



EUROPEAN
COMMISSION

Brussels, 8.2.2022
COM(2022) 46 final

ANNEXES 1 to 3

ANNEXES

to the

PROPOSAL FOR A REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

**establishing a framework of measures for strengthening Europe's semiconductor
ecosystem
(Chips Act)**

ANNEX I

ACTIONS

Technical description of the Initiative: scope of actions

The initial and, where appropriate, subsequent actions of the Initiative shall be implemented in accordance with the following technical description:

1. ***Design capacities for integrated semiconductor technologies***

The Initiative shall build up large-scale innovative design capacities for integrated semiconductor technologies through a virtual platform available across the Union. The platform will consist of new innovative design facilities with extended libraries and tools, integrating a large number of existing and new technologies (including emerging technologies such as integrated photonics, quantum and AI / neuromorphic). In combination with existing EDA design tools, it will allow to design innovative components and new system concepts and demonstrate key functionalities such as new approaches to high performance, low energy, security, new 3D and heterogeneous system architectures, etc.

Working closely with the user industries from a variety of economic sectors, the platform will connect the communities of design houses, IP and tool suppliers, with RTOs to provide virtual prototype solutions based on co-development of technology. Risks and development costs will be shared and new web-based methods of accessing design tools, with flexible cost models (especially for prototyping) and common interface standards will be promoted.

The platform shall be continuously upgraded with new design capabilities as it continuously integrates more and more technologies and designs for low-power processors (including open-source, such as RISC-V). It will offer its services via the cloud, maximising access and openness to the whole community by networking existing and new design centres across the Member States.

2. ***Pilot Lines for preparing for innovative production, and testing and experimentation facilities***

The Initiative shall support pilot lines for production and testing and experimentation facilities bridging the gap from the lab to the fab of advanced semiconductor technologies. Focus areas include:

- (a) Pilot lines to experiment, test, and validate, including through Process Design Kits, the performance of IP blocks, virtual prototypes, new designs and novel integrated heterogeneous systems in an open and accessible way.

The virtual platform above will allow design exploration of new IP blocks and new system concepts to be tested and validated on the pilot lines through early Process Design Kits, providing immediate feedback

to refine and improve the models before transfer to manufacturing. From the start, the Initiative will expand several existing pilot lines, in synergy with the design infrastructure, to enable access for design and (virtual) prototyping projects.

- (b) New pilot lines on semiconductor technologies such as FD-SOI down to 10-7 nm, advanced Gate-All-Around and leading-edge nodes (e.g. below 2 nm), complemented by pilot lines for 3D heterogeneous systems integration and advanced packaging. The pilot lines will be integrating the latest research and innovation activities and their results.

The pilot lines will include a dedicated design infrastructure consisting for example of design models simulating the fabrication process for the design tools used to design circuits and systems-on-chip. This design infrastructure and a user-friendly virtualisation of the pilot lines will be set up that will make them directly accessible throughout Europe via the design platform above. Such link will enable the design community to test and validate technology options before these become commercially available. It will ensure that new chip and system design fully exploit the potential of new technologies and deliver cutting edge innovation.

Together, these pilot lines will advance European IP, skills and innovation in semiconductor manufacturing technology and will reinforce and expand the European position in new manufacturing equipment and materials for advanced semiconductor technology modules, such as e.g. lithography and wafer technologies.

Close concertation and collaboration with industry shall be organised to guide this capacity expansion and the critical inclusion from the start of selected qualified pilot lines involving for example advanced packaging, 3D heterogeneous integration technology and important additional functionalities like e.g., silicon photonics, power electronics, sensing technologies, silicon graphene, quantum technologies, etc. This powerful extended pan-European pilot line infrastructure, intimately connected with the design enablement infrastructure, is fundamental for expanding Europe's knowledge, capacity and capabilities to close the innovation gap from publicly funded research to commercially funded manufacturing, and to increase both demand and manufacturing in Europe by the end of the decade.

3. ***Advanced Technology and Engineering Capacities for quantum chips***

The Initiative shall address the specific needs of the future generation of information processing components exploiting non-classical principles, notably chips exploiting quantum effects (i.e. quantum chips) based on research activities. Focus areas include:

- (a) *Innovative design libraries for quantum chips* building on the design and fabrication processes of the well-established processes of the classical semiconductor industry for semiconductor- and photonics-based qubit platforms; complemented by the development of innovative and advanced design libraries and fabrication processes for

the alternative qubit platforms that are not compatible with semiconductors.

- (b) *Pilot lines* for the integration of quantum circuits and control electronics for building quantum chips building on and capitalising on ongoing research; and, for providing access to dedicated clean rooms and foundries for prototyping and production, reducing the entry-barrier for the development and production of small volumes of quantum components and accelerating the innovation cycles.
- (c) *Testing and experimentation facilities* for testing and validating advanced quantum components produced by the pilot lines, closing the innovation feedback loop between designers, producers and users of quantum components.

4. ***A network of competence centres and skills development***

The Initiative shall support:

- (a) The creation of a network of *competence centres* in each Member State to promote the use of these technologies, acting as interfaces to the above-mentioned advanced design platform and pilot lines, facilitating their effective use, and providing expertise and skills to the stakeholders, including end-user SMEs. Competence centres will provide innovative services to industry, with particular attention to SMEs, academia and public authorities delivering tailored solutions to a wide variety of users that will foster wider uptake of design and advanced technology in Europe. They will also assist in growing a highly skilled work force in Europe.
- (b) On *skills*, specific training actions will be organised around design tools and semiconductor technologies at a local, regional or pan-European level. Scholarships for graduate studies will be supported. These actions will complement industrial commitments under the Pact for Skills, increasing the number of internships and apprenticeships, in collaboration with academia. Attention will also be paid to reskilling and upskilling programs for workers transferring from other sectors.

5. ***‘Chips Fund’ activities for access to capital by start-ups, scale-ups, SMEs and other companies in the semiconductor value chain***

The Initiative shall support the creation of a thriving semiconductor and quantum innovation ecosystem by supporting wide access to venture capital for start-ups, scale-ups and SMEs to grow their business and expand their market presence in a sustainable manner.

ANNEX II

MEASURABLE INDICATORS TO MONITOR THE IMPLEMENTATION AND TO REPORT ON THE PROGRESS OF THE INITIATIVE TOWARDS THE ACHIEVEMENT OF ITS OBJECTIVES

1. The number of legal entities involved (subdivided by size, type and country of establishment) in the actions supported by the Initiative.
2. The number of design tools developed or integrated under the Initiative.
3. The total amount co-invested in design capacities and pilot lines under the Initiative.
4. The number of users or user communities getting access to design capacities and pilot lines under the Initiative.
5. The number of businesses, which have used the services of national competence centres supported by the Initiative.
6. The number of persons who have received training to acquire advanced skills and training on semiconductor and quantum technologies supported by the Initiative.
7. The number of start-ups, scale-ups and SMEs who have received venture capital from the 'Chips Fund' activities and the total amount of capital investments made.
8. The amount of investment by companies operating in the EU, taking into consideration the segment of the value chain in which they operate.

ANNEX III

SYNERGIES WITH UNION PROGRAMMES

1. Synergies of the Initiative with the Specific Objectives 1 to 5 of the **Digital Europe Programme** shall ensure that:
 - (a) The targeted thematic focus of the Initiative on semiconductor and quantum technologies is complementary;
 - (b) Digital Europe Programme specific objectives 1 to 5 support digital capacity building in the advanced digital technologies including **High Performance Computing, Artificial Intelligence**, and **cybersecurity**; and, it also supports advanced digital skills;
 - (c) The Initiative will invest in capacity building to reinforce advanced design, production and systems integration capabilities in cutting-edge and next-generation **semiconductor and quantum technologies** for innovative business development, strengthening Europe's semiconductor supply and value chains, serving key industrial sectors and creating new markets.
2. Synergies with the **Horizon Europe** shall ensure that:
 - (a) although thematic areas addressed by the Initiative and several areas of Horizon Europe converge, the type of actions to be supported, their expected outputs and their intervention logic are different and complementary;
 - (b) Horizon Europe provides extensive support for research, technological development, demonstration, piloting, proof-of-concept, testing and prototyping, including pre-commercial deployment of innovative digital technologies, in particular through:
 - (i) a dedicated budget in the pillar 'Global Challenges and European Industrial Competitiveness' for the cluster 'Digital, Industry and Space' to develop enabling technologies (AI and robotics, Next Generation internet, High Performance Computing and Big Data, key digital technologies (incl. microelectronics), combining digital with other technologies);
 - (ii) support to research infrastructures under the pillar 'Excellent Science';
 - (iii) the integration of digital across all the Global Challenges (health, security, energy and mobility, climate, etc.); and
 - (iv) support for scale-up breakthrough innovations under the pillar 'Innovative Europe' (many of which will combine digital and other technologies).
 - (c) the Initiative is exclusively focusing on building large-scale capacities in semiconductor and quantum technologies across Europe. It will invest in:

- (i) fostering innovation by supporting two closely interlinked technological capacities that enable designing novel system concepts and their testing and validation in pilot lines.
 - (ii) providing targeted support to build training capacity and enhance applied advanced digital competences and skills to support development and deployment of semiconductors by technology development and end-user industries; and
 - (iii) a network of national competence centres, which facilitate access and provide expertise and innovation services to end-user communities and industries, to develop new products and applications and to address market failures.
 - (d) the technology capacities of the Initiative will be made available to the research and innovation community, including for actions supported through Horizon Europe;
 - (e) as the development of novel digital technologies in the area of semiconductors matures through Horizon Europe, those technologies where possible progressively will be taken up and deployed by the Initiative;
 - (f) Horizon Europe programmes for the development of skills and competencies curricula, including those delivered at the co-location centres of the EIT's KICs, are complemented by capacity-building in advanced applied digital skills and competences in semiconductor and quantum technologies supported by the Initiative;
 - (g) strong coordination mechanisms for programming and implementation are put in place, aligning all procedures for both the Horizon Europe Programme and the Initiative to the extent possible. Their governance structures will involve all Commission concerned services.
3. Synergies with Union programmes under shared management, including **the ERDF, ESF+, the European Agricultural Fund for Rural Development and the European Maritime, Fisheries and Aquaculture Fund**, shall ensure the development and strengthening of regional and local innovation ecosystems, industrial transformation, as well as the digital transformation of society and of public administrations. This includes support for the digital transformation of industry and the take-up of results, as well as the rolling out of novel technologies and innovative solutions. The Initiative will complement and support the trans-national networking and mapping of capacities it will support and make them accessible to SMEs and end-user industries in all Union regions.
4. Synergies with the **Connecting Europe Facility** shall ensure that:
- (a) the Initiative focuses on large-scale digital capacity and infrastructure building in the areas of semiconductors aiming at the wide uptake and deployment across Europe of critical existing or tested innovative digital solutions within a Union framework in areas of public interest or market failure. The Initiative is mainly to be implemented through coordinated and strategic investments with Member States, in building digital capacities in semiconductor technologies to be shared across

Europe and in Union-wide actions. This is particularly relevant in electrification and autonomous driving, and should benefit and facilitate the development of more competitive end-use industries, particularly in the mobility and transport sectors;

- (b) the capacities and infrastructures of the Initiative are to be made available to testing of innovative new technologies and solutions that can be taken up in the mobility and transport industries. The Connecting Europe Facility is to support the roll-out and deployment of innovative new technologies and solutions in the field of mobility and transport as well as in other domains;
- (c) coordination mechanisms are to be established, in particular through appropriate governance structures.

5. Synergies with **InvestEU Programme** shall ensure that:

- (a) support through market-based financing, including pursuing policy objectives under the Initiative is provided under Regulation (EU) 2021/523; such market-based financing might be combined with the grant support;
- (b) a blending facility under the InvestEU Fund is supported by financing provided by the Horizon Europe Programme or the Digital Europe Programme in the form of financial instruments within blending operations.

6. Synergies with **Erasmus+** shall ensure that:

- (a) the Initiative supports the development and acquisition of the advanced digital skills needed for the development and deployment of cutting-edge semiconductor technologies in cooperation with relevant industries;
- (b) the advanced skills part of Erasmus+ complements the interventions of the Initiative, addressing the acquisition of skills in all domains and at all levels through mobility experiences.

7. Synergies with other Union programmes and initiatives on competencies and skills shall be ensured.