

General Information	
Preliminary title of the European Partnerships	Key Digital Technologies (KDT)
Short description of the partnership	Strengthen electronics value chains and integrate them into sectoral applications, enabling EU digital technology sovereignty and exploiting opportunities brought by artificial intelligence and emerging approaches.
Services directly involved	DG CNECT
Context and problem definition	<p>The proposal builds on the experience of the Electronic Components and Systems Joint Undertaking (ECSEL JU). The objectives and scope will be, however, extended and adapted to a new political, industrial and technological reality:</p> <p>Semiconductor components is an important and growing sector (468B\$, 13.7% in 2018) expecting to reach 1T\$ by 2030. Production in Europe is around 10% of the world market, with leading players in equipment and materials, low-power processing and power electronics. For embedded systems, Europe holds specific strengths in safety-critical and real-time systems, with a market share of about 25%. Competition from other regions has stepped up dramatically with 10s of B€ per year being invested by China and other regions in R&I and to acquire foreign technology. Lack of technological autonomy may be a real threat to Europe's potential to innovate and furnish key industries with secure, trusted, low-power solutions on which they depend for their competitive edge.</p> <p>The rapid proliferation of artificial intelligence (AI) is having a major impact on data and its distribution across different computing environments. Distributed intelligence will be the mainstay of the data-driven economy and Europe needs to master the essential hardware, software and systems integration to guarantee privacy, security and integrity of the data, and drive innovation in existing and future market segments.</p> <p>Existing technological paradigms are reaching physical and economic limits, and are being replaced by new ones. In a sector, which already invests around 18% of annual revenues in research and innovation, this is an unprecedented challenge. However, it is also an opportunity for Europe to strengthen its core competences.</p> <p>To maintain a sustained effort to address these challenges, substantial resources (infrastructure, knowledge, innovation) need to be invested by combining public (national and European) and private investments.</p> <p>Application sectors making use of key digital technologies, namely automotive, aerospace, industry, health, computing, communications, energy, etc., will be actively involved in the proposed partnership, as participants in actions that address full value chains covering the supply and demand sides. This will ensure that critical technologies and components can be made available across Europe, while being globally competitive in performance and cost.</p> <p>As acknowledged in the Interim Evaluation Report, the current ECSEL JU has been instrumental in creating a well-structured framework where the Union, Member States, Associated Countries, academia and industry work together to develop and implement a unified EU strategy for Electronics Components and Systems.</p> <p>This enabled support to pilot lines to further mature key digital technologies, which in turn led to substantial downstream investments by industry and Member States through an Integrated Project of Common European Interest (IPCEI) in microelectronics.</p>

Objectives and expected impacts	<p><u>Objectives</u></p> <ul style="list-style-type: none"> ▪ The overarching objective of a future partnership is to reinforce Europe's potential to innovate through robust electronics value chains providing secure and trusted technologies tailored to the needs of user industries. ▪ It will equally contribute to boosting the EU's competitiveness, and technological sovereignty, including that of its industries, by providing essential components and software as well as the related manufacturing infrastructure in Europe. ▪ A future partnership will contribute to and strengthen the European Union's scientific and technological bases by developing key digital technologies, related to computing and sensing systems to address major global challenges in digital communications, mobility, health, security and automation. ▪ Alignment of national strategies on digital technologies into a single EU strategy, with the involvement and financial support of Member States. <p><u>Expected impacts</u></p> <ul style="list-style-type: none"> ▪ The primary expected impact of a future partnership is to maintain and develop the competitiveness of the supply sector in Europe (which includes suppliers of integrated electronics & photonics components, equipment manufacturers, suppliers of materials and software, integrators of components & systems into final products & services). It will be measured in terms of absolute value of EU digital technology supply, its year-to-year growth and market share with respect to major competing regions (US, China, Japan, Korea, Taiwan). ▪ Equally important expected impact is the leveraging effect of key digital technologies in the competitiveness of relevant sectors of the economy (automotive, manufacturing, medical, energy, etc.). All sectors are currently engaged in a process of digital transformation. A successful digitisation will be possible only with access to advanced, low-power, trusted and secure technologies that can be tailored to the needs of user industries is guaranteed. ▪ To date, synergies achieved under current ECSEL JU have reinforced the industrial ecosystems. Synergies continue to grow, enabling an ever-stronger innovation capacity, and demanding collaboration with new communities of actors. This dynamic is expected to further bring together technological communities and promote integral EU digital approaches. ▪ The support to key digital technologies is much needed in order to ensure Europe's industrial future together with reinforcements in cybersecurity, artificial intelligence and high performance computing capacities. ▪ It is also essential to reinforce the future partnership's capacity in testing the developed and matured technologies in relevant contexts. This is expected to happen through reinforced cooperation with other R&I initiatives and other partnerships to develop common/shared test-beds, facilitated by existing and future lighthouse projects. It is envisaged that a future partnership could provide other R&I initiatives and partnerships with fast-track and early access to advanced key digital technologies. Such cooperation will contribute to significantly increase and further the impact of the funded R&D&I for the benefit of the European industry and economy at large. Initial candidates for this type of cooperation will be health, mobility and industrial partnerships. <p>The expected timeframe of a future partnership necessary to achieve its objectives and impacts is very closely connected with the implementation of the digital transformation of Europe. Activities will provide the key digital technologies that will in turn ensure that the benefits of digital transformation accrue to Europe. Therefore, the relevance of a future partnership is to be over the coming decade.</p>
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Necessity test: rationale for a European Partnership	<ul style="list-style-type: none"> ▪ The enabling nature of the technologies, serving a very wide range of applications, can only be addressed in a partnership with a strong governance that includes Member States to align European and national strategies and leverage investment. ▪ The ambition to connect the supply and demand ends of value chains require the setting of large initiatives (pilots, platforms) that combine hardware and software, design and manufacturing and provide the basis for collaborative work. ▪ The scale and increasing intensity of investments in KDTs by the major regions US, China, Korea, Taiwan and Japan, is such that a failure by Europe to align strategies and achieve a critical mass of funding in this research-intensive domain would be detrimental to our positioning in any markets of significance. It will equally undermine further digital innovation in most industrial sectors in Europe.
Relevant for the following parts of Horizon Europe	<p>Pillar II 'Global Challenges and European Industrial Competitiveness'</p> <p><input type="checkbox"/> Cluster Health</p> <p><input type="checkbox"/> Cluster Culture, creativity and inclusive society</p> <p><input type="checkbox"/> Cluster Civil Security for Society</p> <p><input checked="" type="checkbox"/> Cluster Digital, Industry and Space</p> <p><input type="checkbox"/> Cluster Climate, Energy and Mobility</p> <p><input type="checkbox"/> Cluster Food, Bioeconomy Natural Resources, Agriculture and Environment</p> <p><input type="checkbox"/> Cross-cluster</p> <p><input type="checkbox"/> Pillar III 'Innovative Europe'</p>
Currently identified links with other partnership candidates / Union programmes	<p>Reinforced cooperation with other R&I initiatives and partnerships to develop common/shared test-beds. It is envisaged that as part of this cooperation, a future partnership could provide these other R&I initiatives and partnerships with fast-track and early access to advanced key digital technologies leading to faster market uptake.</p> <p>First partnerships candidates for cooperation are Innovative Health Initiative, Clean Aviation, as well as initiatives on connected, automated and electric driving, smart networks and services, etc.</p> <p>Further alignment and coherence with joint initiatives on HPC, AI and Cybersecurity is foreseen as secure, low-power, high-performance components for data-processing becomes a real need and a competitive advantage.</p>
Does the proposed partnership build on currently active ones?	<p>ECSEL JU, launch of last calls 2020</p> <p>Photonics, launch of last calls 2020</p>
Expected type and composition of partners	<p>A future partnership will have as its main constituency the industry associations - representing industry and research and technology organisations across Europe – of the current ECSEL JU. It will also incorporate inter alia the integrated photonics and software technologies industries and research communities. It will also involve and take on board relevant partners from areas such as AI, to facilitate the fast development of key technological elements -- hardware components and software—providing a leading edge to Europe as a supplier of AI solutions.</p>
Contributions and commitments expected from partners	<p>As research is normally executed in consortia by the industry and research partners, it is expected that their contributions are in-kind for the operations of the JU. It could also include a financial contribution to the administrative</p>

	<p>costs of the KDT JU as well as specific support activities (roadmapping, studies, dissemination).</p> <p>Lighthouse projects already in existence in the ECSEL JU are enabling cooperation all along the electronics value chains in industry, mobility and health. Their roles are expected to grow in order to facilitate the uptake of the developed technologies for the benefit of the entire European society and economy. A number of other lighthouse projects already in the pipeline will expand the breadth and impact of a future partnership.</p> <p>The involvement of partners will be through open calls for proposals, which are broadly disseminated at EU and national levels. Calls of the ongoing JU attract over a thousand participants per year, with over 25% of SMEs, and its openness has been highlighted in the mid-term evaluation report.</p>
Currently envisaged implementation mode(s).	<p><input type="checkbox"/> Co-programmed European Partnership</p> <p><input type="checkbox"/> Co-funded European Partnership</p> <p><input checked="" type="checkbox"/> Institutionalised European Partnership</p> <p style="padding-left: 40px;"><input type="checkbox"/> Article 185</p> <p style="padding-left: 40px;"><input checked="" type="checkbox"/> Article 187</p> <p style="padding-left: 40px;"><input type="checkbox"/> EIT-KIC</p>
Justification of the implementation mode	<p>The research and industrial challenges addressed by the ECSEL JU, and for which a stronger partnership is required in the future, cannot be addressed in a light partnership as it needs strong commitments from all involved. The involvement of Member States as funders makes the usage of Art. 187 most suitable. Other envisaged implementation modes currently listed under Horizon Europe do not have the breadth to ensure the much-needed, scope, contributions and impact as described throughout this fiche.</p> <p>An adequate framework is needed to blend various funding streams (e.g. European Structural and Investment Funds, Digital Europe Programme). It will also appropriately build up dedicated technology intelligence (e.g., lighthouse projects). It will equally underpin further innovation in most industrial sectors in Europe, and consequently in associated value chains.</p> <p>The existing ECSEL-JU has <i>inter alia</i> been instrumental in supporting pilot lines to further mature key digital technologies, something which is quite difficult to envisage with a lighter partnership. The synergies that were achieved under ECSEL JU show the potential to reinforce the dynamics in the industry, as well as with and among the participating Member States. However this it is unlikely that this would sustain/ survive without a stable, legal framework, a clear governance and set of rules.</p>
Proposed starting year	2021