, EU Commission President Ursula von der Leyen launched InvestAI, a new initiative to mobilize €200 billion in public and private funding for AI. Of this, €20 billion is earmarked for up to five AI gigafactories, each designed to host around 100,000 advanced chips12. The goal is to build shared infrastructure for training very large models and make Europe, in von der Leyen's words, "an AI continent." This signals the continent's intent to build the upstream infrastructure muscle needed to support AI innovation.

Venture funding is also accelerating: European AI startups raised roughly $8 billion in 2024, capturing about 20% of all VC activity in the region — a record high that is projected to grow further in 2025 as new companies enter the field.13

The gap shows up not only at the macro level, but also at the firm level. At the macro level, the challenge is understood and addressed, but the same cannot be said at the firm level.

Our survey reveals that most European companies cap AI spending at modest levels, with more than 80% allocating no more than 20% of ICT budgets. By contrast, U.S. companies skew higher, with a far larger share (51%) dedicating 31-50+% of ICT budgets to AI, signaling a more aggressive commitment to scaling the technology.

Talent, skills and culture

Talent is currently the largest workforce challenge for European AI. Our survey found that 40% of companies cited a lack of AI-skilled talent as the top internal barrier to scaling the technology.

Broader evidence points in the same direction. McKinsey estimates the EU could face a shortfall of 1.4 to 3.9 million technology professionals by 2027.16 Nearly half of European employers searching for cybersecurity staff report difficulty hiring, and over a third identify AI expertise as the most critical gap. Contrary to pessimism about job losses, there is an immense need for relevant skills to drive European success in the AI supercycle.

Then there are the cultural and educational barriers. In our survey, nearly a third (30%) of decision-makers said organizational resistance and low AI literacy were major hurdles. External data shows the same thing: only 31% of European firms have a formal AI policy in place, despite widespread use of AI tools, and just 39% of European employees report receiving formal AI training, compared to 52% in the US. This does little to dispel the stereotype of Europe's workplace culture being a high-regulation technological backwater.

Skills, mindsets, and institutional agility will determine whether Europe can truly capitalize on its AI investments. A sovereign hardware and software stack, as well as funding are not sufficient by themselves to secure Europe's place in the AI age.

Being global leaders in AI is essential to EU Industry Leaders*

% of leaders

*Q18. How ambitious should Europe be in developing its own AI-ready internet infrastructure?
Gemic for Nokia, 2025 survey of European executives (N=1024)

Power and energy

Energy is the most common constraint in facilitating Europe's AI infrastructure. Europe's ability to implement the technology at scale is colliding with the limits of energy production and the grid. Nearly nine in ten executives (87%) are concerned that Europe's energy infrastructure cannot keep pace with AI demands. More than half (57%) say it is either at serious risk or already showing signs of stress. These limitations are already creeping in, with 21% of firms saying that energy constraints are directly delaying AI projects. A further 28% have been forced to alter project timing and site selection.

High energy costs, a more general consequence of outdated infrastructure, matter too. A majority (52%) of firms say Europe's energy costs are already uncompetitive compared to global rivals; 40% of executives cite permitting delays, and 35% report inadequate grid capacity or limited access to renewables.

This all means that Europe's AI projects are more expensive, slower to set up, and harder to get approved than those in the US or Asia. Perhaps even more concerning is that almost two-thirds (61%) of leaders at European firms are considering moving some data-intensive operations to regions with cheaper power or have already done so. With American AI and data center companies making direct deals with nuclear power plants to lock in energy supply for their AI projects, Europe has serious catching up to do.

European firms may be forced to offshore compute to reduce power costs*

% of leaders

61%
Moving or Considering Moving Compute

21%
On our radar – no action taken yet

16%
No – we plan to stay where we are regardless of energy access

N/A

*Q44. Has your organization considered relocating data-intensive operations due to energy supply or sustainability concerns? Gemic for Nokia, 2025 survey of European executives (N=1024)

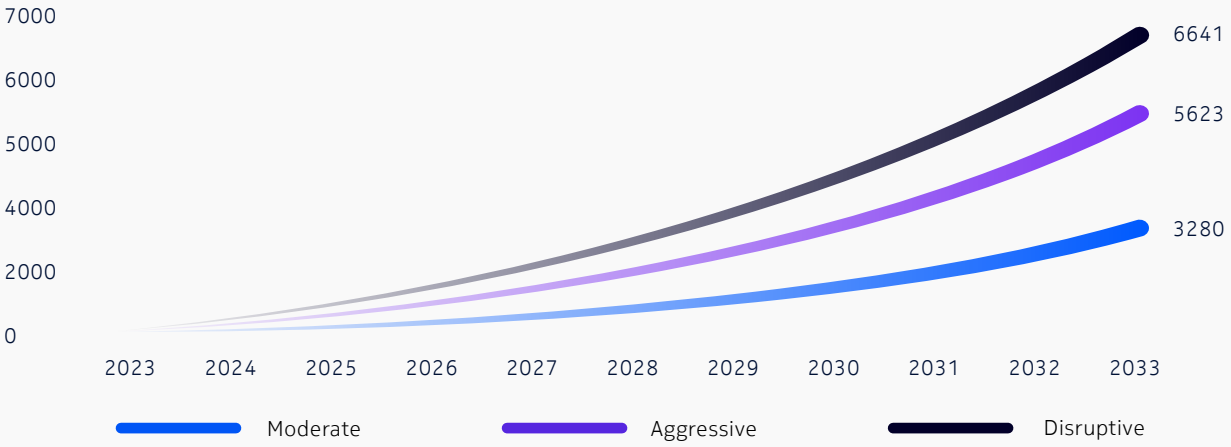
Connectivity and networking

Investment, talent, and power constraints remain critical, but the deeper challenge lies in the AI infrastructure itself. Today, the continent's digital backbone is simply not set up for AI: high-performance connectivity is fragmented, and security is exposed. Bell Labs projects that global data traffic will surge by five to nine times by 2033, putting unprecedented strain on Europe's stretched networks.17

Crucially, AI alone is expected to account for one-third of that load, reaching 1,088 exabytes per month by 2033, with consumer AI traffic growing more than 50% annually through generative tools, gaming, and extended reality.17 Enterprise AI workloads will grow even faster, at nearly 60% annually, driven by predictive maintenance, autonomous operations, and video analytics.17 Meeting this demand would not only avert systemic stress but also guarantee clear returns on infrastructure investment, making inaction the costliest choice of all. Without a decisive build-out of, resilient and secure networks, Europe risks staying an AI "taker," reliant on others' infrastructure and standards, rather than emerging as an AI "maker".

Global network traffic is projected to grow 5x to 9x through 2033*

Figure 19; wan, global, eb/month



*Nokia Bell Labs global network traffic report (2024)

AI dependency would undercut Europe's broader ambitions, like restoring productivity growth, strengthening security and meeting climate goals. The infrastructure gap is a drag on business competitiveness. It also threatens Europe's digital sovereignty in the same way that dependence on Russian or American energy has historically limited its political sovereignty.

Concern about network infrastructure and connectivity is widespread: 78% of executives are worried about Europe's ability to provide the connectivity AI needs, with 11% identifying as extremely concerned.

AI deployments have substantial connectivity demands—and cracks are already visible, with more than half of firms (54%) reporting poor network performance in the form of latency, downtime, or throughput issues caused by rising AI and data traffic. 16% say these disruptions are materially impacting operations. The vast majority, a staggering 77% of businesses, are already encountering connectivity issues before any substantial attempt to scale up AI.

Part of the problem is structural. In the U.S., the average operator serves around 100 million subscribers, about 29% of the population.18 In India, the figure is even higher at 260 million (18%).19 In Europe, by contrast, the average operator has just 5 million customers, approximately 1% of the EU population.18 Fragmentation on this scale strangles investment capacity. Consolidation is not optional; it is the only way Europe's operators can muster the resources to build out advanced standalone 5G, 6G, and next-generation broadband at the scale AI will demand.

The consequences of falling behind are already clear. In 2024, China (80%), India (52%), and the United States (24%) led the world in 5G standalone availability, while Europe languished at just 2%.20 Performance tells the same story: the median European consumer experiences 5G SA download speeds of 221.17 Mbps — well below the Americas (384.42 Mbps) and both developed (237.04 Mbps) and emerging (259.73 Mbps) Asia-Pacific.20 Unless Europe addresses its fragmentation and accelerates investment, its networks will remain the bottleneck that throttles AI before it can scale.

EU firms already reporting performance problems*

% of executives

*Q12A. To what extent are your company's current AI efforts currently constrained by infrastructure limitations (e.g., compute, bandwidth, latency, mobile/fixed networks, cloud, data center, or energy)?
Gemic for Nokia, 2025 survey of European executives (N=1024)

Executive concern about Europe's AI infrastructure*

% of leaders

*Q17. How concerned are you about internet reliability as AI workloads increase in scale?

Source: Gemic for Nokia, 2025 survey of European executives (N=1024)

86%

Concerned

14%

Not concerned

Reliability fears are mounting too. 86% of firms say they are at least somewhat concerned about internet reliability as AI workloads increase, with 40% describing themselves as very or extremely concerned. Among firms operating in Europe's next-generation industries, this figure rises to 62%.

The picture is complicated by a gap between what enterprises say they need and their actual needs, as experienced by telecommunication providers. Enterprises are prioritizing sovereignty and control, with more than half (52%) already operating private AI clouds and 37% running secure data zones. Connectivity sits lower on their list of concerns, with just 25% reporting a need for low-latency edge processing. Only 13% of enterprises expect to need sub-10ms latency in the next two to three years. Most (58%) believe 10-29ms will be sufficient for their workloads.

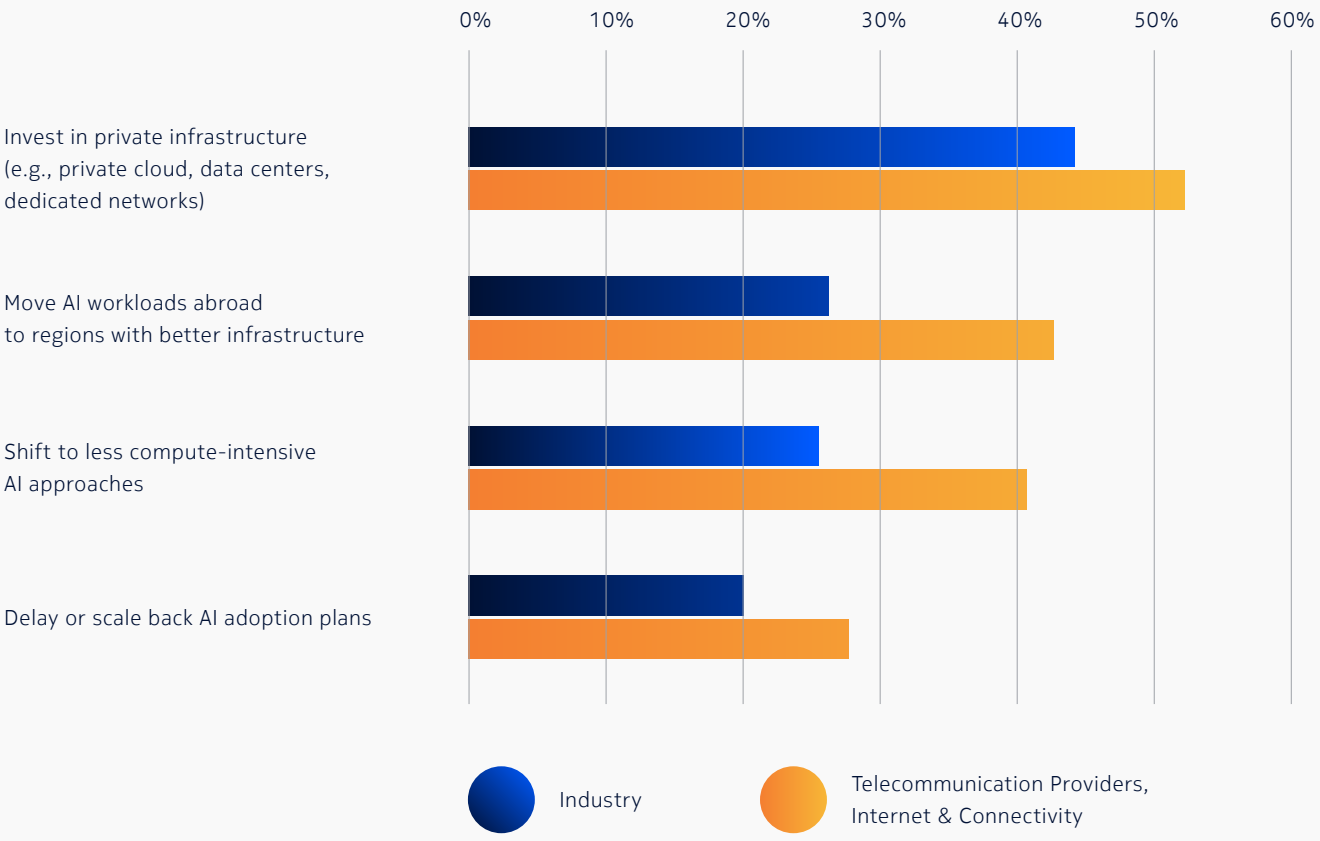
Telecommunication providers see it differently. They are preparing to deliver far more low-latency services, with 18% targeting sub-10ms and 43% aiming for 10-29ms. Crucially, they say demand for it is already here, with 81% of leaders at CSPs reporting that customers are asking for AI services their networks cannot yet support, and 28% facing these requests frequently. They know, even more than other businesses, that real-time AI will depend on connectivity capabilities that Europe does not yet have.

The gap is multiplied across the connectivity chain, with leaders citing connectivity failures inside data centers (31%), between data centers and the edge (38%), and in high-capacity links to end customers (41%). Even as firms pour resources into sovereign AI compute, they may find their ambitions compromised.

As with energy, these strains are already reshaping behavior in ways that undermine Europe's sovereignty and competitiveness. If connectivity shortfalls persist, European firms will be forced into workarounds: potentially offshoring workloads; leaning heavily on global AI and data center companies outside of Europe; even fragmenting into private infrastructure silos.

How European firms plan to respond if infrastructure limits AI*

% of executives



*Q20. If infrastructure limitations persist, what will your company most likely do?
Source: Gemic for Nokia, 2025 survey of European executives (N=1024)

Security

Cybersecurity is one of the most common application of AI across various industries: nearly two-thirds of firms (64%) say it will be their main area of deployment over the next two to three years, ahead of automation, customer service and innovation. Investment reflects this. About half of firms plan to dedicate between 16% and 30% of their IT budgets to AI security, and nine in ten are scaling up their spending, with more than a third doing so significantly.

This reflects a deeper European ambition. Leaders deeply desire trusted networks, with 86% saying that keeping data and control within Europe is very or extremely important for confidence in AI infrastructure. Meanwhile, 73% already treat sovereignty as a critical part of their infrastructure strategy, partly to build trust in their companies. And companies are acting on this desire by prioritizing EU-based cloud services (39%), running sensitive workloads on-premises (40%), and turning to open-source models (39%) to reduce dependence on foreign providers.

But sovereignty cannot be secured on paper alone. Analysis shows that Europe is still materially exposed to high-risk vendors, with 38% of European base stations still reliant on untrusted technology.21

The fear of new AI era security risks is widespread across the EU*

% of executives

*Q24A. Do you believe your organization faces new or evolving security risks in the AI era?
Source: Gemic for Nokia, 2025
survey of European executives (N=1024)

The imperative to secure AI begins with safeguarding the infrastructure that enables it: from networks and data traffic to algorithms and hardware dependencies.

The 'Salt Typhoon' case serves as a warning: vulnerabilities in information systems can and will be exploited for espionage, data theft, and sabotage23. High-risk vendor technologies could equally become door-openers for unauthorized penetration of critical networks, underlining the urgent need to secure the AI ecosystem itself.

At the same time, AI offers a powerful opportunity to enhance security: to predict, detect, and neutralize emerging threats faster than ever before. Between 84% and 87% of firms across communication service providers, industry, and emerging technology sectors believe that security risks are evolving with AI. What worries firms most is the growing complexity of those threats: 85% fear AI will enable more sophisticated attacks, from automated intrusions and deepfakes to the manipulation of physical infrastructure. Preparedness remains uneven. Only a quarter of organizations believe Europe is ready for the next generation of AI-driven threats, while over half are increasing investment to adapt, and a third remain unsure how to act.

The future without next-gen infrastructure

European executives know there's a need for advanced, affordable regional AI infrastructure that provides both security and digital sovereignty. But firms are being forced to respond to infrastructure constraints in ways that could undermine Europe's competitiveness. Our survey found that 45% of executives say their firms are building private infrastructure to compensate for these limitations, with over half building private AI clouds, 29% say they will move workloads abroad to regions with better infrastructure.

Each of these approaches, if they become widespread trends, will limit Europe's digital sovereignty and future competitiveness. Fragmentation into private silos erodes the economies of scale Europe needs to stay competitive; offshoring exports data and innovation; and delivering the benefits AI elsewhere.

Key takeaways and recommendations

1

Underinvestment relative to the U.S risks leaving European firms technologically boxed in. To break out, leaders should pursue alliances, consortia, and co-investment models that unlock more capital, improve returns, and enable scale.

2

Advantage will come from building trusted AI-ready, sovereign, and secure connectivity – especially 5G Standalone and fiber, edge-to-cloud integration, and reliable intra and inter data center connectivity.

3

Telecommunication providers need to be able to position themselves as essential providers of AI infrastructure.

4

Adopt a new approach to competition policy. More scale (through consolidation) within the telecom sector is essential to increase telecommunication provider investment.

5

Ensure that connectivity is always secure and trusted. The 5G Security Toolbox, restricting untrusted technology, must be extended to all critical telecom technologies (including fiber, optics, IP,...) and made compulsory in all EU member states.

6

To ensure Europe benefits in time from the advantages of next generations of advanced connectivity, implement more harmonized conditions and timely spectrum allocation within member states.

Europe can still win, but must invest in line with European goals

Despite all these challenges, European business leaders remain ambitious: 83% believe Europe should either keep pace with global competitors or aim for outright leadership in AI-ready infrastructure. European firms also want to succeed on their own terms, with Europe an AI superpower that retains distinctively European priorities: sovereignty, security, and sustainability.

Sovereignty is one of the top priorities: 86% say keeping data and control within Europe is very or extremely important, with 73% citing sovereignty as a critical part of infrastructure planning. Far from a niche, solely political concern, sovereignty is now the essential foundation of digital trust, and security is recognized as the thing that makes sovereignty possible. With 85% of firms expecting AI to introduce new or more complex threats, European businesses are already responding: 64% identify cybersecurity as their top AI application, and 91% are scaling up investment, with more than a third doing so significantly.

Being global leaders in AI is essential to EU Industry Leaders*

% of leaders

*Q18. How ambitious should Europe be in developing its own AI-ready internet infrastructure?
Gemic for Nokia, 2025 survey of European executives (N=1024)

Sustainability is also among the top priorities. Already, 55% of firms require their infrastructure providers to use 100% renewable energy, and more than a third are focused on using AI in a way that cuts energy use and reduces carbon impact. Europe is making climate alignment a competitive advantage, showing that AI infrastructure can be not just fast and secure, but also green by design.

The risk, of course, is time. Infrastructure gaps in energy, connectivity, and compute still threaten to push firms down less desirable roads that may undercut Europe's lofty vision. A majority (61%) of European companies are relocating or considering relocating data-intensive operations abroad; many are defaulting to AI and data center companies to secure affordable capacity; and over half have built private AI clouds.

Each of these solutions might solve short-term bottlenecks, but collectively they undermine Europe's ambition. Offshoring exports Europe's data and innovation capacity. Dependence on a handful of foreign firms for crucial AI infrastructure cedes strategic control away from European interests. And fragmented private clouds recreate a problem Europe already knows too well: the patchwork of national telecommunication providers markets that left the continent divided while the US and China built unified, scaled infrastructures. Without coordination, Europe risks repeating that mistake with AI: fragmented infrastructure that lacks the economies of scale to compete globally.

Nevertheless, Europe's industrial leaders are bullish on AI's potential to deliver transformative gains across the continent. They want to harness it in line with European goals and values: reviving growth, leading on climate, and securing digital sovereignty, in line with the vision set out by Mario Draghi. Policymakers and investors must now move fast to close the gaps and turn ambition into reality. Building the infrastructure comes first: the networks, energy systems, and security backbone without which AI cannot scale.

Only once this physical foundation is in place can you facilitate the AI supercycle. Without decisive progress on the infrastructure build-out, Europe will remain an AI taker, dependent on foreign capacity and constrained by its own fragmentation, echoing the worst future fears of EU industry leaders. Meeting the moment will require policymakers, industry, and telecommunication providers to act together to pool capital, scale skills, and build trusted sovereign infrastructure. With that coordination, Europe can be an AI maker, unlocking the full value of the Supercycle in a way that is sovereign, secure, and sustainable.

Otherwise, AI will be simply too big for the European internet.

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Methodology

This white paper is based on new research conducted by Nokia in collaboration with Gemic, a growth strategy firm. The foundation of the work is a quantitative survey of 1,024 senior decision-makers across Europe, carried out online by Dynata between July and August 2025.

Respondents were drawn from three key groups: telecommunication provider executives in Europe's ten largest industries, and leaders from the ten fastest-growing sectors, as identified in the European Commission's 2024 Draghi Report on Competitiveness. All respondents held C-suite or director-level positions, ensuring the data reflects high-level strategic perspectives on AI, infrastructure, and competitiveness.

The survey covered six major European markets: the United Kingdom, Germany, France, Italy, Spain, and the Netherlands.

In addition to survey data, the white paper is supported by secondary research conducted jointly by Nokia and Gemic, as well as expert interviews with Nokia leaders working across AI infrastructure, security, sustainability, and digital sovereignty.

About Nokia

Nokia is a global leader in connectivity for the AI era. With expertise across fixed, mobile, and transport networks, we're advancing connectivity to secure a brighter world.

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