The AI Data Robotics Association

ADRA POSITION PAPER

Response to the European Commission Public Consultation on the Future of European Partnerships

With Annex I, The Complexity of Deploying AI and Robotics for European End-Users, and ADRA's recommendation for a strong Physical AI and Robotics Partnership

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Foreword



For five years, ADRA has worked to build something Europe lacked: one connected community in AI, data and robotics. Research, industry, start-ups and the governments of Member States and associated countries had long worked apart, fragmented at local, national and European levels. Today, ADRA is a trusted platform connecting these communities across Europe. Our role has been that of an orchestrator: bringing together people, capabilities and resources across borders to build a stronger European ecosystem.

Over the past two years, with our members and the European Commission's support, we have focused on the next frontier: Physical AI, where AI, data and robotics converge in machines that perceive, learn and act in the physical world. This is a strategic opportunity for Europe to lead rather than follow. While Europe has few frontier AI labs, it has what Physical AI needs most: a world-class industrial base, real-world data and thousands of specialised SMEs that lead their niches in global value chains. Our answer is not to replicate closed, end-to-end systems built elsewhere, but to build a modular, interoperable European approach that capitalises on these strengths.

AI, data and robotics must stay together because they are part of the same value chain. Data enables AI to learn from the physical world, AI gives machines the intelligence to perceive, decide and act, and robotics turns that intelligence into real-world capabilities. Separating them would fragment the very capabilities Europe needs. Nor can any Member State succeed alone: the necessary expertise, data, investment and industrial demand are distributed across Europe. Only by pooling them can we reach the scale needed to compete globally.

But technological excellence alone is not enough. Europe needs a different model for how innovation is organised, financed, validated and brought to market. Too often, excellent research fails to become products that industry can adopt and companies can scale. This is the gap we aim to close through the Catalyst. Rather than starting with technology and hoping the market will follow, this end-user-led model starts with real industrial needs, connects demand with research and technology providers, pools resources and investment, and accelerates the validation, qualification and deployment of European solutions. The aim is to move from fragmented projects to a coordinated European effort that delivers industrial impact at scale.

The stakes go far beyond industrial competitiveness. Physical AI will increasingly shape how our factories, hospitals, transport systems and public services operate, and a Europe that only consumes these technologies will depend on others for the models and machines at the heart of its economy and society. Technological sovereignty is therefore also about freedom: Europe's freedom to make its own choices, decide what technology is for and shape its future according to its own vision and values. Europe knows how to build these technologies; it must also choose why.

Europe has built the foundations of a strong research and innovation ecosystem; it must now give that ecosystem the instruments, investment and industrial ambition to deliver at scale. We therefore call for a strong, dedicated Physical AI and Robotics Partnership that keeps AI, data and robotics together in one coherent strategy, with the long-term commitment, resources and agility needed to turn Europe's technological excellence into industrial leadership. Building on five years of ecosystem development and the innovation model pioneered through the Catalyst, ADRA is ready to continue playing a leading role in shaping the strategy, orchestrating the ecosystem and driving implementation. This paper sets out how we can turn that ambition into reality.

Emanuela Girardi
President, ADRA

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Executive Summary

This document is ADRA's response to the European Commission's public consultation on the future of European Partnerships, together with the evidence base behind it and a single, concrete recommendation that follows from both. Sections 1 to 4 make the case, structured against the Commission's own consultation questions. Annex I sets out the industrial evidence supporting that case, gathered directly from end-users and practitioners. Section 5 turns that case into a specific ask: the launch of a *strong* Physical AI[1] and Robotics Partnership, capitalised at a scale proportionate to what is at stake.

ADRA's central argument is that almost every weakness in Europe's current innovation system traces back to fragmentation: research effort duplicated across parallel programmes, a single market fragmented enough that successful companies still scale up abroad, and industrial demand fragmented into individual purchasing decisions instead of one collective European vision. A European Partnership, properly designed, is the mechanism that turns that fragmentation into scale – letting Europe's best research groups, integrators and end-users compete for a shared industrial prize while collaborating on the pre-competitive infrastructure no single firm or Member State could build alone.

Fragmentation does its greatest damage in the productisation gap: the difficult middle between a successful prototype and a product that is assured, manufacturable, certifiable, supportable, integrable and trusted enough for a first customer to deploy. Europe's research excellence is not in doubt. What is missing is the bridge from that excellence to adoption – validation, assurance and qualification whose results customers, investors and regulators can all rely on. That bridge, and the productisation it unlocks, is the thread running through every recommendation in this response.

Annex I grounds this argument in direct industrial evidence. Two parallel consultation tracks – with industrial end-users across ten sectors, and with the practitioners who would have to build, certify and support whatever those end-users deploy – surfaced thirteen recurring deployment barriers. The clearest and most consequential is a preference European industry states consistently: given a genuinely competitive European alternative, it would buy European, for trust, data governance and strategic alignment – and just as consistently reports that this alternative does not yet exist at the scale the market needs.

> **ADRA'S RECOMMENDATION**
>
> **Europe should launch a strong Physical AI and Robotics Partnership now** – not as one option among several, but as the vehicle that lets the approaches described throughout this response reach industrial scale – capitalised at least as ambitiously as the Chips partnership, whose combined budget approaches €11 billion, of which €4.175 billion is the EU contribution. The legal form matters less than scale and agility, and should follow from them (Section 5.5).
>
> The partnership should not, however, be absorbed into a single structure covering all digital technologies: Physical AI is organised around its supply chain and its end-users, and should coordinate with chips and connectivity rather than merge with them.

Physical AI is a potential leapfrog for Europe. Instead of competing in a race for ever larger models whose terms were set elsewhere, Europe can lead the next phase of AI, in which its industrial base and the real-world data it generates are decisive advantages. The prize is a competitive European deep-tech industry in Physical AI and

[1] Physical AI marks the convergence of artificial intelligence and the physical world: systems that take physical interaction constraints into account. These systems combine novel AI models with new sensors and actuators to gain significantly higher levels of perception and autonomy to act in and interact with the physical world. Unlike current versions of AI, centred on understanding and generating text and images, Physical AI models need to be built with the constraints of real-world physics – object permanence, cause and effect, friction, and momentum – enabling them to reason about physical dynamics and act accordingly through robots, autonomous vehicles, drones, and other embodied systems. The real-world deployment of Physical AI will require the development of new highly versatile, dexterous, reconfigurable, and interactable systems, exploiting and integrating the latest developments in materials, computation, sensing, actuation and other enabling technologies.

robotics – one capable of setting the pace globally rather than following it. What follows sets out the evidence, the design, and the investment case for building it.

1. Introduction

ADRA – The AI, Data and Robotics Association – represents industrial end-users, SMEs and start-ups, research and technology organisations, and universities, working across artificial intelligence, data and robotics in Europe. ADRA welcomes the Commission's decision to open a structured review of the future design of European Partnerships ahead of Horizon Europe 2028–2034, and its explicit intention to strengthen the mobilisation of private co-investment, alignment with strategic priorities, and accessibility for new members and applicants.

This response draws on ADRA's own work over the past year: an evolving business case for moving beyond a networking association, an end-user-led "Catalyst" and "Super-Integrator" model for Physical AI and embodied robots, and direct engagement with the industrial[2] end-users – from aerospace to steel to energy – who would have to live with whatever framework the Commission designs next. The full evidence base from that engagement is set out in Annex I. We submit this response as a proposed operating model the Commission can draw on directly.

The diagnosis summarised above has a direct design consequence: a European Partnership should be more than a subsidy scheme. Member States, firms and their value chains should collaborate towards shared, concrete solutions to major needs and challenges, through infrastructures and projects deployed first in Europe and then exported. Section 2 sets out the diagnosis in detail and shows where European research most often stalls: in productisation, between prototype and first customer. Sections 3 and 4 connect it to instruments the Commission has already put in motion, and Section 5 sets out the partnership this model now requires.

> *"Unlike Large Language Models, Physical AI cannot solely learn from the internet. These models must learn from robots performing real tasks in factories. Europe already possesses one of the world's most advanced manufacturing ecosystems. This should become our strategic advantage."*
>
> **Jim Mainprice**, Senior Manager, Artificial Intelligence, Bosch Corporate Research

2. The Case for Reform

Europe's position is not one of weak research; it is one of research that stalls before it reaches a customer. Competitive advantage is not won at the research frontier alone: ease of access, integration, deployment and adoption matter as much, and success should be measured by how quickly research becomes validated, usable and scalable products. Four reference points make this concrete. On the current technology frontier, the United States produced 40 notable AI models in 2024, China 15 and Europe three.[3] A year later the gap had not closed: the United States and China alone produced 94 of 2025's notable models between them, 59 and 35 respectively.[4] On company formation, no EU company with a market capitalisation above €100 billion has been built from scratch in the past fifty years, while six US companies passed €1 trillion in valuation over the same period; between 2008 and 2021, close to 30% of Europe's unicorns relocated abroad, mostly to the United States.[5] And on the factory floor, Europe's own industrial robot installations fell 8% in 2024 to 85,000 units, even as Asia absorbed 74% of the

[2] In this document, "industrial" is used in a broad sense. It covers not only manufacturing and process industries, but every sector where AI, data and robotics are deployed in operations to produce goods or deliver services, including healthcare, agri-food, transport and mobility, and tourism. "Industrial end-users" therefore means any organisation that adopts and operates these technologies in its core activities, whether or not it would conventionally be considered an industrial company.

[3] Stanford University Human-Centered AI Institute, AI Index Report 2025, April 2025 (hai.stanford.edu/ai-index).

[4] Stanford University Human-Centered AI Institute, The 2026 AI Index Report, "Research and Development" chapter, April 2026.

[5] Mario Draghi, The Future of European Competitiveness: A Competitiveness Strategy for Europe, European Commission, September 2024.

world's new deployments.[6] Together, they are the visible symptoms of three compounding weaknesses in how partnerships are designed and run: a systemic one, a velocity one, and a relational one.

3	0	~30%	−8%
notable AI models produced in Europe in 2024, against 40 in the US and 15 in China	EU companies above €100bn in market value built from scratch in the past 50 years	of Europe's unicorns relocated abroad between 2008 and 2021	fall in Europe's industrial robot installations in 2024, as Asia took 74% of new deployments

Sources: Stanford HAI, AI Index Report 2025; M. Draghi, The Future of European Competitiveness (2024); IFR, World Robotics 2025.

Figure 1 sets out the pathway from research to scale. The stages between demonstrator and first customer – real-world validation, assurance and qualification, and productisation – are where European research most often stalls, and where this response concentrates its recommendations.



Figure 1. The critical pathway for Physical AI: from research to deployment

2.1 Aligning technology and market

Europe's existing partnerships have demonstrated genuine excellence in research, and their potential can be unlocked by strengthening the connection between technological advance and market demand. The two are not opposing forces. They form a continuum along which innovation progresses through a value chain that includes researchers, industry, end-users, investors and policymakers.

Present partnerships, however, sit far towards one end of that continuum. They strongly favour early research over market-driven outcomes, and their budgets are frequently not commensurate with the ambitions attached to them. The consequence is a misalignment that runs in both directions. On the supply side, a translation gap leaves breakthroughs stalled at low Technology Readiness Levels: without a credible path to commercialisation, results and the talent behind them drift outside Europe. On the demand side, an adoption gap leaves European industry under-using genuinely disruptive innovation, defaulting to established vendors because the perceived risk of integrating unproven technology is too high.

Starting from a well-defined problem

Not all innovation reaches the market, and no instrument can change that. The most reliable route, however, begins with a problem someone is willing to solve, and engages the value chain of all the stakeholders who can contribute to solving it.

The hardest part of this is defining the problem. That step is routinely underestimated, and an innovation ecosystem's strength lies first in its capacity to identify and articulate the problems that technology can usefully address. Methodologies such as design thinking help structure this work, provided they are applied as a rigorous

[6] International Federation of Robotics, "World Robotics 2025 report – Industrial Robots," press release, Frankfurt, 25 September 2025 (ifr.org). Cited hereafter as "World Robotics 2025."

strategic framework rather than as a set of introductory techniques, integrating user needs, industrial constraints and technological opportunity from the outset.

Closing the translation gap

The translation gap is visible in how Europe treats the intellectual property its own public research produces. A joint study by the European Patent Office and the Fraunhofer Institute for Systems and Innovation Research found that European universities file a rising share of European patents,[7] yet the pattern researchers still describe as the "European paradox" persists: strong upstream science, weak downstream commercialisation. The EPO's survey of European universities and public research organisations found that 21% of their patented inventions were not commercially exploited and had no exploitation planned, with incomplete R&D or a missing proof of concept the most frequently reported barrier.[8] Even grantees of the European Research Council, arguably the best-funded and most rigorously selected research population in Europe, see only 44% of their patented inventions reach any commercial use.[9]

A partnership model that funds research while treating what happens to its intellectual property afterwards as someone else's concern will continue to reproduce this pattern, whatever legal form the partnership eventually takes. The evidence argues for explicit gates – proof of concept, validation, partner search and commercialisation – rather than a general commitment to market. Four measures would change it:

- **Anticipate commercialisation pathways from the research phase**, by involving industrial and investment partners early rather than at the point of exploitation, supported by active cross-border brokerage, searchable asset portfolios and sector-specific scouting.
- **Treat validation, assurance and qualification as part of commercialisation**, not as a later deployment step. For Physical AI, customers adopt only on credible evidence that a system works reliably and safely in its intended operating environment; producing that evidence belongs on the commercialisation pathway from the start.
- **Build bridges between laboratories and markets** through dedicated mechanisms – technology transfer platforms, pilot lines, sector-specific incubators – that accompany inventions through to adoption rather than releasing them at the end of a project.
- **Retain talent** by creating environments in which research and entrepreneurship coexist, including professor-entrepreneur models that allow researchers to pursue commercialisation without leaving the research base.

Closing the adoption gap

The adoption gap is equally measurable, and the contrast is stark. Global survey evidence suggests that generative AI is now used in at least one business function at roughly 70% of organisations worldwide.[10] In the EU, by contrast, Eurostat found that only 20% of enterprises used AI technologies of any kind in 2025, up from 13.5% in 2024, the baseline behind the Commission's Apply AI Strategy;[11] use remains concentrated among larger firms, at 55% of large enterprises against 17% of small ones.[12] The two figures come from different surveys and do not measure one precise gap, but both point the same way.

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[7] European Patent Office and Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI), study on the role of European universities in patenting and innovation, October 2024, as reported by the EU Intellectual Property Helpdesk (29 October 2024) and Euronews (23 October 2024).

[8] European Patent Office, Valorisation of Scientific Results – Patent Commercialisation Scoreboard: European Universities and Public Research Organisations, EPO, November 2020: 36% of the patented inventions surveyed were commercially exploited, 42% had exploitation planned and 21% had none planned; inventions not yet at proof of concept were the most frequently reported reason.

[9] European Research Council, "New report reveals how ERC grantees commercialise their patented inventions," 3 February 2025 (erc.europa.eu).

[10] McKinsey & Company, The State of AI: How Organizations Are Rewiring to Capture Value, global survey, March 2025 (71% of respondents report regular use of generative AI in at least one business function).

[11] European Commission, Apply AI Strategy, COM(2025) 723 final, 8 October 2025; adoption figures also set out in Council of the European Union document ST-13731-2025-INIT. Cited hereafter as "the Apply AI Strategy."

[12] Eurostat, "Use of artificial intelligence in enterprises," Statistics Explained, data extracted December 2025 (enterprises with 10 or more employees). Cited hereafter as "Eurostat 2025."

> *"Europe risks facing accelerated industrial entry by non-EU robotics players if it does not act before market structures are locked in… Europe often regulated and protected strategic sectors only after deep market penetration; with Physical AI, the rules already exist, but the trusted path to scale is still missing."*
>
> **Daniele Pucci**, Co-founder and CEO, Generative Bionics

Europe is not short of available technology. It is short of the demand-side mechanisms that would make adopting that technology the obvious commercial choice. Adoption can be accelerated by pooling demand, as Section 3.1 sets out and as Annex I documents from the deployment side, and by reducing the perceived barriers of cost, complexity and risk through:

- **Sector-specific demonstrators** that show concrete use cases in operating conditions rather than in laboratory settings.
- **Targeted funding for deployment phases**, which currently fall between research instruments and commercial finance.
- **Support networks for SMEs**, combining training with access to expertise.

Towards an integrated approach

Success does not lie in choosing between technology push and market pull, but in integrating them around well-defined problems. Three conditions make that integration possible:

1. **Collaborative governance and programmes.** Researchers, industry, users and funders should be involved in balanced consortia from the outset, not consulted once priorities are fixed.
2. **Shared metrics.** Success should be measured not only by publications and patents, but also, where relevant, by their economic and societal impact – including, explicitly, the proportion of results that reach commercial use.
3. **A culture of iteration.** Some paths will not succeed. The requirement is that the lessons from them inform what follows, rather than being absorbed silently at the end of a funding cycle.

2.2 The velocity and agility imperative

The Commission is aware of this. Successive simplification measures, the move to lump-sum funding, and the Apply AI Strategy all recognise that administrative burden and slow decision-making carry a real cost. The direction of travel is right, and any new partnership structure, whatever its legal form, must avoid reintroducing that burden through its own governance. Our argument concerns pace: the rate at which these reforms are being generalised remains far below the rate at which the underlying technology and its financing are moving, and the gap is widening rather than closing.

Grant administration, as currently structured across most of the partnership landscape, cannot move at the pace of AI innovation and private capital. Project officers are mandated to verify compliance, not to pursue outcomes. Outside the EIC there is no equivalent of an empowered programme manager charged with following programmes and projects through, facilitating adaptation to a fast-moving competitive landscape, and – where the evidence warrants it – recommending that underperforming work be stopped and its funding redeployed.

Complexity, fragmentation and policy churn impose a further tax on participation, and that tax falls hardest on SMEs and start-ups, precisely the actors Europe most needs to keep engaged. A funding model organised around milestones rather than proposal cycles, with the authority to act on what those milestones reveal, would move at something closer to the speed the technology race requires.

The evidence supports the shift. The most recent rigorous estimate, built on US federal appropriations data, puts the social return to non-defence public R&D at 140–210%; a wider survey of the literature finds studies estimating

returns as high as $5–$20 per dollar invested.[13] Whatever the precise multiple, the return on public R&D is high enough that slow administration carries a real cost.

2.3 Towards cohesive value chains

Perhaps the most overlooked opportunity lies in relational coordination, where greater integration could unlock significant value. Many current public-private partnerships operate as networking platforms: they convene expertise and coordinate research agendas through Memoranda of Understanding. Their impact could be substantially increased by structuring the value chain more cohesively, standardising legal and IP collaboration terms, and linking project pipelines across neighbouring partnerships and Pillar II clusters. Standardisation here means a common process and modular templates, not identical economics for every asset.

> *"Physical AI is such an area where we can make a global impact. Europe has a strong industrial base in robotics paired with the research excellence required. Major concentrated and dedicated investments in Physical AI would lead to both increased European sovereignty and competitiveness. To be successful Europe needs to move fast and invest at the same scale as the other global actors."*
>
> **Fredrik Heintz**, Professor of Computer Science, Linköping University, and Research Vice-President for AI, ADRA

Doing so would remove redundancy, simplify IP agreements, harmonise procurement, and ensure that a breakthrough in one Member State reaches end-users in others. Section 3.1 sets out how ADRA's Catalyst model proposes to achieve this by pooling resources, qualification and procurement power on the end-user side, so that problems are solved collectively rather than by each company and Member State in isolation.

Figure 2 summarises this diagnosis and links each weakness directly to a design requirement for the future framework.

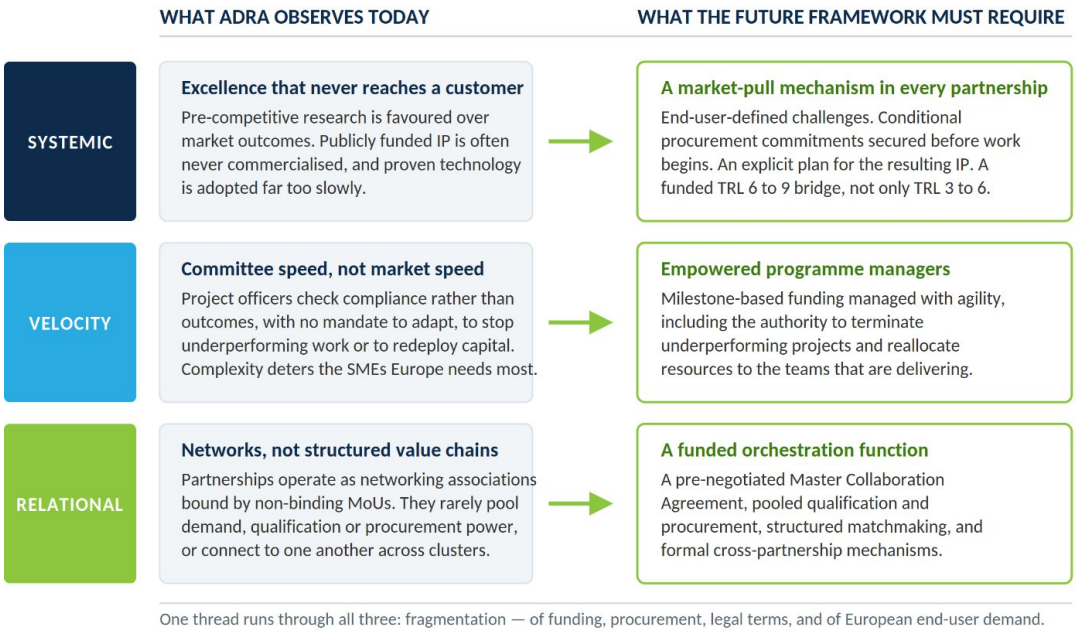


Figure 2. What ADRA observes today, and what the future framework must require

[13] Andrew J. Fieldhouse and Karel Mertens, "The Social Returns to Public R&D," NBER Working Paper No. 33780, May 2025 (forthcoming, American Economic Review), estimating social returns of 140–210% to non-defence public R&D; see also Information Technology and Innovation Foundation, comments to the US Office of Management and Budget, 13 July 2026, noting that other studies find $5–$20 in social benefit per $1 of public R&D invested.

3. ADRA's Recommendations Against the Consultation's Five Assessment Areas

We structure our substantive recommendations around the five areas the questionnaire identifies for Treaty-based partnerships, since the same principles should also inform Work Programme-based partnerships by default.

3.1 Support for the development, uptake and deployment of new technologies and solutions

Partnerships should be required to build an explicit market-pull architecture rather than assume uptake will follow from research quality alone. The Catalyst model, which the Apply AI Strategy commits to establishing with ADRA,[14] does this by pooling, on the end-user side, four things companies currently manage separately and at duplicated cost across Europe: investment, vendor qualification, testing and experimentation, and procurement power.

- **Pooling resources and investment.** A Coordination Board of industry end-users defines "Grand Challenges" from critical operational pain points and, critically, co-invests directly rather than only setting requirements – contributing funding, data, testing environments and existing infrastructure, and engaging their value chain of partners, suppliers and subcontractors alongside their skilled workforce, together with Conditional Commitments to deploy secured before a challenge is launched.[15] This converts a wish-list of industry requirements into a funded, de-risked demand signal that a start-up or RTO can actually build against – provided commitments are graded by strength, since a non-binding Letter of Intent validates demand far less than a paid pilot, a venture-client contract or a purchase order.
- **Pooling vendor qualification.** Rather than every end-user separately testing and retesting the same emerging vendors, ADRA's proposed Robotics Skills Qualification Centres (RSQCs) pool this evaluation once, on shared, standardised, industrially realistic benchmarks, and make the resulting qualification usable by any participating end-user.[16] Because customers, investors and procurers can all rely on the same trusted evidence, none has to repeat expensive validation independently, shortening the path from demonstrator to first customer and on to wider adoption. This is precisely the kind of pre-competitive cooperation competition law already accommodates: companies that compete daily in their own product markets can still cooperate on the shared, prior question of whether a given robotic skill is safe, reliable and interoperable enough to deploy at all.
- **Pooling operational environments and workforce expertise.** Qualification establishes that a capability works to a defined standard, not that it works in a particular plant, on a particular line. That is settled only through iterative experimentation in real conditions, and it is the step at which otherwise sound technologies most often stall. End-users participating in a challenge therefore commit test beds and engage their skilled workforce from the outset rather than at handover. The technical return is that the problems no simulation anticipates surface while there is still time and funding to solve them, and are solved with the knowledge of the people who understand the process best. The organisational return is adoption: workers who have helped shape a solution understand what it is for, contribute their experience to its design, and have prepared for the change in their own practice before it arrives.
- **Pooling procurement power: a buyers' club for European supply.** The furthest-reaching version of this pooling is already taking shape informally within ADRA's own end-user network: sector-level "buyers' clubs" in which companies agree collectively to prioritise European suppliers for a given technology. The idea is not new to EU policy: the same logic lies behind the "anchor customer" and "European preference" criteria now

[14] The Apply AI Strategy, cited in full at note 11.

[15] ADRA, "Accelerating European Robotics and AI by Enhancing Current Innovation Frameworks" (Pan-European Challenge Orchestration, internal working paper V0.7, 2026); ADRA, "Catalyst: Seizing Europe's Industrial AI & Robotics Future" (internal, 2026). Cited hereafter as "the Catalyst materials."

[16] The Catalyst materials, cited in full at note 15.

under discussion in the review of the EU's public procurement rules,[17] and, to some extent, behind the Member-State-backed co-funding that Important Projects of Common European Interest already use to de-risk investments too large or too uncertain for any single company or country – with artificial intelligence among the fields now being prepared for future IPCEIs.[18] A future Partnership should formalise this logic by giving a validated buyers' club greater standing and inviting the Commission to co-underwrite the riskiest tranche of that collective commitment.

- **A funded bridge across the productisation gap, from TRL 6 to TRL 9.** Turning a successful demonstrator into a validated, assured, manufacturable and deployable product is at least as strategically important as the underlying research, and a European competitiveness challenge in its own right. It should be funded as a sequence rather than a single block – industrial validation; certification and manufacturability; first reference deployment; replication – with each tranche released or terminated against evidence-based criteria. Because TRL measures technical maturity only, those criteria should also test commercial readiness and the value chain's readiness for scaled manufacturing. Shared testing infrastructure – Testing and Experimentation Facilities and the RSQCs described above – should validate solutions under realistic industrial conditions and, where relevant, generate a presumption of conformity that shortens the path to CE marking under the AI Act and the Machinery Regulation.

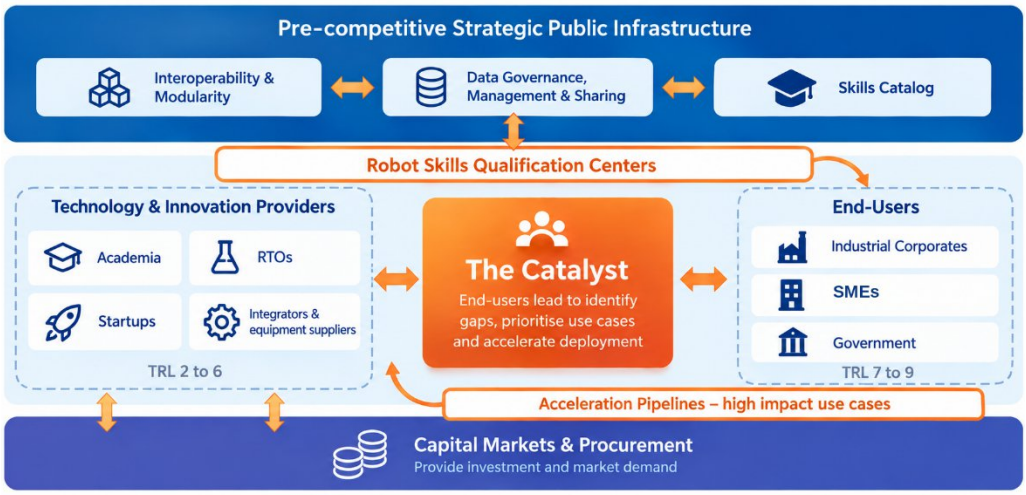


Figure 3. The Catalyst model

> *"Physical AI is where Europe's digital rulebook meets its industrial backbone. Our advantage will not come from replicating others' race for scale, but from turning trustworthy AI, robotics excellence and high-quality industrial data into deployable systems…"*
>
> **Brando Benifei**, Member of the European Parliament (S&D, Italy) and AI Act co-rapporteur

3.2 Mobilisation of private co-investment

Private capital will not flow into a system it cannot assess, and future partnerships should not have to build that assessment mechanism from nothing. Two instruments the Commission has already put in motion answer much of this problem; partnerships should be designed to connect to them explicitly rather than build parallel, competing mechanisms.

- **The Scaleup Europe Fund** – a €5 billion, market-based vehicle the Commission helped establish alongside a coalition of private investors, now managed by EQT and already making its first investments in strategic deep-

[17] European DIGITAL SME Alliance, "The year ahead: 2026 will make – or break – Europe's tech sovereignty," April 2026.

[18] European Commission, "Important Projects of Common European Interest (IPCEI)" policy overview, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs; on artificial intelligence among fields being prepared for future IPCEIs, see Zabala Innovation, "The approved IPCEIs and the IPCEIs in the pipeline," 2026.

tech sectors – is designed to close exactly the late-stage financing gap ADRA's model targets.[19] A partnership's validation gate (the RSQC model, or an equivalent) should be formally recognised as a qualification signal that reduces due-diligence friction for this Fund and others like it, rather than operating in ignorance of it. That makes the chain explicit: validation and assurance create customer confidence; customer confidence secures a first deployment; a first deployment creates investor confidence; and investor confidence finances scale.

- **The proposed European Competitiveness Fund** – combining a new €234 billion envelope with Horizon Europe's €175 billion for a total of roughly €409 billion from 2028, consolidating fourteen existing instruments – is the natural home for the "programmatic wrapper" model this response describes.[20] A partnership that draws down Competitiveness Fund and Horizon Europe resources as a single, blended, milestone-gated funnel serves the Fund's own stated purpose of simplification; a partnership that operates as a fifteenth stand-alone structure alongside it works against that purpose. As the Council and Parliament finalise the Fund's governance over the same period this consultation is running, ADRA suggests including a provision in the future Single Basic Act clarifying that Treaty-based partnerships are expected to operate as delivery vehicles aligned with the Competitiveness Fund.
- **A standard investment-readiness package at the validation gate**: technical results, IP and freedom-to-operate position, regulatory plan, customer commitments, unit economics, capital requirement and governance information. Without it, recognition by a fund will remove little due-diligence friction.
- **Blended financing that crowds in capital progressively.** Member State and private capital should be drawn in as a project matures, rather than relying on a single upfront grant.
- **An explicit leverage multiple** – for example, €5–10 of private follow-on capital for every €1 of public funding – tracked as a core performance indicator of the partnership itself, not as an afterthought.

3.3 Alignment with the EU's strategic priorities

Future partnerships should be designed from the outset to plug into EU-level infrastructure that already exists or is now confirmed, rather than requiring separate alignment after the fact. The Apply AI Strategy, published in October 2025 alongside the AI in Science strategy and building on the AI Continent Action Plan of April 2025, already sets out eleven sectoral flagships – including manufacturing – an "AI-first" policy for public decision-making, and a "Buy European" preference for public procurement of AI solutions.[21] A future Physical AI and Robotics Partnership should be built as the delivery mechanism for the hardware side of AI specifically – robotics, drones and smart equipment – not as a separate initiative that has to be reconciled with it afterwards. The same logic applies to Common European Data Spaces, AI Factories and EuroHPC compute access, and the AI Skills Academy: aggregating demand for compute and data access on behalf of SME members and building workforce-reskilling requirements into every challenge are concrete ways to operationalise this alignment.

3.4 Cooperation and knowledge exchange between partnerships and other R&I initiatives

Cross-partnership cooperation currently happens by chance, and communication is the first thing to fix. A sustained effort across media and professional networks that the relevant communities actually read is the precondition for everything else: results that are not visible cannot be reused. On that basis, an explicit orchestration process should connect partnerships to one another – through joint calls, shared challenges and aligned roadmaps – scouting and communicating high-potential results across Member States and clusters so that a breakthrough achieved in one

[19] European Commission, EU Start-up and Scale-up Strategy "Choose Europe to Start and Scale," 28 May 2025; European Innovation Council, selection of EQT as manager of the €5 billion Scaleup Europe Fund, 18 May 2026; Scaleup Europe Fund's first investment, in Finnish satellite company ICEYE, announced 5–6 August 2026.

[20] European Commission, proposal for a European Competitiveness Fund as part of the 2028–2034 Multiannual Financial Framework, 16 July 2025 (single-market-economy.ec.europa.eu); Council of the European Union, partial negotiating position on the European Competitiveness Fund, 16 June 2026.

[21] The Apply AI Strategy, cited in full at note 11.

region can solve a challenge in another. A shared marketplace, in which technology providers in one partnership are matched to end-user demand surfaced in another, would make those connections systematic. It should work as an active brokerage service: curating opportunities, validating demand, packaging complementary assets, introducing parties and following each lead through to an agreement. The Joint European Forum on IPCEIs, which already brings Member State representatives together to align major cross-border industrial projects, shows that a standing coordination body of this kind is workable in practice; partnerships need an equivalent for pre-competitive research and challenge design. Without it, the portfolio's stated goal of avoiding overlap and fragmentation will not be achieved by structural design alone. Regional nodes would extend the same reach to less-connected regions, mapping partnership challenges to smart-specialisation strengths, providing local validation infrastructure and connecting successful projects to EU-wide customers and investors, in line with Horizon Europe's widening objectives.

3.5 Accessibility for new members and funding applicants

Accessibility should be measured by how quickly and cheaply a new entrant can start contributing – in staff qualification and time required, not only in whether the door is formally open. We recommend:

- **A single, pre-validated Master Collaboration Agreement** with modular schedules – background IP, project results, data access, publication, confidentiality, licensing routes, spin-off rights, research-use reservations, anti-shelving obligations, liability and dispute escalation – so that members can join a new challenge without months of bespoke legal negotiation. Default positions and the grounds for deviating from them should be published, and results left unexploited beyond a defined period should become available for licensing on open but protected terms. This is the project-level equivalent of the simplified, EU-wide "28th regime" the Commission is separately developing for start-up and scale-up company law.[22]
- **Subsidised access to the service catalogue and challenges for SMEs and start-ups**, alongside tiered participation for larger corporates, so that scale does not crowd out disruptive smaller entrants.
- **A simplified, fast application process** – a response within days and a signed agreement within weeks – as an explicit service-level commitment, not an aspiration.
- **An Associated Partner model** that allows sector associations and intermediary bodies to participate in a partnership's orchestration without competing with their own members' core funding pipelines, preserving neutrality while adding connective capacity.

4. Principles for the Design of the Future Partnership Portfolio

Beyond the five assessment areas, ADRA offers the following views on the portfolio-level questions the consultation raises.

4.1 A value-chain approach, not a project-by-project one

Thematic structuring should be organised around value chains and industrial challenges rather than around individual technologies considered in isolation. This requires structured matchmaking between hardware vendors, AI providers, end-users and their own supply chains – and, critically, an intermediation layer between them. That layer may take an organisational form, a shared, interoperable middleware, or both; what matters is that something occupies it, because its absence is what allows a portfolio of individually sound projects to fragment into parts that do not compose. The same logic should guide any consolidation of the portfolio: partnerships grouped along value and supply chains, not by broad technology family (Section 5.5).

[22] The Start-up and Scale-up Strategy, cited in full at note 19.

4.2 A strategy defined and owned by Europe

A portfolio requires a prior condition that is currently missing: a strategy Europe has defined for itself.

At present, Europe largely competes inside strategies defined and dominated by others. In artificial intelligence, the terms of the contest – ever larger models, hyperscale data centres, supercomputing capacity – were set in the United States, and Europe enters that contest structurally behind. Frugal AI, where European research held a genuine lead and where the constraint-driven engineering culture of European industry is an advantage rather than a handicap, has largely disappeared from the strategic conversation. In robotics, the current debate treats humanoid form factors as the route to general-purpose capability, on the unexamined premise that a system able to take human form can therefore do everything. That framing is driven largely by the United States and China, and it does not survive contact with the applications that matter: surgical, agricultural and logistics robots are not humanoid, and there is no engineering reason why they should become so.

A European strategy would instead be derived from European conditions: the urgent and large-scale needs of world-leading European corporations, Europe's resilience in the face of demographic, ecological and societal pressure, and the values the Union has chosen to defend. Such a strategy is both more likely to produce European leadership and more defensible politically than one measured against benchmarks set elsewhere.

> *"AI models and infrastructure are rapidly commoditizing. For Europe, this presents an opportunity to lean into its strengths rather than copy foreign industrial policies. Its strengths are adoption through trustworthiness and collaboration (…) high-quality data and talent in areas like robotics."*
>
> **Stefan Leijnen**, Professor of Artificial Intelligence, Utrecht University of Applied Sciences, and Industry Vice-President for AI, ADRA

4.3 The industrial structure and assets Europe already has

Europe's industrial strength has never rested primarily on platform scale. It rests on specialised firms that dominate narrow markets requiring precision, quality and deep technical knowledge – in mechanical engineering, instrumentation, components and process technology. The hidden-champions literature traces this pattern in Germany to nineteenth-century institutions, and above all to an apprenticeship and skills system that reproduced highly qualified workers across generations where comparable systems elsewhere in Europe were dismantled.[23] It is concentrated in parts of the continent rather than distributed evenly across it, but it is real, it is European, and no competitor replicates it easily.

Those firms exist because industrial machinery is composable. Systems divide into subsystems with definable interfaces, and a subsystem is a market a single specialist can master completely. Developed as monolithic, end-to-end models, Physical AI has no interfaces and therefore no niches, and European specialists become subcontractors to whoever owns the whole. Developed as a modular, interoperable stack – perception, control, actuation, end-effectors, safety assurance, each addressable on its own – the niches exist, and the firms best placed to occupy them are the ones Europe already has. Architecture is therefore industrial policy, and a portfolio that makes modularity a condition of funding creates the market structure in which European industrial strength compounds.

The second asset is data. Physical AI models are trained on interaction data – motion, force, process, failure, edge cases – generated by operating industrial systems. Such data does not exist on the open web and cannot be acquired by scraping. It is produced continuously inside European factories, plants, hospitals, ports and energy

[23] D. B. Audretsch, E. E. Lehmann and J. Schenkenhofer, "Internationalization strategies of hidden champions: lessons from Germany," Multinational Business Review, 2018, tracing the origins of the Mittelstand model to nineteenth-century social, political and economic developments rather than to the post-war recovery; see also D. B. Audretsch and E. E. Lehmann, The Seven Secrets of Germany, Oxford University Press, 2016.

infrastructure, in sectors where precision manufacturing and regulatory oversight have made process records unusually complete. Europe holds an asset its competitors cannot obtain from outside, and cannot presently use it, because no safe legal and contractual route exists for the companies that hold it to share it. The Neutral Data Escrow (Section 5.5) exists to close that gap.

4.4 We have done this before: ASML

Extreme ultraviolet lithography reached high-volume manufacturing in 2019. Work on the underlying physics began in the mid-1980s; ASML committed definitively to the technology in 2001; first demonstration tools shipped in 2006, and roughly another decade passed before manufacturers trusted the systems in production.[24] ASML characterises the effort as four decades of work, billions in research and development, and thousands of people across the world. The company that emerged recorded net sales of €11.8 billion in 2019, the year the technology entered volume production.[25]

Two features of that trajectory bear directly on the design of the proposed partnership.

The first is duration. No funding cycle, and no partnership horizon of five or seven years, would have carried EUV from physics to production. Much of that final decade was productisation: turning a working demonstrator into a tool reliable and productive enough for customers to trust in volume manufacturing. An instrument intended to produce capabilities of this kind must outlast the political cycles in which it is approved, with stability of funding treated as a design requirement rather than a matter for annual negotiation.

The second is how demand-side capital was committed. In 2012, ASML's three principal customers – Intel, TSMC and Samsung – contributed €1.38 billion to its research and development over five years, took an aggregate 23% non-voting minority stake for €3.85 billion, and, in Intel's case, entered contractual commitments to advance purchase orders for tools that did not yet exist.[26] Customers funded development, accepted the risk of failure and guaranteed a market, while the supplier retained operational control. This is the structure the Catalyst and the proposed Private Investment Fund seek to reproduce: conditional commitments to deploy, secured before a challenge is launched.

ASML works with some 790 product-related suppliers, co-develops modules with partners and invested €500 million in its research partners in 2019 alone[27] – one integrator and several hundred specialists holding defensible positions within a modular architecture, operating at the technological frontier.

4.5 Governance principles that should apply across the whole portfolio, regardless of legal form

- **An innovation culture that matches the ambition of the mandate.** The US ARPA model's record shows that its outcomes have hinged as much on a specific organisational culture – risk tolerance, acceptance of a high failure rate, and genuine deference to programme managers as risk-taking, idea-driven entrepreneurs rather than grant administrators – as on any procedural design.[28] Where that culture has been absent, where failure is punished rather than expected, the model has struggled to deliver.

[24] ASML, "Making EUV: from lab to fab," 2022 (asml.com); Bits&Chips, "ASML ships 100th EUV scanner." Cited hereafter as "the ASML EUV record."

[25] ASML Holding N.V., fourth-quarter and full-year 2019 financial results, 22 January 2020.

[26] ASML Holding N.V., Form 6-K, FY2012, Customer Co-Investment Program announcements of 9 July, 5 August and 27 August 2012, filed with the US Securities and Exchange Commission.

[27] ASML Holding N.V., Annual Report 2019, highlights.

[28] See W. B. Bonvillian and R. Van Atta, "ARPA-E and DARPA: Applying the DARPA Model to Energy Innovation," and W. B. Bonvillian, "DARPA and its ARPA-E and IARPA Clones: A Unique Innovation Organization Model," which note that one researcher estimates roughly 85% of DARPA projects fail to achieve their planned goals, and attribute the model's success to an empowered, entrepreneurial programme-manager culture combined with a willingness to cancel or restructure underperforming projects, rather than to a specific institutional form.

- **Empowered, time-limited programme or "impact" managers**, drawn from across Member States, serving three- to five-year terms with genuine executive authority – including the authority to terminate underperforming projects and reallocate their funding.[29]
- **Outcome- and milestone-based financing as the default**, rather than proposal-based financing, so that funding tranches are tied to demonstrated progress. Milestones should change by stage – testing technical performance, user validation, regulatory progress, manufacturability, private funding attraction and commercial demand – with an independent review at each release point and a documented decision to continue, redirect or stop funding.
- **Intellectual honesty**, built into governance rather than treated as a reputational risk: a partnership that never stops funding an underperforming project is not protecting public money. It is wasting it.

4.6 Wildcards and disruptors

The technologies that will define the next decade of AI, data and robotics will not all come from today's roadmaps. Some will be disruptors that overturn established products and business models. Others will be wildcards: unexpected, high-impact ideas and teams from outside established communities. Disruptive results stay scattered across programmes and are reported for compliance rather than for industrial decision-making. Even the enterprises best placed to scale them lack a clear view of what is emerging, how mature it is, who holds the rights and how to engage. Too many breakthroughs therefore scale elsewhere, taking their intellectual property with them. Yet Europe's industrial leaders already have what disruptive ventures most lack: global markets, supply chains, manufacturing capacity, regulatory expertise and capital. Through corporate venturing, spin-ins and spin-outs, complementing venture capital rather than replacing it, they can become launchpads for Europe's next generation of disruptive businesses.

ADRA therefore proposes that future partnerships, starting with the Physical AI and Robotics Partnership set out in Section 5, build in transparency and connectivity by design. A Disruptor and Wildcard Radar should give industry a continuously updated map of emerging disruptors and wildcards. It should build on the Commission's Innovation Radar and Horizon Results Platform, and every funded project should feed it with a short results passport. RAISE, the Resource for AI Science in Europe, should be a connecting point between the Radar and the scientific community, bringing in disruptors from AI for science and science for AI, where many wildcards first appear. Industrial partners and end-users should, in turn, publish their challenges and adoption conditions as open demand signals.

Industry should help turn breakthroughs into businesses through first-customer commitments, buyers' clubs, access to test beds and supply chains, and standard IP terms that keep the value in Europe. Pre-agreed stage gates should carry successful wildcards on to the European Innovation Council, the Scaleup Europe Fund and the European Competitiveness Fund, without restarting the application process at each step.

[29] ADRA, From Research to Reinvention: AI Catalyst and the Future of European Innovation (internal, 2026).



SECTION 5

A Physical AI and Robotics Partnership for Europe

Europe should launch a strong Physical AI and Robotics Partnership now – capitalised at least as ambitiously as the Chips partnership.

5. A Physical AI and Robotics Partnership for Europe

5.1 Recommendation

ADRA recommends that the Commission propose a dedicated **Physical AI and Robotics Partnership** for the 2028–2034 programming period, in whichever legal form best secures the scale and agility the field requires (Section 5.5). The instrument should keep artificial intelligence, data and robotics within a single scope, organised around the end-user value chain, and should coordinate closely – through joint calls, shared roadmaps and the other orchestration mechanisms described in Section 3.4 – with the strategies and programmes covering its principal components: chips, including sensors and microcontrollers; connectivity, from edge to cloud and from terrestrial to space infrastructure; and raw materials. It should be capitalised at least as ambitiously as the Chips partnership (Section 5.7).

This recommendation is not ADRA's alone: a 2026 euROBIN Open Letter addressed to the Commission's leadership[30] and euRobotics' independently published Vienna Statement of June 2026[31], reach closely related conclusions from different starting points.

> *"Electronics represent the future of technology—highly efficient, deeply intelligent, and increasingly central to everyday life. They should now be treated as essential commodities, similar to oil, metals, or agricultural products. With the rise of Physical AI, human interaction with electronics and semiconductors will exceed interaction with almost any other object."*
>
> **Deepak V. Katkoria**, Founder, Logiicdev

5.2 Objectives

The partnership should commit to three objectives that Europe can get behind, deliberately few so that progress can be measured and reported:

1. **Sovereign models for European industry.** Create Physical AI models that are designed, developed and deployed in Europe – open, interoperable, trained on European industrial data and qualified under European rules – and use them to reclaim and rebuild industries Europe has lost.
2. **Shared needs, deployed at scale.** In seven fields of application (Section 5.4), turn needs that end-users share across companies and borders into qualified solutions with first customers, and from there into repeatable deployments across Member States.
3. **Companies that scale in Europe.** Grow European integrators, component makers and start-ups into companies that scale inside the Union, financed by European capital, supplied through European value chains and setting the standards for trustworthy Physical AI.

A small set of indicators should track them: European models in production use, solutions qualified and deployed in each field, private capital mobilised per euro of public funding, and Europe's share of global robot production and installations, which should be rising by the end of the programme.

5.3 The case

The convergence of AI, data and robotics into Physical AI and the applications in multiple sectors is the

[30] "Europe's Robotics Moment: From Trustworthy AI to Trustworthy Robots," euROBIN open letter to the European Commission, September 2026 (https://www.eurobin-project.eu/images/Open-Letter-AI-based-robotics.pdf).

[31] "euRobotics Vienna Statement", euRobotics, June 2026 (eu-robotics.net/eurobotics-vienna-statement).

defining technological shift of this programming period, and one of the few global races in which Europe still holds a credible position. Europe never built the consumer software industry, but it did build the industrial one: SAP, Siemens, Dassault Systèmes, Schneider, ABB. Physical AI is the next layer of that same stack – the intelligence that runs on machines Europe already designs, certifies and exports.

Within that layer, convergence is running from the top of the AI stack down. Agentic and Physical AI share a research agenda and a reasoning layer, and world models, which learn how the physical world behaves, are becoming their common foundation. Physical execution lags, because robot data is scarce, robot policies remain brittle and the hardware itself still needs major advances: new materials, more capable actuators and drive trains, dexterous hands with tactile sensing and energy-efficient onboard computing.

Europe's industrial base is both substantial and exposed. Around a quarter of the world's industrial robots are produced in Europe, supported by more than 400 service robotics producers and real depth in mechatronics, sensors and microcontrollers.[32] If the intelligence layer is licensed from outside the Union, that installed base becomes a distribution channel for value captured elsewhere – the outcome Europe already experienced in consumer electronics.

The demand side is equally structural. With a shrinking working-age population and persistent shortages in manufacturing, logistics, construction and care, Physical AI is the most realistic route to maintaining industrial output, and reshoring is arithmetically implausible without it. Reindustrialisation and Physical AI are the same policy.

Security and cybersecurity make this a strategic capability, not only an industrial one. Physical AI is the technology base beneath drones, additive manufacturing, autonomous logistics and robotic systems operating in contested or hazardous environments, and mastery of it is increasingly treated as a matter of national security by Europe's partners as much as its competitors. In July 2026 the United States added advanced robotic devices, including humanoid and quadruped mobile robots, to the list of equipment barred from authorisation on national security grounds, on the basis of a finding that foreign-built systems could present a cybersecurity risk to critical infrastructure – following comparable action on drones and network equipment, and alongside an ongoing Section 232 investigation into imports of robotics and industrial machinery.[33] The reasoning applies with equal force in Europe. A machine that senses, decides and acts inside a plant, a hospital or an energy facility is an attack surface as well as an asset: it carries remote update rights, telemetry leaving the site, and a dependency that cannot be unwound quickly if the supplier relationship changes. Cybersecurity, safety assurance and supply-chain provenance therefore belong in the partnership's mandate from the outset.

Scope must stay single. Value in Physical AI is created at the interfaces – data to model, model to autonomy and control, control to machine, machine to safety case. Splitting one engineering chain across separate programmes creates institutional seams where the technology has none, and Europe ends up funding components while others integrate systems. Integration is where both the margin and the standards sit. The scarce resource in this field is also engineers who work across the full stack, and separate programmes fund separate communities. This single scope is defined by the Physical AI value chain, from data and models to machines deployed with end-users, rather than by digital technologies as a whole.

Hardware requires heavier intervention than software. A Physical AI venture carries inventory, tooling,

[32] European Commission, Apply AI Strategy evidence base on European robotics production and the European service robotics supplier base (see note 11); World Robotics 2025, cited in full at note 6.

[33] US Federal Communications Commission, designation of "advanced robotic devices" – including humanoid and quadruped mobile robots – and solar power inverters on the Covered List, announced 28 July 2026, following a White House task force finding of cybersecurity risk to critical infrastructure; reported by Politico and Agence France-Presse, 28–29 July 2026. See also US Department of Commerce, Bureau of Industry and Security, Section 232 investigation into imports of robotics and industrial machinery, initiated 24 September 2025.

certification, field service and multi-year cycles before first revenue. It reaches profitability later and absorbs far more capital. The instrument must therefore run on hardware timelines: patient capital released against validated milestones, procurement that makes Europe a launch customer for its own innovations, and financing conditions that let European companies scale inside the Union rather than seek capital and cede IP overseas.

> *"Compared with software, hardware companies require larger upfront investments, longer development cycles, and more complex supply chains… To compete, Europe must not only support early-stage innovation but also provide the scale-up capital and market access needed to turn promising hardware companies into global leaders."*
>
> **Bram Verhoef**, Co-founder and VP Customer Engineering & Success, Axelera AI

5.4 Strategic fit, integration and openness

Long-term relevance and strategic fit. Physical AI is not a theme for one programming period. It will shape how Europe manufactures, builds, farms, cares and moves goods for decades, and it sits where the Union's central priorities meet: competitiveness and reindustrialisation, the response to demographic change, and economic security. It is also where Europe's own assets count most – industrial data, a strong machinery and automation base, and a regulatory framework that defines trustworthy AI (Section 4.3). A partnership in this field needs a horizon longer than one funding cycle, as the ASML record shows (Section 4.4).

Integration rather than addition. The partnership would integrate existing efforts rather than add another layer. It would succeed the current AI, Data and Robotics partnership and bring together work now spread across sector partnerships, networks of excellence such as euROBIN and testing infrastructure, around a single value chain. Above all, it would integrate two communities that rarely work together in Europe today: AI companies and robotics companies. The technologies are converging (Section 5.3), yet the companies remain apart. Bringing them together is a leapfrog opportunity: Europe can build the integrated stack before others lock in theirs.

Size, maturity and coherence. Physical AI is the next major shift after generative AI, and it is already part of Europe's strategy: the Apply AI Strategy commits to a Catalyst for European robotics and makes the RSQCs a flagship. The technology is maturing fast, but its market structure is not yet locked in, which is why timing matters. The scope is coherent because it follows one value chain (Section 5.3). Communities of this kind take years to build: the AI, Data and Robotics partnership began only in 2021, and ADRA, its private side, is still a young organisation. A dedicated partnership would build on that investment; folding it into a broader structure would reset it just as it begins to deliver.

Open to trusted partners, sovereign at the core. Sovereignty must be central: the models, the data and the safety-critical layers of European machines should be designed, developed and controlled in Europe. Sovereignty is not autarky, however, and resilience comes from trusted partnerships as much as from domestic capacity. The partnership should therefore make room for cooperation with countries that share European values and trustworthy approaches to AI and robotics – among them Switzerland, South Korea and Japan, all associated with Horizon Europe or in the process of becoming associated – on standards, qualification, data and joint challenges, while keeping control of the critical layers in Europe.

Industry engagement, sector by sector. The partnership should focus on seven fields of application: construction, maritime, healthcare, farming and agriculture, logistics, production, and services. In each, end-users share needs that no single company can meet alone – the same tasks to automate, the same safety cases to make and the same skills to qualify – and can mutualise the cost of meeting them through

shared challenges, test beds, qualification, data and procurement. Annex I shows how consistently those needs recur across sectors; the European Robotics Catalyst gives them a standing place to be pooled (Section 5.6).

5.5 Choosing a partnership of the required scale

The legal form should follow from what the partnership must do, not precede it. What matters is scale commensurate with the opportunity, and the agility to fund, stop and redeploy at the pace of the technology. Four proposed mechanisms also need standing legal personality, cross-border certainty or long-term commitment: a **Neutral Data Escrow** pooling anonymised real-world data from competing stakeholders, which needs a liability and IP framework outlasting one funding cycle; a **blended finance vehicle** investors can contract with; **Robotics Skills Qualification Centres** whose assessments are recognised across borders; and a decade-scale mission to deliver systems that work in unstructured, populated or harsh environments.

An institutionalised partnership under Article 187 provides that legal personality, but experience with existing Joint Undertakings shows the costs: a separate legal structure to set up and run; decisions that need agreement between the Commission and participating Member States; running costs that private members must co-fund; and participation that can depend on national co-funding, which narrows access. A co-programmed partnership is lighter and more open, but cannot by itself hold pooled data, contract with investors or guarantee cross-border recognition. ADRA therefore asks the Commission to choose the form against three tests – scale, agility and openness – and, whichever it chooses, to apply the governance principles in Section 4.5 so that the partnership does not add the administrative burden and slow decision-making it exists to remove.

The consultation asks whether a single Joint Undertaking covering all areas would be effective. For Physical AI, ADRA believes it would not. Where the partnership portfolio is consolidated, consolidation should follow value and supply chains rather than broad technology families. Grouping Physical AI and Robotics into a single structure with all digital technologies would weaken a highly strategic and targeted approach. Its innovation is driven and validated by end-users in operational settings – factories, hospitals, farms, logistics hubs and energy sites – where machines must be integrated into live processes and qualified to work safely in a human-centric way, under the AI Act together with the Machinery Regulation. Within a much broader structure, these priorities would compete with different industrial constituencies and larger budget lines, and the end-user focus on which the European Robotics Catalyst and the Robotics Skills Qualification Centres depend may be diluted. Coordination with chips, connectivity and compute remains essential, and should be secured through shared challenges, roadmaps and the other orchestration mechanisms described in Section 3.4, rather than through a shared legal structure.

5.6 Mandate

- **Real-world data.** Model agreements and clear rules on what companies may share, operationalised through the Neutral Data Escrow: whoever unlocks industrial data at scale first will set the models others build on.
- **Open source, interoperability and modularity.** An open European model for SMEs, integrators and researchers to build on, instead of closed foreign models with remote update rights over critical machinery; common interfaces and data formats; and modular architectures that let specialists sell into systems they did not build and update safety cases without full recertification.
- **The European Robotics Catalyst as demand-side function.** ADRA's end-user-led Catalyst, turning requirements in the seven fields of application (Section 5.4) into the partnership's technical priorities,

supporting the buyers' clubs now forming and identifying first-of-a-kind deployments worth de-risking.

- **Robotics Skills Qualification Centres.** A Union-wide RSQC network with a common methodology: the validation gate that procurers rely on and that investors release capital against. Catalyst, RSQCs and gated investment form one pipeline – demand, validation, capital.
- **Productisation and entrepreneurship.** A track that takes validated results past the demonstrator – hardening, industrial design, manufacturability, certification, first reference deployments – in the evidence-gated tranches of Section 3.1, and a Sovereign Venture Studio function that forms companies and routes founders to investors and first customers.
- **Regulation and standards.** Industry's channel into AI Act implementation and into standards for AI-enabled machinery, which are still being completed although the Machinery Regulation will require third-party assessment of self-learning safety functions from January 2027.[34] China set up a committee for humanoid and embodied-intelligence standards in December 2025;[35] Europe's machinery-safety record and RSQC data give it the base to lead.
- **Long-horizon research with a route to market.** A ring-fenced exploratory line – bio-based and biohybrid, nano-, micro- and soft robotics, novel materials, neuromorphic computing – protected from reallocation, with commercialisation designed in: a named application domain, RSQC qualification and early end-user exposure through the Catalyst.

5.7 Capitalisation

The closest comparator is the Chips partnership: a €4.175 billion EU contribution, close to €11 billion with national and private funds, credited with catalysing more than €43 billion in wider investment.[36] Physical AI reaches a broader set of end-use sectors than semiconductors and should be capitalised at least as ambitiously, drawing on the European Competitiveness Fund and Horizon Europe/FP10 envelopes, paired with a Private Investment Fund on the Scaleup Europe model released against RSQC-validated ventures. For benchmark: China's national AI industry fund, established with RMB 60 billion, made its first embodied-intelligence investment in 2026, and MIIT and SASAC have set a target of more than 10,000 humanoid robots in commercial use by the end of 2026.[37]

Launched now and capitalised at this scale, a Physical AI and Robotics Partnership is the vehicle that lets Europe compete on equal terms within this decade rather than diagnose the same gap again in the next.

6. Conclusion

The instrument of the European Partnership is not the problem; its current operating model is. Partnerships that are systemically oriented towards technology push rather than market pull, that move at the speed of compliance rather than industry, and that coordinate loosely rather than orchestrate a structured value chain will continue to produce excellent research that does not become European leadership. The thread running through all three dimensions – systemic, velocity and relational – and through this response is fragmentation: of funding, of

[34] Regulation (EU) 2023/1230 on machinery, applicable from 20 January 2027, Annex I, Part A, which lists safety components and embedded systems "with fully or partially self-evolving behaviour using machine learning approaches ensuring safety functions" among the products requiring third-party conformity assessment. On the AI Act side, the harmonised standards being drafted by CEN-CENELEC JTC 21 missed their original 2025 delivery deadline.

[35] SESEC (Seconded European Standardization Expert in China), "MIIT Establishes New Technical Committee for Humanoid Robots and Embodied Intelligence," 9 March 2026: the Standardization Technical Committee on Humanoid Robots and Embodied Intelligence (MIIT/TC08) was established on 26 December 2025.

[36] European Commission, press releases and Chips partnership materials on the Chips JU budget and mobilised investment, 2023–2026: a €4.175 billion EU contribution within a combined budget approaching €11 billion, credited with helping catalyse more than €43 billion in wider public and private semiconductor investment.

[37] Press reporting on China's national AI industry investment fund (established with RMB 60 billion) and its first embodied-intelligence investment in 2026, and on the joint directive of the Ministry of Industry and Information Technology and the State-owned Assets Supervision and Administration Commission targeting more than 10,000 humanoid robots in commercial use by end-2026.

procurement, of legal terms, and of the end-user demand that should be one of Europe's biggest competitive advantages. Its most costly consequence is the productisation gap, where European research reaches the demonstrator but not the first customer.

ADRA has developed, and is actively piloting with its members across aerospace and defence, automotive, industrial manufacturing, energy and other sectors, an operating model built specifically to reverse that fragmentation: a pan-European, challenge-based framework in which Europe's best research groups, integrators and end-users compete openly for a shared, concrete strategic objective while collaborating on the pooled resources, shared qualification and common standards that let a breakthrough anywhere in Europe scale everywhere in Europe.

Annex I shows this diagnosis is not theoretical: it is what ADRA's own end-users and practitioners report directly. Section 5 shows it is not ADRA's alone: other voices are converging on the same conclusion in the same year. A dedicated Physical AI and Robotics Partnership, distinct from, and coordinated with, the partnerships covering chips and connectivity, properly capitalised and built to carry results through validation, assurance and productisation to a first customer, is the concrete step that turns this convergence into industrial capability.

We would welcome the opportunity to discuss this model, and the material referenced throughout this response and its annex, with the Commission services preparing the future Single Basic Act and the wider Partnership portfolio.

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ANNEX I

The Complexity of Deploying AI and Robotics for European End-Users

Findings from ADRA's end-user and practitioner consultations on high-impact AI-powered robotics industry pilots.

2
consultation tracks

10
industrial sectors

13
deployment barriers

Annex I: Methodology and the Complexity of Deploying AI and Robotics for European End-Users

Findings from ADRA's End-User and Practitioner Consultations on High-Impact AI-Powered Robotics Industry Pilots, for Europe's Intelligent Robotics Roadmap

Annex I – 1. Introduction and Methodology

ADRA is pursuing a sustained initiative to identify and define high-impact applications of AI-enabled robotics across European industry. These applications are intended to serve as reference use cases – High-Impact AI-Powered Robotics Industry Pilots – for Europe's Intelligent Robotics Roadmap, pinpointing the specific opportunities where advanced automation can deliver substantial, demonstrable benefit.

The initiative has drawn strong industry interest, with participation from leading European companies in sectors from automotive and aerospace to mining and vessel construction. The key deliverables are a clear identification of common challenges and opportunities across these industries, and concrete, actionable recommendations on the pre-competitive capabilities and infrastructure needed to support deployment at scale. The most significant anticipated outcome, described in Annex I Section 6, is the establishment of a Community of Industrial Users of AI-Powered Robotics.

The findings below are grounded in stakeholder interviews and evidence gathered across two parallel consultation tracks, summarised in the table below.

Track	Who was consulted	Format	Purpose
End-User Consultation	Industrial end-users across automotive, aerospace, construction, consumer goods, defence, electronics, equipment manufacturing, medical and pharmaceutical, mining and vessel construction, including BMW, Renault, Valeo, Airbus, Safran, Leonardo, Thales, STMicroelectronics, ABB, Comau, Johnson & Johnson, Roche, Navantia, Bosch, CEA and ArcelorMittal.	Structured workshops, roundtables and one-to-one interviews.	Capture real operational pain points, deployment barriers and procurement preferences, in end-users' own terms.
Practitioner Consultation	The technology providers, system integrators, RTOs and qualification bodies who would have to design, build, certify and support whatever end-users eventually deploy.	A parallel programme of workshops, roundtables and one-to-one interviews.	Test each end-user-reported barrier against what is technically and operationally deliverable today, and identify where pre-competitive infrastructure is genuinely missing.

Running these as two distinct tracks, rather than a single mixed exercise, was deliberate. End-users are the authority on what a barrier feels like in practice; practitioners are the authority on whether it is a genuine technical ceiling or a gap that pre-competitive investment could close within a normal industrial timeframe. Where the two tracks agreed – as they did on nearly every item below – that agreement is itself part of the evidence.[38]

[38] ADRA, "High-Impact AI-Powered Robotics Industry Pilots" consultation material for Europe's Intelligent Robotics Roadmap (internal, 2026).

Annex I – 2. The Thirteen Deployment Challenges

The following challenges recurred, in substantially the same form, across both consultation tracks and across sectors as different as aerospace and mining. Each is presented with the underlying challenge, its practical impact on deployment, and – where directly relevant – a pointer to where ADRA's own strategic work or independent, corroborating evidence already addresses it.

2.1 Reliability and trustworthiness

Current AI and robotics systems often lack the robustness and predictability industry demands. Models may identify correlations without understanding underlying cause and effect, producing spurious decisions in dynamic environments; "black box" systems resist the explainability needed for debugging, trust and regulatory compliance; rare, unforeseen "long-tail" events common in real industrial settings are poorly represented in training data; and industry needs quantifiable performance, safety and uptime guarantees that complex AI and robotic systems struggle to provide. The impact is hesitancy to deploy in mission-critical processes and heavy reliance on manual oversight.

This is not treated as a fixed constraint at the policy level. The ECS 2026's first roundtable was framed explicitly around causality, efficiency and an understanding of the physical world as the basis for a distinctively European AI architecture, positioned as an opportunity rather than a limitation.[39]

2.2 Difficulty with "basic" human tasks

Tasks intuitive for humans remain exceptionally hard for AI and robots: true comprehension of complex instructions or ambiguous situations; advanced inspection for minute or unexpected defects; operating in cluttered, unpredictable, dynamically changing spaces rather than controlled factory settings; and replicating the dexterity of human hands with varied or delicate objects. This limits automation potential across manual, labour-intensive work and forces reliance on highly customised, inflexible solutions.

The Deep Dive identifies this precise shift – AI's frontier moving from language into the physical world – as one of Europe's clearest nextgen AI opportunities, citing early investment momentum behind physical and embodied-learning ventures as evidence that Europe has entered the race for embodied learning systems.[40]

2.3 Managing variability and flexibility

Industry increasingly needs agile manufacturing, but automation is still largely built for mass production. High-mix, low-volume production is difficult to serve cost-effectively; multi-use, easily reprogrammed robots remain rare; and the time needed to program, test and validate a system for a new product or task can be long enough to erase the agility benefit entirely. The result is high setup costs, inflexibility and underused robotic assets. This is precisely the research priority the SRIDA sets out under Next-Generation Smart Embodied Robotic Systems: soft robotics, configurability and lifelong learning.[41]

2.4 Affordability and total cost of ownership

Beyond purchase price, total cost is driven up by a lack of modularity (expensive full-system replacement rather than component upgrades), an absence of standardisation, poor interoperability between vendors' systems, and dependence on a small number of suppliers. This limits adoption, especially for SMEs, and makes a clear return-on-investment case difficult to build. It is also the deployment-side expression of the architectural argument in Section 4.3: modularity is what makes incremental upgrade, and therefore affordable ownership, possible at all.

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[39] ADRA, "European Convergence Summit (ECS) 2026: Economic and Environmental Security through Digital Differentiation," draft agenda (internal, 2026). Cited hereafter as "ECS 2026."

[40] Stefan Leijnen, Deep Dive: Strategic Investing in Europe's Nextgen AI, Invest-NL Deep Tech Fund, June 2026, supported by the European Union under the InvestEU Advisory Hub. Cited hereafter as "the Deep Dive."

[41] Fredrik Heintz, Nabil Belbachir and Edward Curry (eds.), Strategic Research, Innovation, and Deployment Agenda 2025–2027, ADRA, February 2024, Version 1.3. Cited hereafter as "the SRIDA."

2.5 Data challenges: the fuel for AI

Effective AI depends on data, and industry faces governance and security compliance burdens (including under the GDPR); inconsistent formats and protocols that hinder sharing and aggregation; insufficient quantity and quality of labelled, relevant training data; and the underlying difficulty of turning raw data into structured, actionable knowledge. The result is underperforming models and heavy manual effort in data preparation.

This is the still-unfinished agenda behind the SRIDA's Big Ticket #3, An Interoperable and Integrated Framework for Data and Model Ecosystems – the European Common Data Space – which the SRIDA itself notes remains held back by interoperability, trust and governance gaps.[42] It is also the barrier the Neutral Data Escrow proposed in Section 5.5 is designed to remove.

2.6 Supply chain resilience and sovereignty

The AI and robotics supply chain is global and complex. Reliance on non-European sources for critical components such as advanced chips and specialised sensors creates strategic risk; there is a clear desire to build and control key technologies within Europe; common standards could foster a more diverse European supplier base; and localisation could reduce cost and lead times, although it would require substantial upfront investment. The impact is potential disruption and missed European economic growth.

The Deep Dive's "European Champions" analysis – Siemens, SAP, ASML, Bosch, Dassault Systèmes and Philips, among others, increasingly acting as strategic AI co-developers and platform integrators rather than buyers – shows this sovereignty is not aspirational; it is already underway in pockets, but not yet at the scale the end-user consultation calls for.[43] Annex I Section 3 develops this finding in full.

2.7 Absence of global "super-integrators"

The technological complexity of integrating AI, robotics, IoT, data systems and existing infrastructure overwhelms most individual companies, and there are too few entities capable of orchestrating complex, end-to-end solutions. SMEs in particular struggle to navigate the fragmented vendor and technology landscape, leading to piecemeal solutions and integration failures.

This is precisely the gap ADRA's own Super-Integrator proposal was designed to close, and it is notable that industrial end-users identified the same gap independently, from the deployment side, before seeing ADRA's proposed answer to it.[44]

2.8 Preference for European solutions versus market gaps

Many European industries express a strong preference for sourcing AI and robotics solutions from European providers, for reasons of trust, data governance and strategic alignment. A current lack of comprehensive or competitive European offerings in certain areas forces them into significant internal development effort or reliance on non-European vendors instead – duplicating effort, raising internal R&D costs for non-core activities, and slowing innovation cycles. This finding recurred so consistently, and carries such direct implications for how a future Partnership should be designed, that Annex I Section 3 addresses it as a dedicated spotlight.

2.9 SME participation and integration barriers

SMEs generally lack the financial resources, in-house expertise or technical understanding to adopt, integrate or contribute to advanced AI and robotics solutions. This excludes a significant share of the industrial base from the benefits of AI and robotics, widening the productivity gap.

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[42] The SRIDA, cited in full at note 41.

[43] The Deep Dive, cited in full at note 40.

[44] ADRA, AI Super-Integrator: Confronting Crisis and Crafting a New Vision for Pillar II of the European R&I Programmes (published, 2026); see also ADRA, Business Case: ADR-Partnership Phasing Out – From Networking Association to Industrial "Super-Integrator" (internal, 2026). Cited hereafter as "the ADRA Business Case."

The SRIDA already proposes a concrete instrument for exactly this problem: "researchers for loan," giving smaller companies simple, short-term rental access to a pool of EU experts – more economic for a small company than hiring permanent AI specialists it cannot yet justify.[45]

2.10 The need for standardisation and interoperability

The lack of common standards, protocols and interfaces across AI and robotics systems, components and data formats is itself a distinct and recurring barrier – not only an SME issue, since large industrials integrating multi-vendor systems face the same friction. It hinders generalising solutions across applications, increases integration cost and complexity, entrenches vendor lock-in, and slows both market uptake and affordability.

ADRA's proposed Master Collaboration Agreement and interoperable, standard-compliant middleware – the "Lego blocks" approach set out in ADRA's business case – is a direct, already-designed response to this exact barrier.[46]

2.11 Risks in collaborating with innovative start-ups

Start-ups are a key source of innovation, but industry finds it difficult to rely on them for critical solutions because of business-continuity risk, often worsened by a lack of sufficiently patient funding for deep-tech start-ups that need longer development and market-entry timelines. Promising innovations may therefore fail to reach the market or scale, with larger companies defaulting to established, less innovative vendors instead.

Patient capital of this kind is not unprecedented in Europe – the NATO Innovation Fund has deployed more than €1 billion into deep tech across a 15-year horizon designed to give founders patient capital for frontier technologies, according to the Deep Dive – but no equivalent exists yet at civilian scale for industrial AI and robotics.[47]

2.12 Untapped potential in cross-sector collaboration

Significant synergy is missed through insufficient cross-sector collaboration, joint R&D, and shared data infrastructure such as data spaces. Siloed efforts duplicate work and slow progress across the European innovation ecosystem.

The SRIDA names this as its third core mission, in language that could be describing this consultation's own findings: European research activities are fragmented between different communities and remain siloed around disciplines and within Member States, and, in the SRIDA's own words, fragmentation must be addressed.[48]

2.13 Regulatory uncertainty and burden

An evolving and sometimes unclear regulatory landscape creates uncertainty: ambiguity over liability when an AI or robotic system causes harm; the absence of clear, harmonised, efficient certification processes; and the cost and complexity of complying with existing and emerging rules (the AI Act, the Machinery Regulation, cybersecurity legislation), which falls hardest on SMEs. The impact is delayed investment and cautious adoption while companies wait for clarity.

The Commission's own Apply AI Strategy has begun to respond directly, with an AI Act Service Desk offering a compliance checker and an AI Act Explorer – a step in the right direction, though not yet a substitute for the harmonised certification pathway end-users are asking for.[49]

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[45] The SRIDA, cited in full at note 41.

[46] The Catalyst materials, cited in full at note 17; the ADRA Business Case, cited in full at note 15.

[47] The Deep Dive, cited in full at note 40.

[48] The SRIDA, cited in full at note 41.

[49] The Apply AI Strategy, cited in full at note 11.

Annex I – 3. Spotlight: Europe's Unanswered Preference for European Solutions

Of everything the two consultation tracks surfaced, this is the finding with the sharpest implications for policy design. It is not a claim that European end-users are protectionist by instinct. It is a market signal: given a genuinely competitive European alternative, European industrial buyers consistently say they would choose it – for trust, for data governance, and for strategic alignment with their own long-term interests – and just as consistently report that the alternative does not yet exist at the scale, breadth or maturity they need.

KEY FINDING

Given a genuinely competitive European alternative, European industrial buyers consistently say they would choose it … and just as consistently report that the alternative does not yet exist at the scale, breadth or maturity they need.

Evidence gathered since the consultations closed corroborates both halves of this finding. On the demand side, the Deep Dive's review of Europe's "European Champions" shows the appetite is real and already moving: Siemens, with €78.9 billion in fiscal revenue, is positioning itself as an industrial AI leader and developing digital-twin infrastructure with Nvidia; SAP has committed more than €20 billion to sovereign cloud and AI and partnered with Mistral on an enterprise stack; ASML took roughly an 11% stake in Mistral's Series C; and Dassault Systèmes, Bosch and Philips continue embedding AI into design, mobility and clinical workflows. The EU AI Champions Initiative, launched at the 2025 AI Action Summit with more than 60 leading European companies – including Adyen, Airbus, ASML, Deutsche Bank, Mercedes-Benz, Philips, SAP, Siemens, Spotify and Volkswagen – signals the potential for a coordinated corporate AI strategy across the continent.[50]

On the supply side, however, the same report identifies the precise gap the end-user consultation reports feeling directly: European corporates, including their own corporate venture arms, invest substantially less in AI than in non-AI venture deals – whether from underestimating AI's transformative potential, lacking internal capability to evaluate it, or assessing the EU's fragmented, highly regulated market negatively. Industrial end-users are, in effect, telling their own investment arms what they want to buy, and those investment arms are not yet fully listening.[51]

ADRA's own proposed response – a formal buyers'-club mechanism, giving a validated coalition of European end-users the same standing as an individual anchor customer when a Grand Challenge defines its Conditional Commitments, with Commission co-underwriting for the riskiest tranche – is set out in Section 3.1. Based on euRobotics' 2024 Unified Vision[52] for European Robotics, the Vienna statement makes a closely related demand: that Europe's robotics innovators be given "growth capital with a long-term perspective that does not require surrendering IP and relocating value creation overseas," describing this as completing an investment cycle that today leaks value precisely at the moment it should scale.[53] This is elaborated further in Section 5.

The same tension sat at the heart of the ECS 2026 agenda: its second roundtable was framed explicitly around operationalising strategic private procurement to create lead markets for deep tech, and building new "Made in

[50] The Deep Dive, cited in full at note 40.

[51] The Deep Dive, cited in full at note 40.

[52] euRobotics, A Unified Vision for European Robotics: A Strategy for Innovation, Growth and Societal Impact, December 2024.

[53] The 2026 Vienna Statement, cited in full at note 31.

Europe" industries – the policy-level articulation of precisely what this consultation's end-users asked for from the ground up.[54]

Annex I – 4. Corroborating Evidence

The findings above were gathered directly from industry. Since the consultations closed, two further bodies of work have reached closely related conclusions from different starting points: a European policy process, and an investment study by a national promotional institution.

4.1 The European Convergence Summit 2026

The European Convergence Summit (ECS) 2026, themed *AI Dependency, Industrial Sovereignty, and Europe's Physical AI Strategy*, was co-organised by ADRA and MEP Brando Benifei at the European Parliament, convening stakeholders across the EU institutions, research and industry to operationalise the AI Act and blueprint Europe's Physical AI strategy.

Participants and speakers included policy perspectives from MEP Brando Benifei (S&D), ADRA President Emanuela Girardi and Prof. Stefan Leijnen; remarks from Airbus AI Senior Scientist Nicolas Schneider; and keynote contributions from Prof. Fredrik Heintz, ADRA Research Vice-President for AI, presenting on Physical AI as Europe's core competitive niche – the same Fredrik Heintz who led the editorial team behind the SRIDA cited throughout this annex.

The summit outlined a two-pillared strategic posture, balancing commercial frontier-model integration with strictly sovereign, open-stack infrastructure for sensitive domains. Discussions directly addressed the shift beyond commoditised digital LLMs towards real-world embodiment, aligning with the reliability and physical-world understanding challenges set out in Annex I Section 2.1. The focus on federated compute grids, shared teleoperation data, AI Act and Machinery Regulation sandboxes, and procurement "resilience scoring" targets the market-pull weaknesses detailed in Sections 2 and 3 of this response.

4.2 The Invest-NL Deep Dive: Strategic Investing in Europe's Nextgen AI

Published in June 2026 by Invest-NL, the National Promotional Institution of the Netherlands, with support from the European Union under the InvestEU Advisory Hub, the Deep Dive was authored by Stefan Leijnen, ADRA's Industry Vice-President for AI, who also leads the international team at the AI Coalition for the Netherlands (AIC4NL), is professor of the AI research group at Utrecht University of Applied Sciences, and founded the Asimov Institute in 2016.[55]

The report identifies five "nextgen AI" opportunity areas where European companies can build defensible global positions. The second of these – industrial AI and robotics – is the area most directly relevant to this annex: as intelligent devices, sensors and machines generate data faster than humans can produce text, the report argues, AI's frontier is shifting from language into the physical world, and Europe is well positioned to lead this next wave, building on its industrial base and specialised high-quality data in manufacturing, science, mobility and energy.

A further finding bears directly on the challenges in Annex I Section 2. On adoption, European countries are among the global leaders in population-level use of generative AI, according to the Microsoft AI Diffusion Report cited in the Deep Dive – Norway at 48.6%, Ireland at 48.4% and France at 47.8% in the first half of 2026.[56] This measures something different from Eurostat's finding that only 20% of EU enterprises used AI in their operations in 2025:[57] population-level consumer adoption and enterprise-process adoption are not the same metric. But the contrast is

[54] ECS 2026, cited in full at note 39.

[55] The Deep Dive, cited in full at note 40.

[56] Microsoft AI Diffusion Report, cited in the Deep Dive (note 41), Figure 24: AI adoption by country, H1 2026, defining adoption as the share of the working-age population using generative AI.

[57] Eurostat 2025, cited in full at note 12.

itself informative. Europeans use generative AI tools readily as individuals, while European industry has been slower to fold AI into its own operations.

Annex I – 5. Alignment with the ADRA SRIDA 2025–2027

None of the thirteen challenges in Annex I Section 2 were selected to fit ADRA's existing strategic agenda. They were reported independently by industrial end-users and practitioners describing their own deployment experience. That they align so closely with the SRIDA, authored two years earlier by ADRA's own research and academic community, is therefore a form of validation in both directions: bottom-up industrial evidence confirming a top-down expert diagnosis.[58]

This Annex's challenge	Where the SRIDA already sets out the same diagnosis
2.2 Difficulty with "basic" human tasks / 2.3 Managing variability	Big Ticket #4, Next-generation smart embodied robotic systems: soft robotics, autonomy, manipulation, configurability, human-robot interaction, lifelong learning.
2.5 Data challenges	Big Ticket #3, An interoperable and integrated framework for data and model ecosystems: the unfinished agenda of the European Common Data Space.
2.6 Supply chain resilience and sovereignty	Mission 2, Strengthening the leadership of European industries in vision and robotics technologies.
2.9 SME participation barriers	The proposed "researchers for loan" instrument: short-term, rentable access to a pool of EU experts for smaller companies.
2.12 Untapped cross-sector collaboration	Mission 3, Integrating and connecting the European research landscape: research "fragmented between different communities and remaining siloed… Fragmentation must be addressed."

Annex I – 6. Toward a Community of Industrial Users of AI-Powered Robotics

The consultation process itself demonstrated the value of the outcome it points toward. Companies that compete daily – across automotive, aerospace, defence, energy and manufacturing alike – were willing to describe the same deployment barriers, in similar terms, once given a structured, pre-competitive forum in which to do so. A standing Community of Industrial Users of AI-Powered Robotics would make that forum permanent: a mechanism through which end-users continue to define shared, high-impact use cases; practitioners continue to test them against deliverable reality; and the pre-competitive capabilities and infrastructure this annex identifies as missing – shared qualification, standardised interfaces, pooled procurement – actually get built, rather than being rediscovered independently by each company in each Member State.

Annex I – 7. Conclusion

Thirteen distinct barriers, reported independently by end-users and cross-checked by practitioners, converge on a single underlying picture: the technology to close most of these gaps exists or is close to existing, but the market structure to deploy it at European scale does not. Chief among the findings is one with a clear remedy already within reach – European industry wants to buy European, and needs a competitive European offering, backed by pooled demand and patient capital, to make that preference actionable rather than aspirational.

[58] The SRIDA, cited in full at note 41.



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