

Joint Vision Paper for an Artificial Intelligence Public Private Partnership (AI PPP) BDVA - euRobotics

The Vision of the AI Public Private Partnership is to boost European industrial competitiveness and lead the world in developing and deploying value-driven trustworthy AI based on European fundamental rights, principles and values.

Executive Summary

WHAT: The AI PPP will enable the adoption of AI so that it strengthens the European market position across sectors, mobilise industrial investments in AI and is at the forefront of the AI-driven transformation in Europe. The AI PPP will establish a European focal point to connect and coordinate AI, Data and Robotics innovation and research communities in the deployment of AI. It will foster alignment with member states and regions, engage stakeholders, and guide regulation and standards. It will also promote the development of societal trust in AI and the development of AI skills at all levels.

WHO: The two associations Big Data Value Association (BDVA) and European Robotics Association (euRobotics) are committed to jointly shaping, developing and operating the AI PPP.

WHY: BDVA has extensive knowledge and expertise about data-driven AI technologies in research and innovation across many sectors; euRobotics has a strong market position based on physical applications using AI technologies. These complementary strengths will drive impact on business, society and technology.

HOW: The AI PPP will mobilise public and private investments to drive the AI transformation and the adoption of AI technology. Both associations will establish a joint *Partnership Coordination Group* as an interim governance structure to facilitate and accelerate the impact of the partnership; identify challenges and opportunities for the joint AI SRIA (Strategic Research and Innovation Agenda) linking business and technical perspectives and establishing solid bridges to member states and other AI-related communities for its development.

Motivation

To boost value-driven adoption of AI¹ across European industrial sectors, the public sector, and society, Europe needs an ambitious and efficient strategy and mechanism that aligns user value and industrial offerings with research excellence in AI.

The successful implementation of AI will transform a wide range of jobs and impact existing value chains. An AI PPP is needed to bring all relevant stakeholders together to co-develop new AI-driven value chains that are sustainable, efficient, fair and aligned with European fundamental values. These emerging value chains need to integrate the physical and data worlds to improve decision-making and human-interaction competences². Therefore, expertise from both the robotics and the big data community must be brought together in a common partnership to deliver on this vision. For this reason, euRobotics representing the robotics community and BDVA representing the big data community are joining forces to create synergies and break existing silos.

The creation of this new AI PPP provides the focal point for the coordination of all stakeholders in the emerging European AI Ecosystem, encompassing end-users, small, medium and large industrial players, start-ups, research institutes and academia, education and training, policymakers and regulators, entrepreneurs and investors. It will create synergies between different communities to optimise the impact of European investments in AI.

Background

The European Commission's Coordinated Plan on Artificial Intelligence³ calls for the development of an industrially led AI PPP triggered by the Big Data Value Association (BDVA) and the European Robotics Association (euRobotics) through the joint action of their respective cPPPs. In December 2018, at the Vienna ICT Conference, BDVA and euRobotics signed a Memorandum of Understanding and committed to developing a new AI PPP.^{4 5} *The AI PPP recognises that the full value of AI comes when it unifies information and motion, digital and physical, data and robotics.* This vision paper is the first expression of this new AI PPP, an industry-driven partnership between robotics and data⁶.

The partnership is built on two well-established associations representing over 400 European organisations from Industry and Research⁷. Each recognises the mutual value in building a new partnership. Both are industry led and focused on achieving impact in the market, both their scopes cover mutually complementary AI technologies, and both understand the need to stimulate the

¹ The term AI is used in its "macro" context throughout this vision paper and therefore covers data, robotics, learning, etc. and the impact these technologies have.

² For instance, the manufacturing domain, which is an important backbone of the European economy, can be leveraged to create interconnected systems of machines that are enhanced by AI-driven technologies, which are not only used in Europe but all over the world.

³ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic, and Social Committee and the Committee of the Regions - Coordinated Plan on Artificial Intelligence (COM(2018) 795 final), 7th December, 2018.

⁴ Data-Driven Artificial Intelligence For European Economic Competitiveness And Societal Progress, BDVA Position Statement, November 2018.

⁵ euRobotics Vision Paper on AI

⁶ "Artificial Intelligence: Public-Private Partnerships join forces to boost AI progress in Europe"
<https://ec.europa.eu/digital-single-market/en/news/artificial-intelligence-public-private-partnerships-join-forces-boost-ai-progress-europe>

⁷ The combined membership of both associations represent Large Industry, SMEs, Research/Academic and Public and Non-for-profit. BDVA membership comprises of 28% SMEs, 16% Large Enterprise, 50% Research with the remainder public entities or non-profit. euRobotics membership comprises 19% SMEs, 13% Large Enterprises, 62% Research, and 6% associated members, such as regions or non-profit organisations.

uptake of AI across all business sectors and between industries in order to maximise the gain for Europe. The Big Data Value Association (BDVA) promotes the development of the Innovation Ecosystem to enable the data-driven digital transformation in Europe delivering maximum economic and societal benefit, and achieving and sustaining Europe's leadership on Big Data Value creation and Artificial Intelligence. The European Robotics Association (euRobotics) promotes robotics uptake in Europe by joining together industrial and academic organisations and engaging directly with end users in exploring and developing the opportunity robotics brings to industrial and service markets. Both associations understand that each brings the other a significant advantage in terms of impact.

Each association has a cPPP agreement with the European Commission under Horizon 2020 and works with the Commission to define strategy and work programmes, within their respective areas, supported by their individual Strategic Agenda documents. Both have been actively engaged in shaping the strategic discussion around AI in Europe and have identified key challenges for AI. The opportunity to develop a new partnership while continuing to serve their existing members is seen by both associations as an important next step that will accelerate the competitiveness of European industry.

Partnership Impact

For the AI PPP to be successful it must have impact that can be seen and felt within Europe. It must be ambitious and realistic about what is needed to stimulate the uptake of AI and about how and where it can contribute.

The communities represented by BDVA and euRobotics are driving the adoption of AI technology and the partnership has direct access to the key players from these areas. Based on this strong market position it can already consult, collaborate and collate key ideas and objectives in a *common focal point* for Europe, where the partnership's primary strength comes from aligning robotics and data in a single effective operational model, rooted in the exploration of synergies and the creation of joint market impact.

Impact will be built on the significant achievements of the two PPPs in leveraging private investment⁸, their promotion of new businesses and in the high number of successful market innovations delivered by their communities. It also builds on the innovation structures each PPP is currently developing such as the cross-sectorial and sectorial data platforms supporting the emergence of data markets in Big Data, and the Digital Innovation Hub networks in robotics. The partnership provides an opportunity to combine and scale up the impact of these investments to create greater value for European business and society.

The partnership is open and inclusive *and seeks to create a common view* that enables success. The combined experience of the partners reaches into every business sector and every region in Europe, an advantage that will leverage actions to deliver AI at European scale. Achieving this needs more than a strong market and technology position, it needs a skilled workforce and a regulatory landscape that enables markets to develop, it needs strategy and an understanding of best practice, it needs a single body that can consult, cohere and collate the requirements for AI at a European level. This partnership is dedicated to that goal.

⁸ The BDVA leverage ratio for 2017 is **6.95** (with 1,1 B€ mobilised private investments since the launch of the cPPP at the end of 2014) and for the euRobotics PPP (SPARC) it is **3.6**. Full details of the success and impact of the PPPs can be found in their respective Annual Monitoring Reports

https://www.eu-robotics.net/sparc/upload/Monitoring-report-2017-final-SPARC-2018_5v0-with-annexes.pdf
http://www.bdva.eu/sites/default/files/MR2017_BDV_PPP_Main%20Report_September%202018_1.pdf

Economy and Businesses

- **European Leverage:** The AI PPP will foster adoption across a wide range of sectors by enabling the leveraging of the combined resources of its members and their expertise in innovation, markets and technology. By leveraging the impacts and success of the Big Data Value and Robotics PPPs, the AI PPP will increase competitiveness in industrial and business sectors that are critically important for the European Union (e.g. Healthcare, Manufacturing, Logistics, Agri-Food, etc), and will accelerate transformation across sectors of economic and societal relevance for European business and citizens (Energy, Finance, Mobility, Transport, Retail, Security, Education, Media, Public services, Telecommunications, etc).
- **Industrial investments:** Europe does not yet have a level market in AI across all regions and the alignment of European and national policies and regulatory practice will take time and effort to put in place to build a European market in AI. The AI PPP will seek to mobilise investments, both financial and intellectual, by connecting organisations as they define and implement AI-driven research and innovation challenges progressing to market.
- **Lead AI-driven Transformation in Europe** AI will have a transformative impact across a wide range of European economic sectors, the public and society. Today AI is being adopted in niche markets and applications where it is being used to enhance single points in existing value chains. But as part of its long-term vision, the AI PPP will look beyond these first steps to the tipping point where AI starts to transform value chains by creating new opportunities and will develop ways to support the prominence of European players in these emerging value chains. Alongside the progression of technical advances, this requires the creation of new channels of commerce, new business models and new skill sets and job profiles.

Innovation Ecosystem

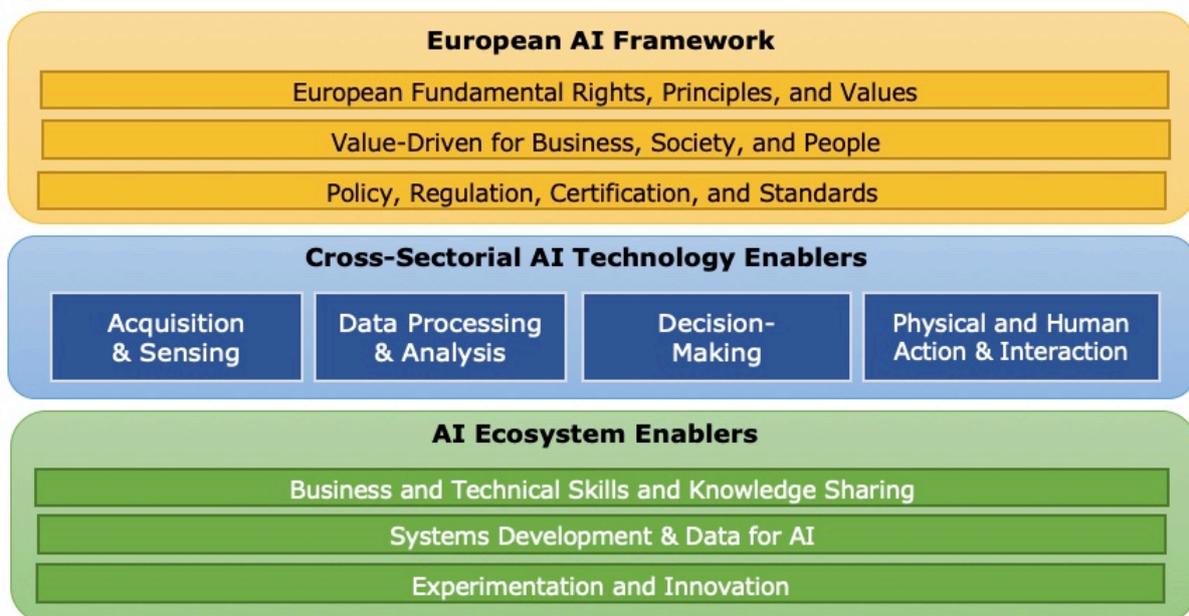
- **A European focal point for exchange and coordination of the AI, Data and Robotics innovation communities:** The AI PPP will first and foremost act as a focus for industry and service stakeholders, including researchers, who seek to access the opportunity offered by applying these new technologies. It will work with them to understand the potential for transformation in each sector and the requirements for skills, standards, finance and the regulatory and technical landscape necessary for success. It will develop support for entrepreneurs accelerating AI into new markets, the translation of research into applications and the demonstration of potential at scale. It will align with existing European initiatives, such as the European On-demand platform, expert networks and other emerging initiatives including start-ups, living labs and incubators.
- **National and regional alignment:** Critical to this ecosystem will be a strong connection between the AI PPP and the networks of Digital Innovation Hubs and comparable national and regional initiatives that will create and develop best practice at a regional level. In this regard strong connections to member states and policy makers at European, national and regional level are essential. Through these connections the partnership will seek to set out European best practice on AI placing emphasis on the effective and appropriate operationalisation of guidelines on privacy, data, ethics and human interaction.
- **Engagement of Stakeholders:** The AI PPP will act as a place for discussion and consensus building. It will provide an industry viewpoint that balances the commercial with the societal, acts as a touchstone for policy makers and develops an industry-led view while guiding and shaping a common AI agenda. The partnership will engage with all concerned stakeholders to communicate, disseminate and broker understanding of the European AI landscape so that each sector and community is informed and aware of the AI potential and of the risks and limitations of current technology. The partnership will work with industry and policymakers to enable a level AI market across Europe by identifying and expressing a European strategic viewpoint on regulation, certification, and standardisation

Society

- **Developing Trust:** Extending the reach of AI to everyone in Europe means that impact, and therefore success, pivots on trust. Trust in the companies that deliver it, trust in technology, trust that data is used safely and responsibly and trust in the organisations that set standards and test products. The AI PPP is dedicated to building this trust and seeking an industrially led approach to developing trust in AI through the application of trustworthy design, validation and certification processes.
- **Skills:** Finally, the partnership will work through its network to ensure that all stakeholders along the value chain, including citizens and users, have the understanding and skills to work with AI enabled systems, in the workplace, in the home and online. Where AI is disruptive the partnership will seek to understand and propagate best practice on collaborative change.

The AI Value Chain

There is widespread acceptance that AI will have a transformative impact on all economic sectors⁹ and on the United Nations' Sustainable Development Goals. AI is a transversal technology that goes across sectors and affects many actors in the “business” value chain. In order to support the adoption of AI within Europe the AI PPP will need to take a holistic perspective on the delivery of AI value that considers the range of challenges that surround AI solutions from business transformation and systems development to legal and ethical issues. The AI PPP will need to engage in shaping the European AI Framework, creating new horizontal AI Technology, and enabling the European AI ecosystem. Within each of these areas the AI PPP will engage in a range of interdisciplinary activities to understand and meet the challenges. These different perspectives frame the conversation, guide the development of the AI SRIA, and support deeper discussion. This brings together the technical and business concerns necessary to deliver AI value.



⁹ G7 2018 Charlevoix “Common Vision for the future of Artificial Intelligence”.

¹⁰ European Council Declaration of Cooperation on AI 10th April 2018

European AI Framework:

- *European Fundamental Rights, Principles, and Values:* All technologies of the AI Value Chain will follow core European rights, principles, and values¹¹, such as respect for human dignity and human rights, freedom, democracy, equality and the rule of law. This European core will serve as high-level requirements for all AI innovations and build trust in AI transformations.
- *Value-Driven for Business, Society, and People:* To foster adoption by a wide range of industries, the public sector, society and citizen, value-driven AI will focus on markets and applications. The value realisation will have a specific focus on the industrial challenges of sectors and domains that are strong in and of importance for Europe.
- *Policy, Regulation, Certification, and Standards:* The AI PPP will contribute to the policy and regulatory debate about the non-technical aspects of AI-driven value creation. By promoting certification and standards in AI, the adoption and scaling of AI technologies will be supported.

Cross-Sectorial AI Technology Enablers:

- *Acquisition & Sensing:* Data acquisition and sensing technologies will provide methods for accessing, converting and aggregating raw data and signals measuring real-world physical parameters into data assets that can be used as input to subsequent analysis steps.
- *Data Processing and Analysis:* Data processing and analysis will make the raw data acquired amenable to use in decision-making. This involves transforming, cleaning, storing, sharing, modelling, synthesising and extracting insights.
- *Decision-Making:* AI-driven applications and activities need access to data, its analysis, and the tools needed to integrate the data analysis within the system or activity. AI usage in business or autonomous decision-making can enhance competitiveness through reduction of costs, increased added value, or other parameters that can be measured against existing performance criteria.
- *Physical and Human Action and Interaction:* The value of AI solutions is greatest where AI-driven insights can be used to assist humans in making complex decisions or where it directs machines to navigate and physically manipulate objects in complex and changing work environments.

AI Ecosystem Enablers:

- *Business and Technical Skills and Knowledge Exchange:* As traditional industry sectors undergo an AI transformation, so too must their workforces. The specialisation required by AI engineers will deepen as the sophistication of leading-edge tools and algorithms increases. The skills for general workers will become broader with increased AI fluency needed including numeracy and statistics. The ability to judge bias in both data and algorithms will necessitate transdisciplinary training for knowledge workers. The delivery of AI skills to SMEs will also be important.
- *Systems Development and Data for AI:* Interdisciplinary approaches which provide strategies, processes and tools for designing and managing complex AI solutions and systems¹². Next-generation AI technology seeks to realise secure and trusted data sharing between diverse participants¹³ so they can exchange and gain access to new and broader data within a clear legal framework. This will be facilitated by data platforms for sharing open data, industrial data

¹¹ High-Level Expert Group on Artificial Intelligence (AI HLEG)
<https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence>

¹² Including Systems of Systems, Systems Engineering, Software Engineering, Knowledge and Data Engineering

¹³ For example industrial consortia sharing private or commercially sensitive data, or the granting of access to personal medical data.

and personal data, giving full control to the data providers and data subjects over their data, ensuring compliance with legal and ethical requirements, and ensuring that full provenance information is maintained.

- *Experimentation and Innovation:* The partnership will stimulate experimentation environments where companies, and more specifically SMEs, can have their AI related services and products quickly piloted and tested, before going to market, for example by using AI Digital Innovation Hubs, where they can access the necessary infrastructure, technical support, skills, data, etc. including incubation and acceleration services, to enable companies to rapidly develop new businesses based on AI technologies, applications and models.

Commitment

The ambition expressed in this vision paper can only be achieved by strong, effective, trusted and agile collaboration between industry, research and policy makers across Europe. BDVA and euRobotics are committed to taking the next steps together; to shape and develop the Strategic Research and Innovation Agenda for Europe, to set up an AI PPP and to make this partnership a common focal point that coordinates support for AI research, stimulates innovation and mobilises public and private funding for AI.

To enact these steps a Partnership Coordination Group linked to the Board of Directors of both BDVA and euRobotics is being created for the purpose of facilitating and accelerating the impact of this collaboration. The Partnership Coordination Group is empowered to hold the scope of the AI partnership, to articulate communication with the European Commission, and to coordinate actions for the AI-PPP SRIA development establishing solid bridges with Member States and other AI-related Communities for the purpose of its development.

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