

General Information	
Preliminary title of the European Partnerships	European Partnership on AI (Artificial Intelligence), data and robotics
Short description of the partnership	This Partnership will help structuring the European AI community, develop a strategic research and innovation agenda and federate efforts around this topic of primal importance for our society and economy.
Services directly involved	DG CONNECT A.1, G.1 <sup>1</sup>
Context and problem definition	<p>AI will disrupt economies and transform organisations and societies, bringing profound positive impacts as well as some challenges. In April 2018, Member States signed a declaration of cooperation on AI to ensure EU's competitiveness in this field. The subsequent Communication on Artificial Intelligence for Europe<sup>2</sup> and the Coordinated Plan<sup>3</sup> also called for a strong and structured cooperation in research, <b><u>joining forces at all levels</u></b>, between the private and the public sector, and with the Commission. The Commission proposed to boost support to AI to reach an overall investment of € 20 bn per year in the next decade.</p> <p>Such level of investment is necessary, given the international landscape<sup>4</sup>, otherwise the EU risks losing out on the opportunities offered by AI, facing a brain-drain and being a consumer of solutions developed elsewhere<sup>5</sup>.</p> <p>It is crucial for Europe to master the technology and its deployment, guaranteeing the respect of European values, as promoted in the April 2019 Communication: “Building Trust in Human-Centric Artificial Intelligence” for an “AI made in Europe”, bringing a competitive advantage for Europe.</p> <p>Europe should build on previous Framework Programme achievements, which resulted in today Europe’ strength: its world-leading AI research community, strong industry and leadership in robotics. This builds in particular on the Public-Private Partnerships in Big Data and Robotics, as well as the “Digitising European Industry” policy initiative.</p> <p>Robotics, including autonomous vehicles, as physical instantiation of AI, is at the core of AI, one of the major strength of Europe to capitalise on.</p> <p>During Horizon 2020, great progress have been achieved in robot safety, perception, intuitive interaction and decisional autonomy; this will have to be further boosted in Horizon Europe, to make robots faster, more efficient, and working for longer periods autonomously, these are pre-condition for large-scale deployment, and human-centric robotics, empowering humans.</p> <p>At the same time, recent developments in AI through machine and deep learning are based on the greater availability of data, of more sophisticated algorithms, and greater computing power.</p> <p>Access to relevant and high-quality data is widely recognised to be one of the crucial elements in building an AI economy in Europe. Building on the great efforts to make industrial and public sector data more accessible during Horizon2020, the access to data will have to scale up in Horizon Europe, address broader set of sectors and drastically increase the quantity of high quality datasets available.</p> <p>The R&amp;I efforts including also access to data need to be reinforced, in</p>

<sup>1</sup> So far, these services have been directly involved, but in the future, this should involve other services in charge of the partnerships for which synergies will be developed.

<sup>2</sup> <https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe>

<sup>3</sup> <https://ec.europa.eu/digital-single-market/en/news/coordinated-plan-artificial-intelligence>

<sup>4</sup> The US government invested almost € 1bn in unclassified AI research in 2016; China is targeting global leadership by 2030 with massive investment (e.g.: € 1.7 bn for an AI technology park in Beijing). Overall, Europe is behind in private investments in AI which totalled around € 2.4-3.2 bn in 2016, compared with € 6.5-9.7 bn in Asia and € 12.1-18.6 bn in North America

<sup>5</sup> 10 imperatives for Europe in the age of AI and automation, McKinsey, 2017

	<p>particular reinforcing scientific cooperation and the development of ecosystems to bring research results to the market. Research has to focus on areas where Europe can make a difference, e.g. efficient support to humans, human centric AI respecting ethics, and security/safety by design principles. Time is of essence, and such partnership is expected to play a major role to guarantee the conditions to compete: the drastic increase of investment, the strong will to collaborate, the priority and political drive from Europe to be leader in human-centric AI and to accelerate the digital/AI transformation of European Industry, the access to resources (expertise, data, tools, infrastructure, deployment channels – via, respectively, the network of excellence centers, the AI-on-demand platform, the data platforms, HPC and AI specific hardware, DIH<sup>6</sup>– developed during Horizon 2020).</p> <p>Horizon Europe has identified AI as one of its main priorities for research, and the Digital Europe Programme will foster AI deployment in priority.</p>
Objectives and expected impacts <sup>7</sup>	<p>The main objectives of the partnership is to boost the development and deployment of AI systems, expected to greatly increase the competitiveness of Europe's industry at global level<sup>8</sup>, but also contribute to solving societal challenges<sup>9,10</sup>: from treating diseases or reducing fatality rates in traffic accidents to fighting climate change or anticipating cybersecurity threats.</p> <p>To develop human-centric AI-based systems which are trustworthy, safe, reliable and efficient, major scientific progress are still needed, requiring:</p> <ul style="list-style-type: none"> <li>- R&amp;I in software (in AI, data analytics, privacy preserving technologies, etc) and in hardware (for safe, efficient and reliable robots);</li> <li>- R&amp;I technologies to access and share data (in quantity, quality, diversity, including privacy by design access and data management);</li> <li>- User-driven validation systems to test the AI in real use-cases and support the take-up of research results</li> <li>- Collaboration mechanisms between the various stakeholders: academia, industry, users, civil society to combat the fragmentation of AI R&amp;I</li> <li>- Inform and demystify AI through dissemination activities to reach out towards the public and all potential users and individuals impacted;</li> <li>- Dissemination towards other relevant communities (e.g.: participation to fairs in application sectors, VC events, etc.).</li> </ul> <p>This can only be achieved by the mobilisation of the community to develop a strategy representative of the various interests, not only the multi-faceted community on the technical side but also addressing the needs from the various application sectors, as well as the non-technological aspects (Ethical, Legal and socio economic - ELSE).</p> <p>The Partnership will be in charge of developing and implementing a Strategic Research and Innovation Agenda (SRIA) maximising the benefits of AI for Europe, including the objectives to be reached by Horizon Europe and the milestones and KPIs<sup>11</sup>.</p> <p>Expected impacts to gradually reach during Horizon Europe:</p> <ul style="list-style-type: none"> <li>- Leveraging <b>investment</b> from industry and Member States, following the</li> </ul>

<sup>6</sup> Digital Innovation Hubs

<sup>7</sup> More specific and detailed objectives, milestones and expected impact, representing the community's views, will be in the SRIA.

<sup>8</sup> AI is expected to add \$15 trillion to the world economy By 2030 - Source: PWC - <https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html>; 70 percent of companies might have adopted at least one type of AI technology - Source: McKinsey - <https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-modeling-the-impact-of-ai-on-the-world-economy>

<sup>9</sup> <https://www.mckinsey.com/featured-insights/artificial-intelligence/applying-artificial-intelligence-for-social-good>.

<sup>10</sup> Using AI to help achieve Sustainable Development Goals (SDG) – Source: UN / McKinsey : [https://www.undp.org/content/undp/en/home/blog/2019/Using\\_AI\\_to\\_help\\_achieve\\_Sustainable\\_Development\\_Goals.html](https://www.undp.org/content/undp/en/home/blog/2019/Using_AI_to_help_achieve_Sustainable_Development_Goals.html) : “160 cases of AI's uses for noncommercial benefit of society [...] touches on all 17 of the UN SDGs”,-

<sup>11</sup> The SRIA defines a broad strategy, not limited to Horizon Europe, and will be developed in synergy with the other PPPs, clarifying the intersections, cooperation, interdependencies, and complementarities, as appropriate.

	<p>target announced in the AI Communication</p> <ul style="list-style-type: none"> <li>- Reaching critical mass to attract <b>investors</b> and foster <b>start-up</b> creation</li> <li>- Fostering long-term Industry-SME/ Industry-Academia <b>collaborations</b></li> <li>- Achieving improved services, processes and products based on <b>trusted, explainable and ethical-by-design AI</b>, providing a competitive advantage for Europe.</li> <li>- Improved access to data, boosting the AI development and deployment</li> <li>- Paving the way to vast AI <b>deployment</b> in all sectors</li> <li>- Making Europe an attractive place for AI <b>talents</b>.</li> </ul> <p>The Partnership will build on the experience of the Horizon 2020 PPPs in Robotics (SPARC) and in Big Data (BDVA – Big Data Value Association). But it will be critical to cover all relevant aspects of AI, ensuring representativeness of all the relevant stakeholders and commitment at the highest level, including from the user industry. At a core of this new partnership, the Commission plans to set up a Leaders' Group on AI, to bring the vision on AI from the major European industry sectors, their commitment to develop and realize the strategy, but also their investment.</p> <p>As compared to the existing cPPPs, the level of ambition is one order of magnitude higher, both in budget<sup>12</sup> and deployment level, given the breadth of the sectors and applications that are increasingly impacted.</p>
Necessity test: rationale for a European Partnership	<p>AI efforts are currently scattered across Europe. A Partnership on AI is necessary to mobilise the communities, identify a common strategy and federate efforts and investments. Joining forces is Europe's only chance to be competitive internationally. The envisaged partnership is expected to create a strong long-lasting network and structure<sup>13</sup>, defining and implement a strategy, rooted in technology providers capacity and user industry needs.</p> <p>This partnership will be articulated around the priorities of the AI communication: capacity and uptake, socio-economic changes, ethical and legal framework, bring on board all the relevant stakeholders from industry, academia, users and representatives of the civil society.</p> <p>This Partnership approach aims to support the implementation of Horizon Europe, while guaranteeing an open and transparent dialogue between the EC and the relevant communities, as demonstrated in Horizon 2020 by both SPARC and BDVA contractual PPPs. Bringing the two partnership under the same umbrella is expected to increase efficiency, given also the substantial increase of the involvement and commitment of end-user industry, deeper engagement with Member States and regional activities (exploiting DIHs networks, some of them specialised in AI and robotics).</p> <p>Some independent report also highlight the key role of such partnership to realise the economic and societal potential of responsible AI in Europe<sup>14</sup>.</p>
Relevant for the following parts of Horizon Europe	<p>Pillar II 'Global Challenges and European Industrial Competitiveness'</p> <p><input checked="" type="checkbox"/> Cluster Digital, Industry and Space</p>
Currently identified links with other partnership candidates / Union programmes	<p>The core activity lies in cluster Digital, Industry and Space, but due to the cross-cutting nature of AI, it is expected to contribute to many other activities of HE. Synergies between SPARC and BDVA will be strengthened and close collaboration with other PPPs or alliances active in the field (ECSEL, HPC, Cybersecurity, IoT and FoF) will be developed and formalised. It will be essential to identify the scope and limit of each Partnership and define boundaries and interaction between them to maximise efficiency of cooperation. This is particularly true for the link with the planned successor of ECSEL and the HPC JUs, focusing on computing infrastructure and next generations of computing. This might</p>

<sup>12</sup> from € 0.9bn/year for the 2 cPPPs – combining private and public funding - to € 20bn/year of cumulated funding in Europe

<sup>13</sup> broader and longer than cooperation within projects, mobilising the community around long-term goals

<sup>14</sup> <https://www.accenture.com/acnmedia/PDF-74/Accenture-Realising-Economic-Societal-Potential-Responsible-Ai-Europe.pdf>

	<p>result in joint programming (e.g. for edge AI, AI-optimised chips). Synergies will have to be developed along 2 axis – to maximise collaborations, complementarities and avoid duplication among PPPs:</p> <ul style="list-style-type: none"> <li>- Along the horizontal axis, synergies between technologies (e.g. between AI, 5G, HPC, cybersecurity, ECSEL, IoT<sup>15</sup>).</li> <li>- Along vertical axes, synergies to guarantee that this technology-driven PPP meets the requirements of the user-driven PPPs, in health, security and disaster prevention, climate &amp; energy, mobility, sustainable agriculture and resources management, space and manufacturing.</li> </ul> <p>The synergies between technology-driven and user-driven PPPs is particularly important, to provide access to the user, and business constituencies and understand their priorities and constraints.</p> <p>Coherence and complementary between SRIA will have to be guaranteed, possibly via overlap in partnerships, and could lead to some joined calls.</p> <p>Initiatives started in Horizon2020 such as the AI-on-Demand Platform, and the networks of DIH will be essential vehicles to transfer results to industry.</p> <p>Synergies with activities in ERC and DEP will be developed, on the one hand to build on foundational scientific progress, and on the other hand to maximise the exploitation of R&amp;I results.</p>
Does the proposed partnership build on currently active ones?	This partnership builds on SPARC (cPPP on Robotics) and BDVA (cPPP on Big Data), established in the context of H2020.
Expected type and composition of partners	<p>Industry, academia, end-users, and civil society. The leaders group on AI will bring the key AI stakeholders and the user industry<sup>16</sup>. It will building on existing cPPP BDVA and SPARC experience, and capitalize on other initiatives such as EurAI, AI4EU, CLAIRE, ELLIS.</p> <p>Good geographical coverage should be an objective and KPI of the cPPP.</p> <p>Public engagement will play an important role for the visibility of the field, demystification of the technology and information of the public about the actual capabilities of AI, and stimulate interest in STEM studies<sup>17</sup>.</p>
Contributions and commitments expected from partners	<p>Besides financial commitment<sup>18</sup>, partners are expected to contribute in providing own resources; in particular access to data from users industry.</p> <p>Commitment to collaboration, between large companies and SMEs, academia-industry, also bringing their own ecosystems for common benefit</p> <p>Commitment to develop and deploy trustworthy AI Made in Europe</p> <p>Commitment to contribute achieving the objectives of the SRIA, and to take an active role to inform the public about AI.</p>
Currently envisaged implementation mode(s).	<input checked="" type="checkbox"/> Co-programmed European Partnership
Justification of the implementation mode	The Co-programmed option is preferred due to the flexibility and simplification required in AI, which also needs to consolidate its constituency. Despite the cooperation with the Member States, it is premature to expect a Joint Undertaking separate legal structure, requiring a more established situation of the research community, the industry, but also of the Member States Strategies in AI, under development or just launched.
Proposed starting year	2020, in order to be in place and provide input to HE from the start.

<sup>15</sup> Some synergies have already been developed, including signature of MoUs between some existing PPPs

<sup>16</sup> It is essential to involve all stakeholders to develop a strategy based on a deep knowledge of the state of the art technology, and addressing the users and industry needs, taking also into account the citizens opinions, expectations, and addressing their concerns.

<sup>17</sup> such as the organisation of the European Robotics week targeted to the public, with more than 1200 events and open labs distributed all over Europe,

<sup>18</sup> as was the case for SPARC for instance, where private partner committed three times the amount of the Union contribution, making it the largest civilian program in robotics worldwide)