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PROPOSAL

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To:	Ms Thérèse BLANCHET, Secretary-General of the Council of the European Union
No. Cion doc.:	COM(2026) 965 final
Subject:	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on a framework of measures for strengthening the Union's quantum ecosystem (Quantum Act)

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Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on a framework of measures for strengthening the Union's quantum ecosystem (Quantum Act)

{SEC(2026) 966 final} - {SWD(2026) 965 final} - {SWD(2026) 966 final} - {SWD(2026) 967 final}

(Text with EEA relevance)

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

• Reasons for and objectives of the proposal

Quantum technologies use the principles of quantum mechanics to provide certain capabilities beyond those of conventional technologies or to complement such capabilities. They are generally grouped into three main areas: quantum computing and simulation, quantum communication, and quantum sensing and metrology. Quantum technologies are currently transitioning from primarily research-driven activities to real-world applications and early-stage commercialisation, amid accelerating global competition.

Given the new opportunities that quantum technologies are expected to create in strategic sectors, developing and deploying quantum technologies is essential to strengthen the Union's competitiveness, technological sovereignty and resilience and to reduce critical dependencies. The Draghi report on the future of European competitiveness[1] describes quantum technologies as *'the next trailblazing innovation in the computing field, which could open new opportunities for the EU's industrial competitiveness and technological sovereignty'.*

Quantum technologies also create new security and resilience challenges. A sufficiently capable quantum computer could compromise widely used cryptographic algorithms or systems, with implications for public administrations, critical infrastructures, sensitive governmental communications, digital identities and financial services. At the same time, quantum value chains depend on specialised materials, components, software, equipment and services, some of which are supplied by a limited number of providers.

While the growing scale of international competition reflects the strategic importance of quantum technologies, the coming years will determine whether the Union becomes a quantum industrial power or remains primarily a source of excellent research and technologies commercialised outside of the Union. Announced public quantum funding for up to 2025 is estimated at around EUR 8.6 billion in the Union, compared with EUR 5.3 billion in the US and estimates point at twice as much in China[2]. However, when it comes to private financing, quantum start-ups in the US received around EUR 7 billion in investment in 2025, compared with only EUR 1.1 billion in the Union. Major US technology companies are also investing directly in quantum technologies, while large-scale corporate investment remains much more limited in Europe[3].

The Union has laid strong foundations to position Europe as a leading continent in the development and uptake of quantum technologies, notably through the Quantum Europe strategy[4]. Around one third of the world's quantum companies are based in the Union, and the Union holds strong positions in research, specialised talent, quantum infrastructures and enabling technologies, including in areas such as cryogenics[5] and photonics. However, these strengths have not yet translated into comparable levels of private investment, industrial deployment or market scale.

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1 *The future of European competitiveness. Part A, A competitiveness strategy for Europe* ('the Draghi report'), September 2024, https://data.europa.eu/doi/10.2872/9356120.

2 Public-support estimates are based on announced commitments and are not directly comparable with actual expenditure because scope, periods and instruments differ across jurisdictions.

3 OECD, *An Overview of National Strategies and Policies for Quantum Technologies*, p. 28.

4 Communication from the Commission to the European Parliament and the Council Quantum Europe Strategy: Quantum Europe in a Changing World, COM/2025/363 final.

5 Cryogenics is the science and engineering of very low temperatures. Some quantum devices, such as superconducting quantum processors, need these temperatures to operate.

The Union holds a leading position in quantum research and innovation, but it continues to face structural weaknesses. The impact assessment identifies three key structural problems: (1) the Union struggles to translate scientific results into products and services for market uptake; (2) while the Union has a large and dynamic start-up ecosystem, companies struggle to reach industrial scale, and early demand remains too shallow and fragmented to provide predictable revenue streams or reference customers; (3) the Union relies on concentrated and, in some cases, non-EU sources for specialised components and enabling technologies, with limited visibility of and mitigation measures for these dependencies. The Union therefore needs to accelerate efforts to translate its research strengths into durable industrial and strategic capabilities. Without substantial investment in research and manufacturing capacity, Europe will remain structurally vulnerable.

The Quantum Act, as the first legislative instrument on quantum technologies in Europe, offers the most appropriate response to the issues outlined above. The Act adds value by setting up a comprehensive enabling framework that aligns Union priorities, coordinates action and builds a critical mass that individual Member States cannot achieve alone. By addressing the cross-border nature of these challenges, the Act facilitates access across the Union to capabilities, infrastructure, suppliers, investors and users. It strengthens coordination, ensures continuity from research to deployment, improves the match between supply and demand and helps identify and mitigate critical dependencies. The Act is intended to strengthen the Union's competitiveness and resilience in the global quantum ecosystem.

Against this background, the proposal pursues two mutually reinforcing general objectives:

(1) To **sustain the Union's scientific and technological leadership and strengthen its competitiveness and industrial deployment capacity**. It aims to improve the coordination of research and innovation (R&I) priorities, access to infrastructures, scale-up finance, specialised skills and links with first buyers and users. This would help quantum technologies and companies mature, reach the market and scale up in Europe.

(2) To **improve the Union's resilience, trusted and quantum-safe deployment and economic security in strategically relevant quantum value chains and infrastructures**. The objective is to reduce exposure to critical dependencies, supply disruptions and security risks by improving the visibility of strategic dependencies and chokepoints, supporting diversification, strengthening trusted deployment and enhancing preparedness for the transition to quantum-safe solutions, particularly post-quantum cryptography[6].

Together, these objectives aim to strengthen Europe's competitiveness, technological sovereignty and resilience while maintaining an open and internationally connected quantum ecosystem.

- **Consistency with existing policy provisions in the policy area**

The Quantum Act complements existing Union instruments by providing a common framework to coordinate quantum research, infrastructure and deployment activities. It is a key legislative measure implementing the quantum Europe strategy and is designed to ensure

[6] Commission Recommendation (EU) 2024/1101 on a coordinated implementation roadmap for the transition to post-quantum cryptography; (OJ L, 2024/1101, 12.4.2024, ELI: http://data.europa.eu/eli/reco/2024/1101/oj), NIS Cooperation Group, A Coordinated Implementation Roadmap for the Transition to Post-Quantum Cryptography, June 2025.

consistency with the existing Chips Act[7] and the proposals for the Chips Act 2.0[8] and the Cloud and AI Development Act[9]. While those instruments address semiconductor manufacturing, cloud and AI infrastructure, the Quantum Act focuses on quantum-specific research, industrialisation, deployment and strategic resilience. It promotes synergies and complementarity while avoiding duplication of responsibilities and funding. The Quantum Act will also complement, without duplicating, the actions set out in the proposed European Biotech Act[10], including as regards AI testing environments, data quality accelerators and interoperability.

The procurement provisions of the Quantum Act complement the existing Union public procurement framework under Directives 2014/23/EU, 2014/24/EU and 2014/25/EU, as well as the proposed Public Procurement Act[11] intended to replace them. The sector-specific measures are aligned with the objectives of the general procurement framework, particularly as regards security and resilience, while avoiding unnecessary regulatory duplication. The Quantum Act does not overlap with the proposed European Innovation Act[12] since it does not contain specific provisions on research procurement including pre-commercial procurement. The Quantum Act sets out rules for procurement by Member States, both as regards procurement of quantum technology as well as regarding the post-quantum safety of products with digital elements, while for Union institutions, agencies and bodies the procurement rules are governed exclusively by the Financial Regulation[13]. Nevertheless, the principles of the Quantum Act should also be followed by the Commission when implementing support of quantum measures from the Union budget.

The proposal also provides for an equity investment vehicle for the financial support of sovereign technologies. Existing business-support initiatives, such as the Enterprise Europe

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7 Regulation (EU) 2023/1781 of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem and amending Regulation (EU) 2021/694 ('Chips Act') (OJ L, 2023/1781, 18.9.2023, ELI: http://data.europa.eu/eli/reg/2023/1781/oj).

8 Proposal for a Regulation of the European Parliament and of the Council on a framework of measures for strengthening the Union's semiconductor ecosystem, repealing Regulation (EU) 2023/1781 ('Chips Act 2.0') (COM(2026) 504 final, 3.6.2026, 2026/0139 (COD), available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52026PC0504).

9 Proposal for a Regulation of the European Parliament and of the Council establishing a framework of measures for strengthening Europe's cloud and AI ecosystem ('Cloud and AI Development Act') (COM(2026) 502 final, 3.6.2026, 2026/0138 (COD), available at: EUR-Lex - 52026PC0502 - EN - EUR-Lex).

10 Proposal for a Regulation of the European Parliament and of the Council on establishing a framework of measures for strengthening Union's biotechnology and biomanufacturing sectors particularly in the area of health and amending Regulations (EC) No 178/2002, (EC) No 1394/2007, (EU) No 536/2014, (EU) 2019/6, (EU) 2024/795 and (EU) 2024/1938 (European Biotech Act), COM/2025/1022 final, 16.12.2025, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025PC1022).

11 Proposal for a Regulation of the European Parliament and of the Council on public procurement and concessions, repealing Directives 2014/23/EU, 2014/24/EU and 2014/25/EU, and amending Regulations (EC) No 1370/2007, (EU) 2023/1542, (EU) 2024/1157, (EU) 2024/1252, (EU) 2024/1735, (EU) 2024/1781, (EU) 2024/2847, (EU) 2024/3110 and (EU) 2025/40, and Directives 2008/98/EC, (EU) 2019/882, (EU) 2022/2381, (EU) 2023/1791 and (EU) 2024/1760 ('Public Procurement Act') (COM(2026) 590 final, 9.9.2026, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52026PC0590).

12 Proposal for a Regulation of the European Parliament and the of the Council establishing a framework of measures for strengthening the Union innovation ecosystem and amending Regulation (EU) 2017/1001 (European Innovation Act), COM (2026) 567 final, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52026PC0567).

13 Regulation (EU, Euratom) 2024/2509 of the European Parliament and of the Council of 23 September 2024 on the financial rules applicable to the general budget of the Union (OJ L, 2024/2509, 26.9.2024, ELI: http://data.europa.eu/eli/reg/2024/2509/oj).

Network (EEN)[14], could help connect quantum capabilities with industry by identifying potential use cases and/or signposting SMEs to relevant technical, testing and financing support.

This proposal responds to the risks identified in the economic security risk assessment performed following Commission Recommendation (EU) 2023/2113[15] on critical technology areas for the Union's economic security, which identified quantum technologies as one of the four areas presenting immediate risks to technology security and leakage. It complements the Union's cybersecurity framework by supporting coordinated preparedness for the transition to post-quantum cryptography. It builds on the existing Coordinated Implementation Roadmap for the Transition to Post-Quantum Cryptography, adopted following Commission Recommendation (EU) 2024/1101 and cybersecurity cooperation structures, while avoiding unnecessary duplication of reporting arrangements.

In terms of implementation, the Quantum Act will build on existing implementing bodies and programmes. The EuroHPC Joint Undertaking[16], or its successor, will continue to implement Union-level quantum research, innovation and infrastructure activities falling within its mandate across quantum computing and simulation, communication, sensing and metrology. The proposal complements the adopted Chips Act, and the Chips Act 2.0 proposal. Quantum hardware depends on semiconductor design, fabrication, packaging, materials and pilot-line capabilities. To avoid overlaps, quantum-chip activities within the scope of the Chips Act and the Chips Joint Undertaking[17] remain there. The Chips Joint Undertaking, or its successor, will continue to support quantum-chip design, pilot lines, prototyping, testing and validation.

The EuroHPC Joint Undertaking, or its successor, will have to ensure dedicated governance arrangements reflecting the separate specific needs and independent decision-making between the high-performance computing and quantum areas. A programme Board for quantum with a separate advisory committee and with responsibility to oversee the quantum-specific part of the budget within the Joint Undertaking may be considered.

The Quantum Act is designed in line with Union programmes and financing instruments proposed under the multiannual financial framework (MFF)[18] for the period 2028-2034,

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14 The Enterprise Europe Network is the largest business support in the world for SMEs with international ambitions (https://een.ec.europa.eu/).

15 Commission Recommendation (EU) 2023/2113 of 3 October 2023 on critical technology areas for the EU's economic security for further risk assessment with Member States, OJ L, 2023/2113, ELI: http://data.europa.eu/eli/reco/2023/2113/oj; European Commission and High Representative of the Union for Foreign Affairs and Security Policy, Joint Communication to the European Parliament, the European Council and the Council on "European Economic Security Strategy", JOIN(2023) 20 final, Brussels, 20 June 2023.

16 Council Regulation (EU) 2021/1173 of 13 July 2021 on establishing the European High-Performance Computing Joint Undertaking and repealing Regulation (EU) 2018/1488 (OJ L 256, 19.7.2021, p. 3), OJ L 256, 19.7.2021, pp. 3–51 (ELI: http://data.europa.eu/eli/reg/2021/1173/oj, as amended, most recently, by Council Regulation (EU) 2026/150 of 16 January 2026 amending Regulation (EU) 2021/1173 on establishing the European High-Performance Computing Joint Undertaking (OJ L, 2026/150, 19.1.2026, ELI: http://data.europa.eu/eli/reg/2026/150/oj).

17 Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe and repealing Regulations (EC) No 219/2007, (EU) No 557/2014, (EU) No 558/2014, (EU) No 559/2014, (EU) No 560/2014, (EU) No 561/2014 and (EU) No 642/2014 (OJ L 427, 30.11.2021, p. 17), ELI: http://data.europa.eu/eli/reg/2021/2085/oj, as amended by Council Regulation (EU) 2023/1782 of 25 July 2023 amending Regulation (EU) 2021/2085 establishing the Joint Undertakings under Horizon Europe, as regards the Chips Joint Undertaking (OJ L 229, 18.9.2023, p. 55), ELI: http://data.europa.eu/eli/reg/2023/1782/oj.

18 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, 'A dynamic EU Budget for the priorities of the future – The Multiannual Financial Framework 2028-2034', COM(2025)

including the proposed European Competitiveness Fund (ECF)[19], and the successor to Horizon Europe[20]. The Quantum Act also builds on relevant activities under the digital Europe programme[21], InvestEU[22], the European Innovation Council and the European Investment Bank Group. Funding and investment decisions will remain subject to the applicable programme legislation, financial rules and budgetary procedures. The equity investment vehicle for the financial support of sovereign technologies, including equity and other forms of repayable support, will be implemented in accordance with the legal act governing the instruments and with the applicable financial rules.

- **Consistency with other Union policies**

The Quantum Europe Framework Initiative, laid down in this Regulation, is designed to boost EU's R&I excellence and translate it into industrial deployment and commercialisation. By doing so, it directly supports the Union's competitiveness agenda by creating the conditions under which European scientific excellence can be turned into industrial value, productive investment, high-quality jobs and globally competitive companies. It responds to the competitiveness challenge identified in the Draghi report and reiterated in the Competitiveness Compass[23]. Europe must improve its ability to scale up breakthrough technologies, deepen the Single Market for innovative products and mobilise private capital around strategic capabilities, taking into account research security considerations[24].

The Quantum Europe Framework Initiative should also build on existing transnational research funding initiatives, in particular QuantERA and its successors, to help coordinate national and regional research programmes and joint calls for proposals. The framework should also consider co-funded actions under Horizon Europe, such as Regional Innovation Valleys, coordinating less and more innovative regions to bring research to market via interregional cascade calls in strategic areas, including quantum and photonics.

In addition, the proposal incorporates measures that bolster the Union's preparedness, security and defence objectives, recognising the civilian and dual-use nature of quantum technologies[25]. As outlined in the European Economic Security Strategy, the 2026 FDI

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570 final/2, 16.7.2025; Proposal for a Council Regulation laying down the multiannual financial framework for the years 2028 to 2034, COM(2025) 571 final, 16.7.2025.

19 Proposal for a Regulation of the European Parliament and of the Council on establishing the European Competitiveness Fund ('ECF'), including the specific programme for defence research and innovation activities, repealing Regulations (EU) 2021/522, (EU) 2021/694, (EU) 2021/697, (EU) 2021/783, repealing provisions of Regulations (EU) 2021/696, (EU) 2023/588, and amending Regulation (EU) [EDIP], COM(2025) 555, 16.7.2025.

20 Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 (OJ L 170, 12.5.2021, p. 1 ELI: http://data.europa.eu/eli/reg/2021/695/oj).

21 Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240 (OJ L 166, 11.5.2021, p. 1, ELI: http://data.europa.eu/eli/reg/2021/694/oj).

22 Regulation (EU) 2021/523 of the European Parliament and of the Council of 24 March 2021 establishing the InvestEU Programme and amending Regulation (EU) 2015/1017 (OJ L 107, 26.3.2021, p. 30 ELI: http://data.europa.eu/eli/reg/2021/523/oj).

23 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, A Competitiveness Compass for the EU, COM(2025) 30 final, Brussels, 29.01.2025.

24 Council Recommendation of 23 May 2024 on 'enhancing research security', C/2024/3510, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202403510.

25 For instance, Quantum sensing can support navigation and situational awareness; and future quantum computing may affect cryptography, materials and optimisation.

Regulation[26], the Niinistö report[27] and the White Paper for European Defence[28], quantum technologies have a strategic dimension, mainly as regards their dual-use aspect, including in navigation, cryptography and sensing. Accordingly, the Regulation establishes provisions to boost both research and the transition to post-quantum cryptographic systems, to foster trusted international cooperation, as well as mechanisms to monitor dependencies and critical components in the quantum domain.

The Quantum Act also addresses cohesion objectives by ensuring distributed access to strategic technologies across the Union. Cross-border access, specialisation and distributed user-support capacity are provided through the establishment of first-level access points in each Member State. They are either operated nationally or through a joint arrangement and are called quantum competence and acceleration centres. This network of centres will enable first-level access points within each local quantum ecosystem for technical and business support, advice on applications and use cases, and information on infrastructures or public procurement opportunities, among other things.

In line with the Joint Communication of the Commission and the High Representative setting out 'An International Digital Strategy for the European Union'[29], which aims to promote a high level of security for the Union and its partners, international cooperation in quantum technologies should be consistent with the Union's objectives of technological sovereignty and economic security. Such cooperation should contribute to fostering reliable suppliers of dual-use technologies, advancing common standards and promoting the development and deployment of quantum applications.

Skills and talent development are essential to strengthening the European quantum ecosystem in the broader context of the Union of Skills and the Pact for Skills. The Regulation complements existing Union initiatives in education and training, including the Commission Communications 'The Union of Skills'[30] and 'A STEM Education Strategic Plan: skills for competitiveness and innovation'[31]; research, advanced digital skills and talent mobility by supporting quantum-specific training, upskilling, reskilling and cooperation between academia and industry. These measures aim to attract talent, address skills shortages and facilitate the development, industrialisation and uptake of quantum technologies across the Union.

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26 Regulation (EU) 2026/1386 of the European Parliament and of the Council of 17 June 2026 on the screening of foreign investments in the Union and repealing Regulation (EU) 2019/452, OJ L, 2026/1386, 26.6.2026, ELI: http://data.europa.eu/eli/reg/2026/1386/oj.

27 S. Niinistö, Safer Together – Strengthening Europe's Civilian and Military Preparedness and Readiness, available at: Safer Together – Strengthening Europe's Civilian and Military Preparedness and Readiness | European Commission, 2024.

28 Joint White Paper for European Defence Readiness 2030, JOIN (2025) 120 final.

29 Joint Communication to the European Parliament and the Council, An International Digital Strategy for the European Union, JOIN(2025) 140 final.

30 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, The Union of Skills, COM(2025) 90 final.

31 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, A STEM Education Strategic Plan: skills for competitiveness and innovation, COM(2025) 89 final.

2. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY

• Legal basis

The Quantum Act is an enabling framework supporting the translation of Union's excellence in quantum research and innovation activities across the Union into leadership in quantum science and technology into industrial capabilities and the scale-up and market uptake of innovative quantum technologies and solutions.

Article 173(3) TFEU is the main legal basis, as it allows the Union to support Member State action in pursuing industrial-policy objectives. In particular, this Regulation aims to strengthen the competitiveness, economic security and resilience of the Union's quantum technological and industrial base by reinforcing research, innovation and industrial capacities, reducing strategic dependencies on third countries, and facilitating the development, deployment and commercialisation of quantum technologies based on research results, without entailing the harmonisation of national laws and regulations. To that end, the Regulation establishes the Quantum Europe Framework Initiative to bridge the gap between scientific excellence and industrial exploitation and to coordinate Union and national strategies, programmes and investments, alongside measures to strengthen the security and resilience of quantum supply chains.

Article 114 TFEU provides the legal basis for targeted measures intended to limit fragmentation and improve the functioning of the internal market. In particular, the proposal includes provisions as regards Articles 20, 21, 24 and 25 of this Regulation, concerning the procurement of quantum technologies and post-quantum cryptography solutions, and the coordinated transition to post-quantum cryptography.

• Subsidiarity: necessity of Union Action

The initiative concerns industrial policy, an area in which the Union may support, coordinate or supplement Member State action under Article 6(b) TFEU. To the extent that it includes internal-market measures based on Article 114 TFEU, it would also concern an area of shared competence under Article 4(2)(a) TFEU. The principle of subsidiarity therefore applies. The three structural problems referred to in the introduction have a significant cross-border dimension. Member State action therefore remains necessary but is insufficient on its own to address the scale, cross-border effects and coordination failures identified. Union action is necessary to complement national measures where objectives require critical mass, shared infrastructure, cross-border market formation or aggregated supply-chain visibility.

• Subsidiarity: added value of Union Action

Union action can add value in four main ways. First, ***alignment***: by aligning Union and national priorities to focus resources where European scale is required, while allowing Member States to support areas that reflect their scientific and industrial strengths. Second, ***economies of scale***: by enabling specialisation and shared access to costly infrastructure (e.g. pilot lines, testbeds), especially for start-ups, SMEs and users located in Member States lacking such facilities. Third, ***market leverage***: by coordinating procurement and strengthening links between companies, users and investors, Union action can create stronger demand and give companies a larger home market in which to scale up, while strengthening the Union's collective position[32]. Fourth, ***identifying and managing strategic dependencies***: by aggregating information across companies, infrastructures and Member States, Union

[32] European Investment Bank, , Investment Report 2025/26: Capitalising on Europe's strengths, , pp. 7 and 254.

action can reveal concentration risks and chokepoints that would not be visible from a national perspective and facilitate coordinated diversification.

- **Proportionality**

The preferred option has been designed to limit legal and administrative obligations to what is necessary to achieve the objectives. Under the preferred option, participation by private actors is generally voluntary. Requirements apply mainly to the Commission, Member States and actors seeking designation or receiving specific Union support. Information obligations are targeted, risk-based and proportionate and apply only in clearly defined circumstances. Existing information must be reused wherever lawful and technically possible, using common definitions, interoperable digital formats and once-only reporting to avoid duplication. SMEs should benefit from simplified procedures, technical assistance and proportionate thresholds.

The proposal follows a 'reuse before new capacity' principle. Existing laboratories, testbeds, pilot lines, competence structures and programme bodies will be used first. Upgrades or new specialised capacity should be supported only where mapping demonstrates a relevant gap or unmet demand. This reduces the risk of duplicative investment and technology lock-in in a field characterised by rapid change and competing technological approaches.

The proposal also preserves technology neutrality. It does not select a single quantum computing architecture, communication technology or sensing platform as the Union standard. Quantum grand challenges, infrastructure designations, procurement measures and strategic projects are expected to use transparent criteria, competitive selection and stage gates, helping firms to adapt to technological progress. For security-sensitive applications or dependencies, safeguards on confidentiality, purpose limitation, procedural rights and the protection of commercially sensitive information apply.

The procurement-related measures are limited to what is necessary to address critical dependencies in quantum technologies and ensure quantum preparedness. In particular, the introduction of non-price award criteria is intended to promote innovation, while remaining subject to the applicable Union public procurement rules. The measures do not go beyond what is necessary to achieve the objectives of this Regulation and preserve the discretion of contracting authorities within the applicable legal framework.

- **Choice of the instrument**

A regulation is the most suitable instrument as the proposal sets up a Union-level enabling framework for strategic coordination, designation of European projects and facilities, common governance, monitoring and cross-border implementation, for which directly applicable conditions are necessary.

A regulation is also appropriate because many of the proposal's measures operate through existing Union programmes and bodies and require common procedures, definitions and interfaces across Member States. A directive would risk divergent transposition of designation criteria, governance arrangements and monitoring requirements, thereby undermining the objective of creating a coherent European quantum ecosystem. At the same time, a regulation preserves national discretion over budgetary, programme and procurement decisions where harmonisation is neither necessary nor legally justified.

3. RESULTS OF EX-POST EVALUATIONS, STAKEHOLDER CONSULTATIONS AND IMPACT ASSESSMENTS

- **Stakeholder consultations**

In line with the Better Regulation Guidelines, the Commission carried out a comprehensive stakeholder consultation process to collect reliable information using a range of methods, consulted parties and tools.

The consultation process combined an open call for evidence with targeted evidence-gathering. The English-language call for evidence ran between 29 October and 26 November 2025; translated versions remained open until 17 December 2025. In total, 228 responses were received, comprising 216 portal submissions and 12 additional papers. Respondents included businesses, industry associations, academic and research organisations, the public, civil-society organisations, public authorities, technical networks and other organisations. The open call for evidence was complemented by 32 targeted interviews, an industry survey with 41 responses from organisations in 13 Member States, exchanges with Member State authorities and targeted discussions with stakeholders in the areas of research, infrastructure, cybersecurity, finance and standards. The evidence-gathering process was also informed by exchanges with relevant scientific and technical advisory bodies, including the Top-Level Board on Quantum Technologies[33], the European Quantum Industry Consortium (QuIC), and the advisory structures of the EuroHPC Joint Undertaking, particularly its Quantum Technologies Advisory Group. Of the industry survey responses, 33 – approximately 80% – came from micro, small or medium-sized organisations.

The consultation channels helped identify the three structural problems and the seven problem drivers identified in the impact assessment. Stakeholders repeatedly pointed to fragmented Union and national action, limited continuity between research and industrialisation, growth-stage financing gaps, difficulties in accessing suitable testbeds and pilot lines, skills constraints, weak demand and procurement pathways, incomplete standards and concerns about dependence on non-EU suppliers. They also emphasised that the policy response should avoid unnecessary duplication and should make better use of existing structures.

- **Impact assessment**

In line with the Better Regulation Guidelines, this regulatory proposal is accompanied by a comprehensive impact assessment that analyses the problem and the subproblems related to the need to strengthen the competitiveness of the Union's quantum ecosystem. The impact assessment identifies possible policy options to address the problem drivers and assesses their likely impacts. The impact assessment examined three alternative policy options against the dynamic baseline – i.e. the current situation and its expected evolution if no action were to be undertaken – and the extent to which reach of those policy options would tackle the three problems identified. The three policy options retained were assessed for their effectiveness, efficiency, coherence, subsidiarity, proportionality, legal and operational feasibility, administrative burden and budgetary implications. The second policy option (PO2) was identified as the preferred option as: it provides structured Union–Member State governance and delivery arrangements while relying primarily on existing Union and national implementation bodies. It provides greater continuity and more secure results across research, industrialisation, finance, demand, skills and resilience while limiting obligations to specified actors and activities. It relies on existing implementation structures, allows phased deployment, uses technology-neutral and stage-gated approaches and preserves flexibility in future budgetary decisions.

[33] European Commission, Register of Commission Expert Groups and Other Similar Entities, Group 4007.

The Regulatory Scrutiny Board issued a positive opinion with reservations on 25 September 2026. It asked the lead service to rectify four shortcomings: the assessment of the problem and its drivers; the comprehensiveness of the dynamic baseline, including future technological developments; the detail of the measures, their implementation modalities and synergies; and the analysis of coherence with other actions. It also asked that assumptions that are not self-explanatory be substantiated and that the calculations of costs and cost savings be reported in sufficient detail.

The impact assessment was modified accordingly. The description of the problems, particularly on the position of the Union against its main competitors, the US and China, was improved; as well as the explanation of policy measures, their implementation, synergies and interactions. The description and quantification of the baseline scenario was strengthened, including the interactions of quantum technologies with other technologies, specifically AI. The risk of technological lock-in and the method for choosing among competing technological pathways in quantum grand challenges, strategic projects and infrastructures were also addressed.

- **Regulatory fitness and simplification**

The preferred policy option (PO2) delivers simplification in different ways. The framework will: (i) use common definitions and templates, and digital and interoperable procedures; (ii) reuse existing information; and (iii) use once-only submission wherever legally possible. Reporting will be consolidated and proportionate to the measure, the actor's strategic role, the public support received and the sensitivity of the information. Additionally, the preferred option does not introduce a horizontal mandatory certification regime or general reporting obligation for the wider quantum ecosystem. The proposal is expected to reduce fragmentation costs for companies and public authorities by creating common entry points, access principles and project frameworks. Monitoring will track actual burdens by company size, activity and measure so that templates, thresholds and frequencies can be adjusted if costs exceed expectations.

- **Fundamental rights**

The proposal respects the Charter of Fundamental Rights of the European Union, in particular the freedom of the arts and sciences (Article 13), the freedom to conduct a business (Article 16), the right to property (Article 17), the right to good administration (Article 41) and the right to an effective remedy (Article 47). The framework preserves scientific freedom, relies on transparent and objective criteria for access to support and designation decisions, and respects the applicable safeguards for the protection of confidential information and personal data. It does not set general reporting obligations for quantum undertakings. Any processing of personal data remains subject to applicable Union and national data protection rules.

4. BUDGETARY IMPLICATIONS

The proposal does not create an automatic entitlement to Union funding. The administrative and implementation resources required to operate the framework are analytically distinct from the programme resources that may be mobilised through future Union and national budgetary decisions. Funding decisions will continue to be taken under the applicable programmes and relevant financial instruments.

The central cost model estimates approximately EUR 105.92 million in societal resource costs, expressed in present-value terms for the preferred option over 2028–2037. Most of these costs fall to the public and implementation side, i.e. the Commission and other EU services, Member State authorities, and implementing bodies. Business-facing costs are

concentrated on applicants, beneficiaries and designated strategic projects; they do not apply to the general business population. Evidenced monetised savings under PO2 amount to approximately EUR 13.59 million, comprising savings for Member State authorities, businesses and implementing bodies.

Separately, the impact assessment provides an indicative estimation of financing needs over the coming years of EUR 12.9-18.1 billion in 2028-2034, which may be covered by the Union's budget under the next MFF, Member State financing as well as private financing.

The human-resource implications concern strategic coordination, coordination with Member States and consultation of quantum stakeholders, the designation and review of projects and infrastructures, strategic intelligence and dependency monitoring, oversight of common monitoring, international cooperation and coordination with implementing bodies. The proposal is designed to reuse existing administrative capacity where possible and to phase in implementation in line with available resources and technological maturity. Further details will be set out in the Legislative, Financial and Digital Statement accompanying the proposal.

5. OTHER ELEMENTS

• Implementation plans and monitoring, evaluation and reporting arrangements

The Commission will have overall responsibility for monitoring implementation and its impacts.

The monitoring framework will distinguish direct outputs from results and longer-term impacts. Broader market outcomes will not be attributed solely to the Quantum Act because they will also depend on technological breakthroughs, macroeconomic conditions, national investment, other Union instruments, private investor and buyer responses, and international developments. This distinction is important in a fast-moving sector where quantitative forecasts are subject to significant uncertainty. Monitoring will use a limited set of indicators aligned with the seven operational objectives set out in Article 4, drawing wherever possible on existing monitoring arrangements. These indicators will cover: (i) participation in supported initiatives: (ii) access to and use of quantum infrastructures; (iii) finance mobilised; (iv) innovation procurement and uptake of quantum technologies; (v) skills development; (vi) progress in post-quantum cryptography preparedness; and (vii) risks affecting critical quantum components and supply chains.

The Commission will evaluate the Regulation five years after its entry into force, in accordance with Article 36. The evaluation will draw on monitoring indicators and information provided by the Quantum Strategy Board, Member States and national competent authorities. The Commission will submit a public evaluation report to the European Parliament and the Council.

• Detailed explanation of the specific provisions of the proposal

1. Chapter I – General Provisions

Chapter I lays out the subject matter and objectives of the Regulation and sets out the definitions used throughout the text.

2. Chapter II – Leadership in Quantum

Chapter II ('Leadership in Quantum') encompasses provisions on quantum research excellence and industrialisation and deployment under the umbrella of a Quantum Europe Framework Initiative. The Chapter is composed of Section 1 (Leadership in Quantum Science and Technology) which addresses the aims of sustaining the Union's scientific and

technological leadership, as well as Sections 2 (Quantum infrastructures) and Section 3 (Accelerating industrialisation and deployment of quantum technologies) which address the objectives of strengthening the Union's industrial deployment capacity. Together, the two pillars aim to support the development of quantum technologies across the technology life cycle, from R&I to industrial scale-up and deployment, while strengthening the EU's technological leadership, competitiveness and resilience.

Chapter II sets up the Quantum Europe Framework Initiative as a Union framework (**Article 3**) to steer a common Union-wide strategy for research, innovation and industrialisation in quantum technologies. Member States are required to bring their national quantum strategies into alignment with the priorities and measures set out in that Framework Initiative. The general objective of the Quantum Europe Framework Initiative is to support quantum research and innovation activities to consolidate European excellence across the Union and enable the Union to lead in quantum science and technology and industrial scale-up, and to transform Europe into a quantum industrial powerhouse and a global market leader in quantum technologies (**Article 4**). To achieve this, the Initiative sets out seven operational objectives: (1) to secure the Union's leadership in quantum science and technology; (2) to overcome critical technological and engineering bottlenecks; (3) to build and operate large-scale strategic quantum infrastructures; (4) to bring mature quantum solutions to market; (5) to accelerate the uptake of quantum technologies across the Union; (6) to attract and develop a strong quantum talent base, and (7) to fast-track post-quantum cryptography research, testing and deployment.

Section 1 (Leadership in Quantum Science and Technology) sets out the measures to sustain and advance quantum R&I excellence. To secure the Union's leadership in quantum science and technology, the first objective, a Quantum Excellence Network is established (**Article 5**). This network gathers leading quantum institutes, university laboratories and research organisations to identify and jointly address major scientific challenges, create synergies, facilitate researcher mobility and improve access to essential quantum infrastructure. The Section also sets out quantum grand challenges (**Article 6**), which should be strategic measures for solving major bottlenecks in high-impact quantum technologies. Addressing these challenges jointly reduces overlaps between leading centres and creates the critical mass necessary to overcome such challenges. The next revolutionary quantum solution may be merely a breakthrough away, and it is precisely this outcome that the challenges are intended to achieve. Their implementation will follow a stage-gate review model, allowing them to continue or be halted if the results do not meet the set objectives, thereby avoiding technological lock-in. Lastly, Section 1 states that the Commission will support R&I activities in post-quantum cryptography (**Article 7**), a key field for security and technological sovereignty.

Sections 2 and 3 focus on the deployment and industrialisation of quantum technologies, as they aim to support the transition from research to industrial-scale production and commercialisation.

Section 2 sets out the measures regarding the deployment and improved access to Quantum Infrastructures. It establishes the creation of the European Quantum Service Platform for Science and Industry (**Article 8**), which offers a common interface to quantum computing resources across the Union. This provides and facilitates a single access point for institutions, firms and users. Building on this, the Regulation supports the development and establishment of strategic quantum infrastructures (**Article 9**), which contribute to strengthening European quantum capabilities, industrialisation and deployment of quantum solutions. These infrastructures can be newly established or reuse existing quantum infrastructures. They will be identified according to criteria regarding their strategic relevance and added value to the

Union, current and expected needs of the quantum ecosystem, and potential cross-border use. The Section also lays out how the areas for these infrastructures are to be identified (**Article 10**).

Section 3 lays out the measures for Accelerating industrialisation and deployment of Quantum Technologies. It establishes the basis for the recognition and designation of strategic projects **(Articles 11–13).** These projects contribute directly to operational objective 4 (deploying quantum technologies) by designating projects that contribute to addressing capacity gaps, boosting industrial capabilities, supporting innovation, deployment and market uptake of quantum technologies. They may also contribute to improving the resilience and autonomy of the quantum value chain.

Section 3 sets out measures to support the scale-up of European quantum companies, including the establishment of specialised Quantum Technology and Innovation Hubs (**Article 14**) to facilitate access to infrastructure, testing, talent and skills. These will function as expertise nodes, covering several areas of quantum technology, where preferential access or reduced fees may be provided to small and medium enterprises, start-ups, universities and research organisations active in the quantum ecosystem. **Article 17** requires each Member State to establish at least one Quantum Competence and Acceleration Centre. Centres may also be established jointly with other Member States or partner countries. These centres will serve as a first level access point for companies in the Union. Their geographical distribution contributes to ensuring easy and direct access for local quantum stakeholders to support in identifying applications, obtaining technical and business advice, accessing infrastructures, skills, and to provide information on finance, suppliers and procurement opportunities. When designating such centres, Member States may decide to build them based on existing national, regional or sectoral structures, with the possibility of a structure being designated both a Centre and a Hub. Thus, these two networks work horizontally to spread access to quantum support (Centres) and vertically, providing access to technical insight and resources through the specialised Hubs.

Section 3 enables the designation of European Quantum Regions of Excellence **(Article 15)** to boost the development and visibility of the regions awarded that label. **Article 16** establishes a Network of European Quantum Regions of Excellence, which organises its work autonomously, to encourage coordination, exchange of best practices, and promote synergies, among others.

Quantum technologies are still an emerging market, and Section 3 sets out measures to help them grow and mature. It empowers the Commission to support standardisation, benchmarking and interoperability activities in the field of quantum technologies **(Article 18)**; and it enables the take up of voluntary labelling schemes **(Article 19).** Both actions contribute to a trusted, interoperable and market-ready European quantum-technology ecosystem.

The different measures set up by this Regulation do not operate in isolation but are an integral part of implementing **a life-cycle approach**. For instance, a medical quantum sensor for early diagnosis or patient monitoring in an early research stage could benefit from research cooperation within the Quantum Science and Technology Excellence Network. Once the technology has demonstrated its viability, the developers could receive practical support with technical implementation, prototyping, testing and validation from a Quantum Technology and Innovation Hub, with additional guidance and referrals from a Quantum Competence and Acceleration Centre. Common terminology, measurement methods, benchmarks and test procedures would help to demonstrate that the medical quantum sensor functions reliably and can be deployed in real-world settings. If the technology achieves sufficient industrial maturity, an initiative to scale up its production could qualify as a strategic project, subject to

the applicable designation criteria. To promote early market uptake, procurement of innovation could help ensure that the sensor finds its first use cases in hospitals or the public health sector and that the transition from pilot projects to repeat procurement under applicable procurement rules is successful.

Another key synergic interaction is around the **innovation chain**. Quantum grand challenges support upstream research and engineering to overcome major quantum technological bottlenecks. Quantum infrastructures and projects help bring the most promising results towards validation, scale-up and deployment, through strategic quantum infrastructures (that validate technologies in operational environments, for example Q-MRI[34]) and strategic projects that would address more mature industrialisation and deployment needs of European relevance. Procurement of innovation supports downstream market uptake by using innovation procurement to create lead markets, provide an initial customer base and accelerate the adoption of quantum solutions. For example, a Q-MRI solution validated under a strategic project could later be deployed through using the procurement of innovation instrument for its first operational deployment. In this way, results from quantum grand challenges can feed into strategic projects, and outputs from the latter can be taken up under procurement of innovation, creating a virtuous feedback loop from frontier research to strategic implementation.

Section 4 (**Articles 20 and 21**) introduces procurement-related measures for quantum technologies, public procurement of innovation and specific requirements for the procurement of post-quantum cryptography solutions.

Section 5 sets out the implementation arrangements for the Quantum Europe Framework Initiative (**Article 22**). Implementation will take place through actions under the EuroHPC Joint Undertaking or its successor, in accordance with its legal mandate and the relevant Union programmes and instruments, without affecting the activities entrusted to other competent implementing bodies. **Article 23** allows the Initiative to be supported by an equity investment vehicle for financial support to sovereign technologies, in alignment with relevant programmes. This should complement existing financial instruments such as the European Innovation Council Fund[35] and the Scaleup Europe Fund[36], primarily for companies larger than scale-ups and by investing in large-scale tickets in tech infrastructure. The European Innovation Council Fund can invest up to EUR 30 million per operation and has developed an extensive portfolio of some 35 quantum investments, raising four of the five largest investment rounds in quantum in the EU in 2025 and catalysing rounds representing nearly 45% of all funding raised in the EU in 2025. The recent Scaleup Europe Fund can invest up to EUR 300 million and beyond per operation in technology leading companies including in quantum.

3. Chapter III – Strengthening the Union's Quantum Resilience

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34 Q-MRI (Quantum Magnetic Resonance Imaging) refers to quantum-enhanced medical imaging using quantum sensors to measure magnetic signals at molecular level.

35 Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, and repealing Decision 2013/743/EU (OJ L 167 I, 12.5.2021, p. 1, ELI: http://data.europa.eu/eli/dec/2021/764/oj).

36 Commission Implementing Decision C(2026) 2051 final of 26 March 2026 amending Implementing Decision C(2025) 7410 on the financing of the European Innovation Council component of the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation (2021-2027) and on the adoption of the Work Programme for 2026 as regards the introduction of the contribution of the EIC to Scaleup Europe Fund; Commission Decision C(2026) 5688 final of 3 August 2026 on establishing the Scaleup Europe Fund (SEF) compartment of the European Innovation Council (EIC) Fund.

Chapter III introduces measures to strengthen the Union's preparedness, economic security and resilience in relation to quantum technologies. It comprises measures supporting the transition to post-quantum cryptography and a framework for strategic intelligence, dependency monitoring and the resilience of the Union quantum value chain.

Section 1 introduces measures supporting the coordinated transition to post-quantum cryptography. **Article 24** addresses monitoring and preparedness, **Article 25** supports coordinated implementation and resilience exercises, and **Article 26** concerns standardisation, benchmarking and interoperability. These measures build on existing Union cybersecurity structures and the Coordinated Implementation Roadmap for the Transition to Post-Quantum Cryptography. Specific procurement requirements are addressed separately in **Article 21**.

The **life-cycle approach** also applies to the transition to post-quantum cryptography (PQC). This transition involves identifying cryptographic dependencies and risks, developing and validating interoperable and crypto-agile solutions, integrating PQC requirements into procurement, and progressively migrating existing systems towards quantum-resistant cryptography.

Ensuring the Union's technological sovereignty also requires action concerning dependencies and supply chains. To improve the visibility of the key bottlenecks and dependencies of quantum value chains, **Section 2** sets out a strategic intelligence and dependency monitoring function (**Article 27**) to be carried out by the Commission. This Section also enables critical quantum components to be identified and monitored **(Article 28)**, including related supply-chain and skills risks, and allows for the development of a market-intelligence platform where appropriate. This mapping of capabilities, supply chains, dependencies and vulnerabilities seeks to improve the Union's intelligence in this area, as well as to support early warning, preparedness and risk assessment activities in relation to disruptions affecting the quantum technology sector.

4. Chapter IV – Governance

Chapter IV, **Section 1,** sets up the Quantum Strategy Board **(Articles 29 and 30),** composed of high-level Member States representatives and chaired by the Commission. The Board will advise and assist the Commission on Union quantum policy, support the consistent implementation of the Regulation, facilitate coordination between Union and national quantum policies and promote cooperation and the exchange of information among Member States. In this way it tackles the fundamental issue of fragmentation of efforts and resources across the Union. **Section 2** lays out the Board's role in supporting the Commission on strategic priorities across the quantum ecosystem, including in international cooperation and strategic partnerships **(Article 31).** The Board will advise the Commission on reducing dependencies, addressing shortages and securing critical suppliers through reciprocal cooperation with non-EU countries.

Finally, **Section 3** sets up the European Quantum Alliance (**Article 32**), composed mainly of representatives of the Union quantum industry, as well as other stakeholders. It will serve as a stakeholder consultation mechanism that maintains a regular strategic dialogue with the Quantum Strategy Board and the Commission. This will create a structured channel for the industry, the Board and the Commission to exchange views on geopolitical, technological, market and industrial developments, as well as dependencies, gaps and opportunities across the quantum value chain.

5. Chapter V – Delegation of Power and Committee Procedure

Chapter V sets out the rules and conditions governing the exercise of delegated powers and the committee procedure (**Articles 33 and 34**).

6. Chapter VI – Final Provisions

Lastly, **Chapter VI** (**Articles 35 to 37**) provides for rules for the confidential treatment of information and an evaluation and review of the Regulation five years after its entry into force, in accordance with **Article 37**. For this purpose, the Commission is required to prepare and submit a report to the European Parliament and to the Council.

2026/0365 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on a framework of measures for strengthening the Union's quantum ecosystem (Quantum Act)

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 173(3) and Article 114 thereof in relation to Articles 20, 21, 24 and 25 of this Regulation,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee[37],

Having regard to the opinion of the Committee of the Regions[38],

Acting in accordance with the ordinary legislative procedure,

Whereas:

(1) The Union is committed to become a global leader in quantum technologies. To fully harness the benefits of quantum computing and simulation, communication, sensing and metrology across strategic sectors, the Union should act with ambition and foresight, strengthening its technological sovereignty, competitiveness, and resilience, while advancing its innovation capabilities and security of supply. To that end, it should reinforce its scientific and technological excellence, accelerate the translation of research results into industrial capabilities, support the scaling-up of undertakings, and stimulate demand for quantum technologies while strengthening the Union's preparedness for the transition to post-quantum cryptography.

(2) In accordance with Article 173(3) of the Treaty on the Functioning of the European Union (TFEU), it is necessary to adopt measures to build capacity and strengthen the quantum ecosystem of the Union, without entailing the harmonisation of national laws and regulations. The Union should reinforce the competitiveness, economic security and resilience of its quantum technological and industrial base, whilst strengthening the research, innovation and industrial capabilities of its quantum ecosystem, reducing strategic dependencies on third countries, and increasing its capacity to develop, deploy and commercialise quantum technologies. In accordance with Article 173(3) TFEU, it is necessary to adopt measures to build capacity and help strengthen the quantum ecosystem of the Union, without entailing the harmonisation of national laws and regulations. In particular, to support those aims and bridge the gap between (i) the Union’s scientific and technological excellence and innovation capabilities and (ii)

[37] OJ C , , p. .
[38] OJ C , , p. .

their industrial exploitation, it is necessary to establish a common Union Framework Initiative for Quantum Research, Innovation and Industrialisation ('Quantum Europe Framework Initiative'). The Quantum Europe Framework Initiative should provide a common framework for coordination between Union and national strategies, programmes and investments around shared strategic priorities. Moreover, the framework for strengthening the security and resilience of quantum supply chains referred to in this Regulation, should contribute to reinforcing the competitiveness and economic security of the Union's quantum technological and industrial base.

(3) Article 114 TFEU provides an appropriate legal basis for (i) the adoption of common procurement requirements for quantum technologies and post-quantum cryptography solutions, and (ii) for coordinated monitoring and precautionary measures aimed at preventing fragmentation of the internal market. Article 114 TFEU is also an appropriate legal basis for the adoption of rules on interoperability and labelling, insofar as such rules help improve the functioning of the internal market. The associated governance and cooperation arrangements support the uniform implementation of such measures across the Union.

(4) Quantum technologies and devices offer significant potential across a wide range of civilian applications, including civil security, and are relevant to national security and defence, and to preserve international security. As recognised in the EU Defence Industry Transformation Roadmap[39], quantum is a key emerging technology for defence capabilities. The security and defence ecosystem should be able to access trusted Union infrastructures and tap into civil research advances where large investments are made into quantum technologies. In particular, quantum-enabled sensing, secure communications and cryptographic resilience can strengthen situational awareness, maritime domain awareness and the protection of critical infrastructure in the Union, including in its eastern border regions through synergies with initiatives such as the Black Sea Maritime Security flagship initiative. The strategic importance of quantum technologies and devices is further underlined by the inclusion of certain quantum technologies within the common minimum scope of foreign investment screening under Article 4(15), point (c) of Regulation (EU) 2026/1386, and by the export controls applicable to certain quantum-related dual-use items listed in Annex I to Regulation (EU) 2021/821[40]. This Regulation should apply to quantum technologies with both civilian and military applications, while excluding quantum systems specifically designed and intended exclusively for military or defence purposes. This is without prejudice to applicable Union rules on export controls and foreign investment screening. That exclusion should apply regardless of whether a public authority or a private contractor develops or uses the technology. At the same time, research and innovation activities under this Regulation should also benefit the security and defence sectors, without prejudice to the rules and requirements applicable under Union programmes and instruments supporting the defence industry, and in a manner complementary to and consistent with them. Synergies should be promoted with relevant Union initiatives in the field of civil security, in accordance with applicable Union law and with full respect for fundamental rights.

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39 Communication from the Commission to the European Parliament and the Council, 'EU Defence Industry Transformation Roadmap: Unleashing Disruptive Innovation for Defence Readiness', COM(2025) 845 final, 19 November 2025.

40 Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items (OJ L, 2021/821, 11.6.2021, ELI: http://data.europa.eu/eli/reg/2021/821/oj).

(5) Quantum technologies may contribute to more secure communications, enhanced sensing and detection capabilities, and improved analytical and operational tools for law enforcement and other competent public authorities. Synergies should be promoted with relevant Union initiatives in the field of civil security, in accordance with applicable Union law and with full respect for fundamental rights.

(6) While bringing potential benefits to different areas of society, quantum technologies can also allow the breaking of currently widely deployed cryptographic schemes. It is essential for the Union to anticipate evolving threats to cryptographic systems and to ensure the resilience of technologies designed to withstand quantum-enabled attacks, including risks emerging from advances in frontier artificial intelligence. The ProtectEU Internal Security Strategy[41] recognises the transition to post-quantum cryptography as a strategic priority for strengthening the Union's internal security preparedness. In line with these strategies, the timely development and deployment of post-quantum cryptography should contribute to strengthening the security and resilience of communication systems, digital services and critical infrastructure, while protecting the information exchange and sensitive data of public authorities against emerging quantum-enabled threats. Synergies should also be promoted between post-quantum cryptography and quantum communication infrastructures, as well as between post-quantum cryptography and relevant Union initiatives in the field of internal security, while ensuring complementarity with actions in the field of defence and full respect for fundamental rights.

(7) While Member States have developed substantial quantum research and innovation activities, such national efforts cannot provide a comprehensive approach to ensure the scale, continuity and coordination required to compete internationally in the quantum area. Fragmented priorities, uneven access to infrastructures and insufficient links between research, industrial development and market demand limit the ability of the Union to translate its existing scientific excellence into industrial leadership. The Quantum Europe Framework Initiative should therefore provide a common framework for coordinating Union and national actions and, under that framework, aligning priorities and capabilities across the quantum technology lifecycle. The Quantum Europe Framework Initiative should promote capacity building across the quantum technology lifecycle[4], from research and technological development to industrialisation. Without establishing any funding programme, it should build on existing programmes, or where applicable, their successors, and implementing bodies, to create the conditions necessary to build the critical mass needed for large-scale technological and industrial development.

(8) To strengthen scientific excellence and strategic cooperation, and to address the absence of a stable Union mechanism for sustaining scientific cooperation around common quantum priorities across Member States, a Union-wide quantum science and technology excellence network (‘quantum excellence network’) should be established. It should bring together leading national quantum institutes and centres of excellence, including universities, research laboratories and research and technology organisations and foster sustained cooperation, researcher mobility, communication, and outreach, while providing access to enabling infrastructure. In terms of organisation of work, the quantum excellence network should have flexibility in establishing its own working arrangements. The quantum excellence network should be supported for Union

[41] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, ProtectEU: a European Internal Security Strategy, COM (2025) 148 final, 1 April 2025.

funding by the EuroHPC Joint Undertaking, subject to applicable funding decisions and should be selected through an open call for applications.

(9) To strengthen the Union's industrial competitiveness in quantum technologies, quantum grand challenges should be introduced under the Quantum Europe Framework Initiative. Those quantum grand challenges should bring together relevant stakeholders from the public and private research and industrial sectors to address major technological and engineering bottlenecks in the further development of quantum technologies. Indicative priority areas identified in an Annex to this Regulation should guide those actions. The implementation and financing of quantum grand challenges should remain subject to the applicable Union programme rules. Where appropriate, quantum grand challenges should also encourage the development and reuse of interoperable open-source quantum software and tools, while respecting intellectual property rights and security requirements.

(10) To ensure transparency, quantum grand challenges should be implemented through open, transparent and competitive procedures under the applicable Union programme. Each grand challenge should be based on milestone-based funding and on a technology roadmap setting out clearly measurable objectives and milestones. An independent expert peer review should assess progress in accordance with the applicable programme procedures and against the predefined milestones and provide recommendations on continuation, redirection or termination. The Commission and the Governing Board of the EuroHPC Joint Undertaking established by Council Regulation (EU) 2021/1173, or its successor, should ensure that the quantum grand challenges are coordinated with relevant Union programmes and initiatives, including Horizon Europe – the Framework Programme for Research and Innovation, the European Competitiveness Fund[42], the InvestEU Programme[43], the Scaleup Europe Fund, the European Innovation Council Fund[44], the Digital Europe Programme[45], the European Defence Fund[46], and the Union Space Programme[47] or, where applicable, with their successors. Additionally, with a view to leveraging existing capabilities and avoiding duplication of efforts, quantum grand challenges should build on grand challenges established pursuant to Regulation (EU) 2026/XXX [insert reference to Chips Act 2.0 once adopted], to Regulation (EU) 202X/XXXX [insert reference to the Cloud and AI Development Act (CADA) once adopted], and priority challenges established under the Council Recommendation on Advanced materials [insert reference to COM(2026) 833 final once adopted].

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42 Proposal for a Regulation of the European Parliament and of the Council (COM(2025) 555 final/2).

43 Regulation (EU) 2021/523 of the European Parliament and of the Council of 24 March 2021 establishing the InvestEU Programme and amending Regulation (EU) 2015/1017 (OJ L 107, 26.3.2021, p. 30, ELI: http://data.europa.eu/eli/reg/2021/523/oj).

44 Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, and repealing Decision 2013/743/EU (OJ L 167 I, 12.5.2021, p. 1, ELI: http://data.europa.eu/eli/dec/2021/764/oj).

45 Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240 (OJ L 166, 11.5.2021, p. 1, ELI: http://data.europa.eu/eli/reg/2021/694/oj).

46 Regulation (EU) 2021/697 of the European Parliament and of the Council of 29 April 2021 establishing the European Defence Fund and repealing Regulation (EU) 2018/1092 (OJ L 170, 12.5.2021, pp.149-1477, ELI: http://data.europa.eu/eli/reg/2021/697/oj).

47 Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU (OJ L 170, 12.5.2021, p. 69, ELI: http://data.europa.eu/eli/reg/2021/696/oj).

(11) The transition to post-quantum cryptography requires continued Union research and innovation in secure cryptographic algorithms, implementations, as well as testing and validation. To that effect, Union support should strengthen Union capabilities, promote cryptographic agility and facilitate the development of trustworthy solutions. For that purpose of such support, priority areas should be identified in an Annex to this Regulation.

(12) Quantum computers are essential tools for developing, testing and validating scientific, public-sector and industrial applications. Therefore, a European Quantum Service Platform for Science and Industry (the 'Quantum Platform') should be established to contribute to and help foster a "think quantum" approach across the Union, enabling researchers, businesses, developers and public-sector users to explore the potential of quantum computing in their respective areas of activity, and to develop the skills and capabilities necessary for the future adoption of quantum technologies. To that end, the Quantum Platform should provide a common interface to the Union's quantum computing infrastructure and dedicated software tools and services, building in particular on the infrastructure made available through the EuroHPC Joint Undertaking. Access to EuroHPC quantum computing resources should remain subject to the applicable access conditions and allocation procedures of the EuroHPC Joint Undertaking. The Quantum Platform should complement existing infrastructures and services and be capable of evolving so as to accommodate additional quantum computing services. Specifically, the Quantum Platform could gradually facilitate access to other quantum infrastructures and services, including quantum communication networks, future quantum internet services, and quantum sensing and metrology facilities, in cooperation with the relevant infrastructure operators.

(13) To promote the testing, validation, deployment and use of quantum technologies in the Union, support should be provided for the establishment, development, operation and, where relevant, expansion of strategic quantum infrastructures. Such infrastructures have the potential to strengthen the Union's scientific and technological capabilities, industrial competitiveness and technological sovereignty by providing capacities that cannot efficiently be developed or maintained by individual actors or Member States. They could generate significant Union added value through cross-border use, shared access and complementarities between existing capacities. The implementation of Union-supported strategic quantum infrastructures should take place through open, transparent and competitive procedures in accordance with the rules applicable to the relevant Union programmes and funding instruments. The identification of areas for the deployment of strategic quantum infrastructures should take into account emerging scientific and technological needs, developments across the quantum value chain and the Union quantum ecosystem. An indicative list of priority technological areas for the establishment of strategic quantum infrastructures should be established in an Annex to this Regulation. Finally, to ensure the protection of the Union's strategic interests, security, defence and technological autonomy, access to strategic quantum infrastructures should be restricted to Member States and third countries associated with the relevant Union programme, provided that such third countries are also members of the EuroHPC Joint Undertaking, where the activities concerned fall within its remit. Access should be provided on open, transparent and non-discriminatory terms.

(14) In June 2019, Member States signed the European Quantum Communication Infrastructure (EuroQCI) Declaration[48], agreeing to work together with the Commission and with the support of the European Space Agency (ESA) towards the development and deployment of a quantum communication infrastructure throughout the Union. EuroQCI seeks to strengthen the security and resilience of communications across the Union by developing a trusted European quantum communication capability. Regulation (EU) 2023/588 of the European Parliament and of the Council[49] establishing the Union Secure Connectivity Programme, provides for the development and gradual integration of EuroQCI into the secure connectivity system. In order to take into account future developments in the applicable legal and regulatory framework, it is necessary to ensure the continuity of the development and deployment of EuroQCI within the framework established by this Regulation, by making it a priority area for strategic quantum infrastructures. This should enable the Union to continue supporting the advancement and deployment of secure quantum communication technologies, while strengthening Union industrial capacity and fostering the development of a competitive market for quantum communication technologies and services.

(15) To strengthen the Union's technological sovereignty, resilience, competitiveness and prosperity in the quantum field, it is necessary to identify and support projects of strategic importance across the quantum value chain. Such strategic projects should provide a common Union framework for recognising major industrial investments and deployment initiatives addressing critical capacity and capability gaps, strategic dependencies and opportunities for Union industrial leadership. Priority technological areas should be established in an Annex to this Regulation and should be treated as indicative, to guide identification of such projects, taking into account technological maturity, infrastructure gaps and deployment needs. Strategic projects should be selected following an open call for applications, on the basis of their strategic relevance, Union added value, their contribution to strengthening the Union's capacity in the field of quantum technologies in one or more strategic areas, their level of technical maturity or feasibility and their expected industrialisation within a reasonable time frame, or their contribution to the resilience of the Union's quantum value chain. A proposal for a project selected for funding by the EuroHPC Joint Undertaking following such open call should be considered to be designated as a strategic project. However, the Commission may also decide to designate proposals that have not been selected for Union funding by the EuroHPC Joint Undertaking as strategic projects, to allow them to benefit from the recognition. Quantum projects that have been designated as strategic projects under this Regulation should also be considered as strategic projects within the meaning of Article 8(4) Regulation (EU) 202X/XXX [European Competitiveness Fund] and should be granted the Competitiveness Seal where they fulfil the conditions set out in Regulation (EU) 202X/XXX [establishing the European Competitiveness Fund], as high-quality projects contributing to the objectives of the European Competitiveness Fund, notably by strengthening the Union's quantum research, innovation and industrial capacities, fostering the development and deployment of quantum technologies and enhancing the

[48] European Declaration on Quantum Communication Infrastructure (EuroQCI), Digital Assembly 2019, available at: https://digital-strategy.ec.europa.eu/en/policies/european-quantum-communication-infrastructure-euroqci .

[49] Regulation (EU) 2023/588 of the European Parliament and of the Council of 15 March 2023 establishing the Union Secure Connectivity Programme for the period 2023-2027 (OJ L 79, 17.3.2023, p. 1, ELI: http://data.europa.eu/eli/reg/2023/588/oj).

competitiveness and resilience of the Union quantum ecosystem. The Commission should be able to withdraw a designation where the applicable criteria are no longer met or where the designation was based on incorrect or false information.

(16) Where public support by Member States for projects and activities under that Regulation may amount to State aid, the relevant rules apply. When planning such support measures, Member States should, where applicable, make use of the relevant frameworks for providing public support. Strategic projects should address a market failure in a proportionate manner, without duplicating or crowding out private financing, while ensuring clear Union added value.

(17) To accelerate the development, testing, validation, qualification, and market introduction of strategic quantum technologies throughout the Union, a limited number of specialised Quantum Technology and Innovation Hubs should be established at Union level. Those hubs should provide specialised knowledge, engineering expertise and skills to help start-ups and SMEs overcome critical technological and engineering bottlenecks in developing market-ready quantum solutions and products. Those hubs should be supported for Union funding by the EuroHPC Joint Undertaking, subject to applicable funding decisions. They should be selected through open calls for applications on the basis of selection criteria such as scientific and technological competence relevant to the area or areas concerned, the capability to contribute to the Union quantum ecosystem and generate Union added value, or the capacity to provide effective access for SMEs and start-ups and the potential to support industrial uptake. Geographical balance across the Union should also be considered, where appropriate, when determining the location of those hubs. To ensure efficiency, avoid unnecessary duplication, and make the best possible use of public investment, the hubs should, wherever possible, build on existing facilities, capacities and structures in the Member States. Those hubs should also cooperate with existing SME support networks, including the Enterprise Europe Network (EEN)[50], to raise awareness of their services and facilitate referrals of SMEs seeking specialised technical expertise or access to experimentation and testing facilities.

(18) Where development of innovative quantum technologies or solutions might face specific regulatory challenges, regulatory sandboxes, that constitute controlled environments enabling the development, validation and testing of innovative solutions under regulatory oversight, resulting evidence-based regulatory learning, could, where appropriate, contribute to their timely market introduction.. The competent authorities of the Member States could consider making use of existing regulatory sandboxes or, where justified, explore establishing new ones in accordance with national law. Such regulatory sandboxes for time-limited experimentation may draw on the technical expertise, testing facilities and other support provided by the Quantum Technology and Innovation Hubs, while being distinct from these hubs.

(19) Quantum innovations rely on strong regional ecosystems that bring together research organisations, industry, start-ups, skills providers (such as universities, training institutions, etc.), skilled workers, infrastructures, investors and users. Strong regional ecosystems can accelerate the translation of research excellence and innovation into industrial growth and market applications. The recognition of European Quantum Regions of Excellence should therefore increase the visibility of such regional

[50] The Enterprise Europe Network is the largest business support in the world for SMEs with international ambitions (https://een.ec.europa.eu/).

ecosystems, promote cooperation across regions and help attract investment and talent, thereby strengthening the competitiveness of the Union's quantum sector.

(20) Unequal access to quantum infrastructures, expertise and resources can lead to growing inequalities in the ability to develop and benefit from quantum technologies. SMEs, start-ups, public-sector entities, and undertakings in sectors with limited quantum expertise, often lack the capacity to identify viable use cases and navigate fragmented access routes to expertise, infrastructures, skills, finance and procurement opportunities. Quantum competence and acceleration centres should therefore be established to provide first-level user general support to facilitate broader participation in the quantum ecosystem and to promote cross-border access to relevant capacities and expertise. To fulfil their purpose, such centres should be established in every Member State or jointly by Member States, be locally accessible in each Member State and be organised within a coordinated Union-wide network. Quantum competence and acceleration centres should use common referral agreements to connect users with Quantum Technology and Innovation Hubs, pilot lines, testing facilities, and other relevant support providers. Quantum competence and acceleration centres should be supported for Union funding by the EuroHPC Joint Undertaking, subject to applicable funding decisions.

(21) Member States and the Commission should promote synergies between quantum competence and acceleration centres with existing clusters and centres established under other Union initiatives, including the European Digital Innovation Hubs established pursuant to Regulation (EU) 2021/694 of the European Parliament and of the Council[51] and the European network of competence centres in semiconductors established pursuant to Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 once adopted]. Such synergies should seek to build on existing expertise, avoid duplication and facilitate access to complementary support services across the Union.

(22) To foster a competitive and interoperable Union quantum ecosystem and facilitate the market uptake and trustworthy deployment of quantum technologies, including open access tools, the Union should support standardisation, benchmarking and interoperability activities. Standards and benchmarks should be developed in light of practical needs, building on existing Union and international initiatives and promoting coordination among relevant bodies. The Commission may request the development of European standards or European standardisation deliverables, as set out in Regulation 202X/XXX on European standardisation [insert reference to Standardisation Regulation once adopted] in support of the objectives of this Regulation. Standardisation and benchmarking measures should be technology-neutral, proportionate and reflect technological maturity.

(23) All activities carried out under the European Quantum Alliance, including the Demand Forum, as well as under the Quantum competence and acceleration centres, the European Quantum Service Platform for Science and Industry and the European Quantum Regions of Excellence should be implemented in full compliance with Union competition law and other relevant provisions of Union law, ensuring that cooperation between undertakings does not lead to distortions of competition notably through the exchange of commercially sensitive information.

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[51] Regulation (EU) 2021/694 of the European Parliament and of the Council of 29 April 2021 establishing the Digital Europe Programme and repealing Decision (EU) 2015/2240 (OJ L 166, 11.5.2021, p. 1, ELI: http://data.europa.eu/eli/reg/2021/694/oj).

(24) Voluntary Union technology labels for quantum devices, systems, products and services could facilitate their identification by buyers, their traceability and, where relevant, interoperability of such technologies, components and products. Such labels should only be introduced once certain conditions regarding technical maturity, proportionality, and the risk of technological lock-in have been met. The Commission should support industry-led and other credible labelling schemes that ensure transparent and non-discriminatory access to the market for all undertakings. Where appropriate, their requirements should be based on relevant standards and standardisation deliverables and should not unduly favour any particular technical solution. Such labelling schemes should not duplicate or conflict with certification or traceability requirements under Union law.

(25) The procurement-related measures established under this Regulation should complement Regulation (EU) 202X/XXX [insert reference to Public Procurement Act once adopted] as well as the provisions concerning public procurement of innovation and research and development procurement established under Regulation (EU) 202X/XXX [insert reference to European Innovation Act once adopted]. Given the specific characteristics of the quantum sector, including the limited maturity of certain markets, dependencies on specialised infrastructures, and security considerations, targeted measures are necessary to address sector-specific challenges and facilitate the procurement and deployment of innovative quantum technologies and post-quantum cryptography solutions. The Union legal framework on public procurement provides for the possibility to use quality criteria for the award of contracts other than price-related criteria. To enable further development of the Union's quantum ecosystem, it is necessary to set mandatory criteria for the procurement of quantum technology products and services. It is therefore necessary to include requirements relating to security of supply, interoperability and lifecycle support in all procurement procedures of quantum technology products and services, in line with the objectives of competitiveness, security and resilience set out in the Union legal framework on public procurement.

(26) In addition, given the possible impact of quantum technologies on security and the Union's strategic interests and technological autonomy, it is necessary to restrict the relevant procurement procedures to products and services that are provided by Union-controlled entities or entities from third countries authorised to participate under the provisions on international cooperation in this Regulation. In this respect, qualification as a Union-controlled entity should not necessarily require majority ownership by Union shareholders. Non-controlling shares held by third-country investors, including in listed companies with widely dispersed shares should not in themselves prevent the qualification as Union-controlled. In that context, control should be understood as the ability to exercise a decisive influence on a legal entity directly, or indirectly through one or more intermediate legal entities, as defined by Article 2(8) Regulation (EU) 2025/2643. It should be clarified that an entity is deemed to provide a quantum technology product, system or service if it performs substantial development, manufacturing or processing of the product, system or service. It may furthermore be necessary to require that also certain critical components of such procured quantum technology product, system or service are provided by Union-controlled entities, or authorised entities from third countries respectively. These require identification through a flexible mechanism that allows to consider the list of critical quantum components established under this Regulation and their availability thereof in the Union.

(27) Public procurement can play a key role in stimulating demand for innovative quantum technologies, accelerating their market uptake and strengthening the Union's technological sovereignty and security of supply. Regulation (EU) XX/XX [European Innovation Act] strengthens the role of public procurement as a driver of innovation and lays down common rules for the procurement of research and development services ('R&D procurement'), including pre-commercial procurement. These rules provide a comprehensive framework to stimulate R&D procurement for quantum technologies. For what concerns public procurement of innovation, Regulation (EU) XX/XX [Public Procurement Act] already allows public buyers to take innovation objectives into consideration when procuring certain supplies, work or services that are not research and development services. However, to foster innovation in the area of quantum technologies, it is necessary to additionally provide that, as regards the procurement of innovative quantum technology products and services, contracting entities ('public buyers') should apply appropriate non-price award criteria reflecting the contribution of tenders to the development of the Union quantum ecosystem. Since a basic requirement underlying this Regulation is that all essential elements of the quantum value chain are sufficiently represented within the Union quantum ecosystem, compliance with that requirement should be taken into account in award decisions. Decisions on the award of individual contracts should remain with the public buyers concerned, in accordance with applicable Union and national law.

(28) Completing the transition to post-quantum cryptography is especially important for critical sectors because they combine (i) a high level of impact in the event of compromise, (ii) valuable long-lived data, (iii) slow and complex upgrade cycles, and (iv) a strong reliance on the trust of the whole digital infrastructure. Therefore, it is necessary to take measures to foster the uptake of solutions that support post-quantum cryptography. Public procurement of certain products or services with digital elements procured by public administration entities, as defined in Article 6(35) of Directive (EU) 2022/2555, which are in the scope of that Directive pursuant to Article 2(2), point (f), or Article 2(5), point (a), thereof, should be limited to products that support post-quantum cryptography and crypto-agility. The relevant products or services should be identified based on the criticality of the systems concerned, in line with the risk-based approach of Directive (EU) 2022/2555. The Commission should set out the technical requirements under which products or services can be deemed to support post-quantum cryptography and crypto-agility. Considering the evolving technical feasibility, it should be possible to provide derogations where suitable post-quantum cryptographic solutions are not ready or where crypto-agility is not technically feasible. With a view to strengthening the security and resilience of critical sectors, reducing strategic dependencies and supporting the development of post-quantum cryptography capabilities, Member States should encourage all entities in sectors of high criticality listed in Annex I to Directive (EU) 2022/2555, and in other critical sectors listed in Annex II to that Directive to implement those procurement limitations. To promote secure and interoperable critical communications and technological preparedness of critical communication infrastructures across the Union, post-quantum cryptography solutions developed and deployed under this Regulation should, where appropriate, ensure interoperability with the European Union Critical Communication System (EUCCS), as envisaged in Regulation (EU) 2026/XXX [insert reference to EUCCS once adopted][52].

[52] Proposal for a Regulation of the European Parliament and of the Council establishing the European Union Critical Communication System (EUCCS), COM (2026) 1010.

(29) Implementation of the Quantum Europe Framework Initiative should be entrusted to the EuroHPC Joint Undertaking, or its successor, as the competent body for quantum-related activities in accordance with Regulation (EU) 2021/1173 and the applicable work programme or other Union programmes and instruments. Taking into account the extension of the EuroHPC Joint Undertaking mandate to cover quantum technologies since January 2026, and in view of a potential successor during the Multiannual Financial Framework 2028-2034, the future implementation arrangements as regards the Quantum Europe Framework Initiative should ensure access to the scientific, technical, industrial and financial expertise needed. That should be without prejudice to the mandate of the Chips Joint Undertaking, or its successor, in accordance with its work programme to contribute to quantum-chip design, pilot lines, prototyping, testing and validation. The provisions of this Regulation should be applied in a manner that ensures complementarity and coherence with the rules governing Union programmes. In the event of a conflict between those provisions and the rules applicable to Union programmes, the latter should prevail to the extent of that conflict.

(30) The deep-tech innovation continuum requires innovative ways of financing to ensure the Union's technological sovereignty. In that regard, the Quantum Europe Framework Initiative, Regulation (EU) 202X/XX [insert reference to Chips Act 2.0 once adopted] and Regulation (EU) 202X/XX [insert reference to CADA once adopted] are interlinked. As highlighted in the Communication of 3 June 2026 on European Technological Sovereignty and the EU Open-Source Strategy[53], further action is needed to support start-ups, scale-ups and strategic companies, including through sustained financial investment capacity and mobilisation, at unprecedented scale, of both public and private capital. Such action should also ensure coherence with the Union's Economic Security Strategy[54] by supporting investment in critical technologies and infrastructure in strategic sectors essential to the Union's technological sovereignty, economic security and competitiveness. As further underlined in the Action Plan on Cybersecurity and Artificial Intelligence[55], the development of sovereign frontier capabilities requires investments of hundreds of billions of euro and calls for urgent crowding-in of private investment, including risk capital and equity, in order to develop and scale innovative European solutions. The Union faces a structural shortage of strategic growth capital and equity, resulting in dependence on third-country capital for the scaling of strategic companies and projects, despite the existence of abundant private capital that does not flow sufficiently to home-grown innovation. Therefore, the Union should urgently develop new ways to use public and private funds to invest in the most promising European start-ups and companies. This calls for coordinated Union action through public funding in the form of direct equity or quasi-equity, to catalyse private investment into large strategic Union technology ventures. To this end, innovative funding instruments, combining strategic oversight by public investors with market driven investment decisions, may be established in line with the rules of the European

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53 European Commission, Communication on European Tech Sovereignty, COM(2026) 503 final (Brussels, 3 June 2026); Commission Decision C(2020) 7149 final of 21 October 2020 on the Open Source Software Strategy 2020–2023 – "Think Open".

54 European Commission and High Representative of the Union for Foreign Affairs and Security Policy, *Joint Communication to the European Parliament, the European Council and the Council on "European Economic Security Strategy*", JOIN(2023) 20 final, Brussels, 20 June 2023.

55 European Commission, *Action Plan on Cybersecurity and Artificial Intelligence*, COM(2026) 450 final (Brussels, 7 July 2026).

Competitiveness Fund and complementing existing financial instruments such as the European Innovation Council and the Scaleup Europe Fund[56] primarily for companies larger than scale-ups and by investing in large-scale tickets in tech infrastructure. To this aim, the Union should be able to establish and implement an equity investment vehicle (the 'Sovereign Tech Equity Fund') for the financial support of technologies which are essential for the Union's technological sovereignty and economic security. This should include support to the implementation of the Quantum Europe Framework Initiative and of Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 once adopted] and Regulation (EU) 202X/XXX [insert reference to the Cloud and AI Development Act (CADA) once adopted]. The vehicle should be established and implemented in accordance with the rules of Regulation (EU, Euratom) of the European Parliament and of the Council 2024/2509 ('Financial Regulation')[57], and during the period of the MFF 2028-2034, with the rules of the ECF InvestEU Instrument established in Regulation (EU) [202X/XXX] [insert reference to ECF once adopted]. The Union should be able to participate in the vehicle as a shareholder together with the Member States and other public or private investors. With a view to increasing the leverage effect of the Union contribution, the vehicle could be established in line with the requirements to become an implementing partner of the ECF InvestEU Instrument. Member States should be able to support the equity investment vehicle, including through contributions from relevant Union programmes, subject to the rules of the relevant programmes. Appropriate governance and operational arrangements should be put in place through non-legislative acts, to underpin the ability of the vehicle to match public-sector steer with professional investment decision making and draw in private capital, and to ensure that the operations of the vehicle comply with Union law, including State aid rules, and relevant Union policies.

(31) The transition to post-quantum cryptography is essential to strengthen the cybersecurity and resilience of the Union's digital infrastructures and services against emerging quantum threats. Commission Recommendation (EU) 2024/1101[58] called for a coordinated approach to this transition, followed by work undertaken within the Cooperation Group ('NIS Cooperation Group') established pursuant to Directive (EU) 2022/2555, which led to the publication of the Coordinated Implementation Roadmap for the Transition to Post-Quantum Cryptography in June 2025 (the 'roadmap'). The roadmap specifically recommends that Member States establish national transition plans by the end of 2026, complete the transition for high-risk use cases by the end of 2030, and by the end of 2035 for medium-risk, and, as much as feasible, for low-risk use cases. In order to ensure a coordinated approach of Union institutions, bodies, offices and agencies to post-quantum cryptography preparedness across the Union,

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56 Commission Implementing Decision C(2026) 2051 final of 26 March 2026 amending Implementing Decision C(2025) 7410 on the financing of the European Innovation Council component of the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation (2021-2027) and on the adoption of the Work Programme for 2026 as regards the introduction of the contribution of the EIC to Scaleup Europe Fund; Commission Decision C(2026) 5688 final of 3 August 2026 on establishing the Scaleup Europe Fund (SEF) compartment of the European Innovation Council (EIC) Fund.

57 Regulation (EU, Euratom) 2024/2509 of the European Parliament and of the Council of 23 September 2024 on the financial rules applicable to the general budget of the Union (OJ L, 2024/2509, 26.9.2024, ELI: http://data.europa.eu/eli/reg/2024/2509/oj).

58 Commission Recommendation (EU) 2024/1101 of 11 April 2024 on a Coordinated Implementation Roadmap for the transition to Post-Quantum Cryptography, (OJ L, 2024/1101, 12.4.2024, ELI: http://data.europa.eu/eli/reco/2024/1101/oj).

account should be taken of the ongoing work carried out by the Interinstitutional Cybersecurity Board (IICB), established by Regulation (EU, Euratom) 2023/2841 of the European Parliament and the Council[59], in particular through its dedicated working group on post-quantum cryptography. That work aims to facilitate cooperation and the exchange of knowledge and best practices among Union institutions, bodies, offices and agencies, with a view to developing common standards, implementation and migration guidelines, and awareness-raising initiatives. To ensure continuity and avoid duplication of reporting requirements, Union institutions, bodies, offices and agencies should notify the Interinstitutional Cybersecurity Board (IICB), in accordance with Regulation (EU, Euratom) 2023/2841, of their level of preparedness with regard to the transition to post-quantum cryptography, while Member States should report on their preparedness to the Commission in accordance with this Regulation.

(32) Building on those efforts, this Regulation should further strengthen the preparedness of the Union for the timely and coordinated transition to post-quantum cryptography. Member States should ensure the timely implementation of their commitments in accordance with the roadmap. In addition, the Commission should monitor the preparedness of Member States for the transition, which should rely as far as possible on existing cybersecurity cooperation and reporting structures. The Commission should assess progress towards achieving the objectives and milestones of the roadmap, and, where it deems necessary, should adopt delegated acts supplementing by setting binding milestones and timelines for implementing the transition to post-quantum cryptography. This is without prejudice to the adoption of implementing acts pursuant to Article 20(5) of Directive (EU) 2022/2555 regarding measures for essential and important entities with regard to the use of post-quantum cryptography. Moreover, the Commission should monitor the research and technological developments in post-quantum cryptography, quantum and classical cryptanalysis and developments in quantum computing technologies, to inform initiatives at Union level and the transition to post-quantum cryptography in the Union.

(33) To strengthen the resilience of the Union quantum ecosystem, it is important to enhance the monitoring of quantum supply chains. Emerging quantum technologies vary considerably in their technological maturity, potential applications and associated opportunities and risks. Given the pace of their development, the Union should adopt a forward-looking approach to identify emerging opportunities, strategic dependencies and vulnerabilities at an early stage, while avoiding premature preference for specific technological pathways or unnecessary restrictions on innovation. To that end, the Commission should carry out strategic intelligence and dependency monitoring, including through the European Skills Observatory[60], in close cooperation with Member States through the Quantum Strategy Board, to support early warning and the adjustment of priorities in light of technological developments. The risks identified through such market intelligence should, where appropriate, inform the application of existing Union and national instruments, including those relating to financing, procurement and economic security. To that end, where appropriate, the Commission should be empowered to establish, by means of implementing acts, common

[59] Regulation (EU, Euratom) 2023/2841 of the European Parliament and of the Council of 13 December 2023 laying down measures for a high common level of cybersecurity at the institutions, bodies, offices and agencies of the Union (OJ L, 2023/2841, 18.12.2023, ELI: http://data.europa.eu/eli/reg/2023/2841/oj).

[60] European Commission, European Skills Observatory, available at: https://employment-social-affairs.ec.europa.eu/policies-and-activities/skills-and-qualifications/union-skills/european-skills-observatory_en .

provisions for a digital twin of the quantum supply chain, serving as a market intelligence platform to support supply chain mapping, risk assessment and informed policy decisions. Additionally, in order to promote synergies and cooperation between Union initiatives, avoid duplication and ensure the efficient use of resources, the market intelligence platform, provided for in this Regulation, should, where appropriate and technically feasible, be capable of being integrated with the Business-to-Business Supply Chain Platform established by Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 once adopted].

(34) To achieve the objectives set out in this Regulation in a coordinated and efficient manner, a governance mechanism should be established at Union level. It is therefore necessary to set up a Quantum Strategy Board, composed of representatives of Member States and chaired by the Commission. The Quantum Strategy Board should assist the Commission by facilitating a smooth, effective and harmonised cooperation among Member States, providing strategic advice on common priorities and gaps. The Quantum Strategy Board should also closely follow progress in the implementation of the different components of the Quantum Europe Framework Initiative, identify new areas for strategic quantum infrastructures and strategic projects, based on the expertise, capabilities and priorities of Member States and advise on matters related to post-quantum cryptography. Furthermore, the Governing Board of the EuroHPC Joint Undertaking should retain responsibility for work programmes, calls and financing decisions under the applicable legal and budgetary framework. The Quantum Strategy Board should not take any financing decisions under the respective work programme.

(35) To receive important advice on specific matters, the Chair of the Quantum Strategy Board, in close cooperation with its members, may establish sub-groups of the Quantum Strategy Board to work on dedicated topics, such as standards, skills, or post-quantum cryptography, and invite experts to participate in the meetings on an ad hoc basis, or invite stakeholders, in particular organisations representing the interests of the Union quantum industry, including the European Quantum Alliance, to participate in its sub-groups as observers.

(36) The bodies and instruments established by this Regulation should be without prejudice to the instruments and governance mechanisms established in the defence and space sectors, including the relevant programme committees and the Observatory of Critical Technologies.

(37) Given the strategic importance of quantum technologies for the Union’s long-term security, resilience, and technological leadership, reciprocal cooperation or partnerships with third countries should be pursued only where this is consistent with the Union’s strategic interests and with the need to safeguard the Union’s technological sovereignty, security, and public order. Such cooperation or partnerships should in any case be subject to appropriate safeguards that protect the Union's technological interests, the protection of sensitive knowledge, intellectual property, and security-related capabilities, in particular against undue dependencies or information leaks without prejudice to the applicable eligibility rules of Union programmes and funding instruments. Subject to these safeguards, participation by entities established in third countries in activities under this Regulation may be based on association to the relevant Union funding programme or on a strategic partnership providing for reciprocal participation. The mutually beneficial partnerships, including

with emerging markets and developing countries, should be established in coherence with the Global Gateway Strategy[61] and International Digital Strategy[62].

(38) In the field of public procurement, reciprocity should not be inferred solely from the formal eligibility of Union-controlled entities to submit tenders. It should require genuine opportunities to compete for and obtain contracts under transparent, objective and non-discriminatory conditions. The Commission should therefore consider not only the applicable legal framework but also actual procurement practices and award decisions, including evidence of systematic or recurrent unjustified disadvantages for Union-controlled entities. Existing international market-access commitments and the competences of the authorities responsible for the relevant procurement procedures should remain unaffected.

(39) The work of the Quantum Strategy Board should be complemented by the creation of a European Quantum Alliance which should constitute a platform for stakeholder engagement and facilitate the exchange of expertise and industry perspectives. More specifically, to foster coordination and stakeholder consultation within the Union's quantum ecosystem, set up a demand forum to promote market uptake, and collect relevant technical, industrial and market input, the European Quantum Alliance should act as an open forum involving research organisations, industry, start-ups and SMEs, users, investors and relevant public authorities, entities or organisations. The Alliance should not have any decision-making powers. The Alliance should engage in a regular strategic dialogue with the Quantum Strategy Board to facilitate the exchange of expertise and information, ensure that industry perspectives are taken into account and contribute to the alignment of the Union's quantum policy priorities with the needs of the Union quantum ecosystem.

(40) In view of the growing demand for quantum-related skills, efforts to strengthen the Union's quantum talent base and the competitiveness of its quantum ecosystem should seek to encourage broader participation in quantum education, training and skills development. The implementation of this Regulation should be guided by excellence-based and merit-based selection criteria, with due regard, where appropriate, to equal opportunities, including gender balance.

(41) To ensure flexibility and to reflect technological development and evolving market needs in the quantum and post-quantum cryptography ecosystem, the power to adopt acts in accordance with Article 290 TFEU should be delegated to the Commission in respect of amending Annex I to update the list of priority areas for quantum grand challenges, amending Annex II to update the list of priority areas for post-quantum cryptography, amending Annex III to update the priority areas for strategic quantum infrastructures, amending Annex IV to update the priority areas for strategic projects and of supplementing this Regulation by establishing specific milestones and timelines for the transition to post-quantum cryptography. It is of particular importance that the Commission carries out appropriate consultations during its preparatory work, including at expert level, and that those consultations are conducted in accordance with the principles set out in the Interinstitutional Agreement of 13 April 2016 on

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61 Joint Communication to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank - The Global Gateway (JOIN(2021) 30 final).

62 European Commission: Directorate-General for Communications Networks, Content and Technology, An international digital strategy for the European Union, European Commission, 2025, https://data.europa.eu/doi/10.2759/4019528.

Better Law-Making[63]. In particular, to ensure equal participation in the preparation of delegated acts, the European Parliament and the Council should receive all documents at the same time as Member States' experts, and their experts should systematically have access to meetings of Commission expert groups dealing with the preparation of delegated acts.

(42) In order to ensure uniform conditions for the implementation of Article 15(1) and 22(2), implementing powers should be conferred on the Commission.

(43) The implementing acts powers relating to Article 20(4) and 27(3) should be exercised in accordance with Regulation (EU) No 182/2011 of the European Parliament and of the Council[64].

(44) In order to ensure trustful and constructive cooperation of competent authorities at Union and national level, all parties involved in the application of this Regulation should respect the confidentiality, authenticity and integrity of information and data obtained in carrying out their tasks to protect in particular intellectual property rights, sensitive business information and trade secrets.

(45) This Regulation should be without prejudice to the application of Articles 101 and 102 TFEU, and to the enforcement powers of competition authorities. If any of the measures provided for by this Regulation constitute State aid, the provisions concerning such measures should be without prejudice to the application of Articles 107 and 108 TFEU.

(46) Since the objectives of this Regulation cannot be sufficiently achieved by the Member States, but can rather, by reason of the scale or effects of the action, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Regulation does not go beyond what is necessary in order to achieve those objectives.

HAVE ADOPTED THIS REGULATION:

Chapter I

General Provisions

Article 1
Subject matter and scope

1. This Regulation lays down:

(a) a framework of measures for strengthening the Union quantum ecosystem, promoting the competitiveness and industrial deployment of quantum technologies, and improving the functioning of the single market by ensuring

63 Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making (OJ L 123, 12.5.2016, p. 1, ELI: http://data.europa.eu/eli/agree_interinstit/2016/512/oj).

64 Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, (OJ L 55, 28.2.2011, p. 13, ELI: http://data.europa.eu/eli/reg/2011/182/oj).

economic security and resilience in strategically relevant quantum value chains and infrastructures; and

(b) provisions to establish an equity investment vehicle to support quantum technologies and the full-stack technologies that are essential for the Union's technological sovereignty and economic security, including those technologies under the scope of Regulation (EU) XX/XX [insert reference to Chips Act 2.0 once adopted] and of Regulation (EU) XX/XX [insert reference to CADA once adopted].

2. For the purposes of paragraph 1, point (a), this Regulation establishes:

(a) a common European quantum research and innovation framework which strengthens the Union's capacity in quantum research and technological development, and supports large-scale initiatives addressing strategic scientific, technological and engineering challenges;

(b) measures to support the scale-up of companies and market uptake of innovative quantum technologies and solutions by accelerating industrial deployment across the Union, facilitating engagement with users, promoting the procurement of those solutions, and increasing access to finance;

(c) measures to strengthen the quantum value-chain resilience, in particular by enabling strategic dependencies to be identified and to prevent supply-chain disruptions and support preparedness for the transition towards quantum-safe infrastructures and solutions;

(d) a coordination framework which supports the strategic development and oversight of Union action in the field of quantum technologies.

3. This Regulation shall not affect the specific procurement procedures and conditions applicable in the defence sector referred to in Articles 9, 11, 15, 52 and 53 of Regulation (EU) 2025/2643[65] and in Council Regulation (EU) 2025/1106[66], or their successor programmes.

Article 2
Definitions

For the purposes of this Regulation, the following definitions apply:

(1) 'quantum value chain' means the system of activities, actors, and technologies relating to the research, development, design, manufacturing, integration, deployment, commercialisation and operation of quantum technologies and their enabling components, systems and applications;

(2) 'quantum components' means physical and functional building blocks of quantum technologies designed to create, control, transmit, process or measure quantum states and systems;

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65 Regulation (EU) 2025/2643 of the European Parliament and of the Council of 16 December 2025 establishing the European Defence Industry Programme and a framework of measures to ensure the timely availability and supply of defence products ('EDIP Regulation') (OJ L, 2025/2643, 29.12.2025, ELI: http://data.europa.eu/eli/reg/2025/2643/oj).

66 Council Regulation (EU) 2025/1106 of 27 May 2025 establishing the Security Action for Europe (SAFE) through the Reinforcement of the European Defence Industry Instrument (OJ L, 2025/1106, 28.5.2025, ELI: http://data.europa.eu/eli/reg/2025/1106/oj).

(3) ‘critical quantum components’ means quantum-specific or enabling components, materials, devices or software that are indispensable for the development, manufacturing, integration, deployment or operation of quantum technologies, and whose limited availability or disruption would significantly impair the resilience, security or competitiveness of the quantum value chain of the Union;

(4) ‘quantum technologies’ means technologies that exploit a combination of quantum-mechanical properties, including quantised states, superposition, entanglement or interference, to enable different applications, including quantum computing and simulation, quantum communications, quantum sensing and quantum metrology;

(5) ‘quantum computing’ means a computing technology that employs quantum-mechanical states and operations for the processing, storage or transmission of information;

(6) ‘quantum communication’ means the sharing of information using the principles of quantum mechanics;

(7) ‘quantum sensing’ means the use of systems exploiting absolute, unchangeable atomic or molecular properties to perform measurements of physical quantities, such as magnetic fields, gravity, and time, with minimum calibration requirements;

(8) ‘quantum metrology’ means the science and practice of reliable, standardised and comparable measurement with accuracy boosted by quantum entanglement and coherence;

(9) ‘quantum communication infrastructure’ means an infrastructure enabling the provision of quantum communication services;

(10) ‘small and medium-sized enterprises’ or ‘SMEs’ means small or medium-sized enterprises as defined in the Annex to Commission Recommendation 2003/361/EC[67];

(11) ‘start-up’ means an undertaking meeting the criteria for an innovative start-up set out in point 3 of the Annex to Commission Recommendation (EU) 2026/720[68];

(12) ‘EuroHPC Joint Undertaking’ means the joint undertaking established by Council Regulation (EU) 2021/1173 and any successor entity or initiative established under Union law;

(13) ‘Chips Joint Undertaking’ means the joint undertaking established by Council Regulation (EU) 2021/2085[69] and any successor entity or initiative established under Union law;

(14) ‘standard’ means a technical specification as defined in Article 2, point (1), of Regulation 202X/XXX on European standardisation [insert reference to Standardisation Regulation once adopted];

(15) ‘European Quantum Communication Infrastructure’ or ‘EuroQCI’ means a certified secure end-to-end quantum communication infrastructure composed of space based

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67 Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium sized enterprises (OJ L 124, 20.5.2003, p. 36, ELI: http://data.europa.eu/eli/reco/2003/361/oj).

68 Commission Recommendation (EU) 2026/720 of 18.3.2026 on the definition of innovative enterprises, innovative startups and innovative scaleups, OJ L, 2026/720, 24.3.2026, ELI: http://data.europa.eu/eli/reco/2026/720/oj.

69 Council Regulation (EU) 2021/2085 of 19 November 2021 establishing the Joint Undertakings under Horizon Europe and repealing Regulations (EC) No 219/2007, (EU) No 557/2014, (EU) No 558/2014, (EU) No 559/2014, (EU) No 560/2014, (EU) No 561/2014 and (EU) No 642/2014 (OJ L 427, 30.11.2021, p. 17, ELI: http://data.europa.eu/eli/reg/2021/2085/oj).

and terrestrial-based solutions, enabling information and data to be transmitted and stored securely and capable of linking critical public communication assets throughout the Union;

(16) ‘post-quantum cryptography’ means cryptography based on algorithms designed to be resistant to attacks by both classical and quantum computers;

(17) ‘crypto-agility’ means the ability to replace or adjust cryptographic algorithms across systems and components, including protocols, applications, software, hardware, firmware, and infrastructure, without compromising security and with no or minimal disruption to ongoing operations;

(18) ‘contract’ means a public contract as defined in Article 6(18), a supply, works or service contract as defined in Article 6, points (21), (22) and (1) and a concession contract as defined in Article 115(1) of Regulation (EU) 202X/XXX [insert reference to Public Procurement Act once adopted];

(19) ‘contracting authority’ means, a contracting authority as defined in Article 7 of Regulation (EU) 202X/XXX [insert reference to Public Procurement Act once adopted];

(20) ‘contracting entity’ means a contracting entity as defined in Article 8 of Regulation (EU) 202X/XXX [insert reference to Public Procurement Act once adopted];

(21) ‘Union-controlled entity’ means any entity set up under the law of a Member State and having its registered office or central administration within the Union that is active in the quantum value chain and is not subject to control by a third country, a legal entity established in a third country or a natural person who is not a national of a Member State;

(22) ‘control’ means control as defined in Article 2, point (8), of Regulation (EU) 2025/2643 of the European Parliament and of the Council[70];

(23) ‘trade secret’ means a trade secret as defined in Article 2, point (1), of Directive (EU) 2016/943 of the European Parliament and of the Council[71].

[70] Regulation (EU) 2025/2643 of the European Parliament and of the Council of 16 December 2025 establishing the European Defence Industry Programme and a framework of measures to ensure the timely availability and supply of defence products (‘EDIP Regulation’), OJ L, 2025/2643, 29.12.2025, ELI: http://data.europa.eu/eli/reg/2025/2643/oj).

[71] Directive (EU) 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure, OJ L 157, 15.6.2016, p. 1, ELI: http://data.europa.eu/eli/dir/2016/943/oj.

Chapter II

Leadership in Quantum

Article 3

Quantum Europe Framework Initiative

1. A common Union Framework Initiative for Quantum Research, Innovation and Industrialisation (the 'Quantum Europe Framework Initiative') is established.

2. Member States shall adopt national strategies on quantum technologies ('national strategies') which are aligned with the agreed priorities and measures of the Quantum Europe Framework Initiative or shall align their existing national strategies accordingly.

3. Member States shall notify the Commission of national strategies adopted or aligned in accordance with paragraph 2 by [OP: to complete six months as of entry into force of this Regulation]. The Commission shall monitor the Member States' adoption and alignment of their national strategies referred to in paragraph 2. Member States shall notify the Commission of any subsequent changes thereof within six months of their adoption.

4. The Commission shall assess whether a national strategy is consistent with the priorities and measures of the Quantum Europe Framework Initiative. Where that is not the case, the Commission shall provide the Member State concerned with concrete recommendations for the purpose of revising that national strategy. The Member State concerned shall submit a revised version of its national strategy to the Commission within a reasonable period of time.

5. The Commission shall monitor the implementation of the measures of the Quantum Europe Framework Initiative and report on its progress annually to the Quantum Strategy Board referred to in Article 29.

Article 4

General objective and operational objectives of the Quantum Europe Framework Initiative

1. The Quantum Europe Framework Initiative shall support quantum research and innovation activities by consolidating excellence across the Union to lead in quantum science and technology and industrial scale-up and transform the Union into a quantum industrial powerhouse and global market leader in quantum.

2. The Quantum Europe Framework Initiative shall have at least the following operational objectives:

   (a) operational objective 1 – *lead quantum*: leadership in quantum science and technology;

   (b) operational objective 2 – *grow quantum systems*: breakthroughs in the Union's critical quantum technological and engineering bottlenecks;

   (c) operational objective 3 – *roll out quantum*: build and deploy large-scale strategic quantum infrastructures;

(d) operational objective 4 – *deploy quantum*: bringing mature quantum technologies to deployment and market;

(e) operational objective 5 – *think and adopt quantum*: accelerating quantum growth and adoption in the Union;

(f) operational objective 6 – *unlock skills for quantum*: attracting and strengthening the quantum talent base of the Union;

(g) operational objective 7 – *make the Union quantum-safe*: accelerating the research, testing, validation and deployment of post-quantum cryptography.

3. When appropriate, the operational objectives referred to in paragraph 2 shall be implemented by applying an iterative approach supporting the development and uptake of quantum technologies across interconnected stages of their development, from research and scientific discovery, through engineering, testing, validation and demonstration, to industrialisation, scale-up, deployment and market uptake ('technology lifecycle approach').

SECTION 1

LEADERSHIP IN QUANTUM SCIENCE AND TECHNOLOGY

Article 5

Quantum excellence network

1. For the purposes of operational objective 1 set out in Article 4(2), point (a) ('lead quantum'), a quantum science and technology excellence network (the 'quantum excellence network') is established.

2. The quantum excellence network shall be composed of leading national quantum institutes and centres of excellence, including universities, research laboratories and research and technology organisations active in quantum science and technology.

3. The members of the quantum excellence network shall jointly define and address major scientific challenges in quantum research. For that purpose, they shall create synergies to tackle the scientific challenges, and facilitate cooperation, including through mobility of the researchers involved, outreach and communication.

4. The members of the quantum excellence network shall have access to infrastructures essential for addressing those challenges referred to in paragraph 3, in accordance with the applicable access conditions.

5. The members of the quantum excellence network shall be selected by means of open, transparent and competitive procedures, based on their scientific and technological excellence and on the complementarity of relevant expertise and capacities.

6. The members of the quantum excellence network shall establish internal working arrangements for the organisation, coordination and promotion of their joint activities.

Article 6

Quantum grand challenges

1. For the purposes of operational objective 2 set out in Article 4(2), point (b) ('grow quantum systems'), quantum grand challenges shall be launched, consisting of strategic actions supporting research and technology initiatives aimed at addressing major technological and engineering bottlenecks in the further development of quantum technologies ('quantum grand challenges'). Such actions may, where appropriate, support the development of interoperable open-source quantum software and tools, without prejudice to applicable intellectual property rights and security requirements. Quantum grand challenges may concern the indicative areas set out in Annex I.

2. The Commission shall be empowered to adopt delegated acts in accordance with Article 33 to amend the list of indicative areas for quantum grand challenges set out in Annex I in order to reflect emerging or new technological and engineering bottlenecks, and market developments relevant to the quantum sector

3. Quantum grand challenges shall be coordinated with grand challenges established pursuant to Regulation (EU) 202X/XXXX [insert reference to Chips Act 2.0 once adopted], pursuant to Regulation (EU) 202X/XXXX [insert reference to the Cloud and AI Development Act (CADA) once adopted], and, where appropriate, with priority challenges established under Council Recommendation XX on Advanced materials [insert reference to (COM(2026) 833 final once adopted].

4. Strategic actions implementing quantum grand challenges shall be selected by means of open, transparent and competitive procedures. Such actions shall be implemented through a technology roadmap setting the detailed implementation approach and major milestones to be achieved by each quantum grand challenge.

Article 7

Research and innovation in post-quantum cryptography

1. For the purposes of operational objective 7 set out in Article 4(2), point (g) ('make the Union quantum-safe'), the Commission shall support research and innovation activities in post-quantum cryptography through relevant Union programmes, with a view to contributing to security and resilience in the context of advances in quantum technologies.

2. The activities referred to in paragraph 1 shall contribute, in particular, to the development, testing and validation of secure, interoperable, crypto-agile and deployable post-quantum cryptographic solutions, including tools and methods facilitating their integration into existing and future digital systems and infrastructures. Those activities may address the priority areas set out in Annex II, without prejudice to other priorities identified under the relevant Union programmes

3. The Commission shall be empowered to adopt delegated acts in accordance with Article 33 to amend the priority areas set out in Annex II in order to reflect emerging technology changes and market developments relevant to post-quantum cryptography.

SECTION 2

QUANTUM INFRASTRUCTURES

Article 8

European Quantum Service Platform for Science and Industry

1. A European Quantum Service Platform (the 'Quantum Platform') is established as a coordinated service mechanism to support scientific research, technological development and industrial innovation.

2. The Quantum Platform shall provide a common interface for researchers, research organisations, undertakings, including start-ups and SMEs, and public authorities to access the Union's quantum computing infrastructure including quantum emulation, simulation, and physical quantum computing resources, as well as related services.

3. The Quantum Platform shall carry out the following activities:

   (a) provide information on available quantum computing resources and on their capabilities and access conditions, and facilitate access through existing allocation procedures;

   (b) facilitate access to a common, interoperable quantum software stack, and interfaces supporting different quantum computing technologies;

   (c) promote interoperability with cloud services, including those provided by cloud service providers established in the Union;

   (d) provide access to relevant technical guidance and support services, in coordination with the Quantum Technology and Innovation Hubs referred to in Article 14 and the quantum competence and acceleration centres referred to in Article 17.

Article 9

Strategic quantum infrastructures

1. For the purposes of operational objective 3 set out in Article 4(2), point (c) ('roll out quantum'), the Commission shall support the establishment and development of infrastructures that help facilitate the development, testing, validation, demonstration, deployment and use of quantum technologies ('strategic quantum infrastructures').

2. Strategic quantum infrastructures shall include one of the following:

   (a) existing quantum infrastructures established or supported under Union programmes or initiatives, where their continued implementation, operation, or development contributes to the purpose referred to in paragraph 1;

   (b) new quantum infrastructures established or developed to contribute to the purpose referred to in paragraph 1.

3. Strategic quantum infrastructures shall be located within the territory of the Union.

4. Access to strategic quantum infrastructures shall be limited to Union-controlled entities. By way of derogation, other entities may be granted access where such access is provided under a partnership concluded by the Union in accordance with Article 31(4) and (6), subject to Article 31(5), and (7).

5. Strategic quantum infrastructures shall be implemented through open, transparent and competitive procedures, in accordance with the applicable rules governing the relevant Union programmes and funding instruments.

Article 10

Identification of areas for strategic quantum infrastructures

1. The quantum infrastructures concerning the priority areas set out in Annex III shall be considered as strategic quantum infrastructures.

2. The Commission shall be empowered to adopt delegated acts in accordance with Article 33 to amend the priority areas listed in Annex III in order to reflect technological advances or emerging infrastructure needs and gaps in Union capacities relevant to the quantum sector.

SECTION 3

ACCELERATING INDUSTRIALISATION AND DEPLOYMENT OF QUANTUM TECHNOLOGIES

Article 11

Strategic projects

1. For the purposes of operational objective 4 set out in Article 4(2), point (d) ('deploy quantum'), the Commission shall designate projects that help achieve the strategic objectives of the Union in quantum technologies by addressing critical capacity gaps, strengthening and building industrial capabilities, supporting innovation, deployment and market uptake of quantum technologies, or enhancing the resilience, security and autonomy of the quantum value chain ('strategic projects').

2. Only projects located within the territory of the Union may be designated as strategic projects that contribute to the achievement of the objectives referred to in paragraph 1.

3. Participation in projects that contribute to the achievement of the strategic objectives referred to in paragraph 1 shall be limited to Union-controlled entities and other entities under a partnership concluded by the Union in line with Article 31(4) and (6), subject to Article 31(7).

Article 12

Identification of areas for strategic projects

1. Strategic projects may include projects concerning the priority areas set out in Annex IV.

2. The Commission shall be empowered to adopt delegated acts in accordance with Article 33 to amend the list of priority areas set out in Annex IV in order to reflect technological change, capacity gaps in industrial Union capabilities or market developments, relevant to the quantum sector.

Article 13

Designation of strategic projects

1. Strategic projects shall be selected by the EuroHPC Joint Undertaking following an open call for applications. A proposal for a project which is selected for funding by the EuroHPC Joint Undertaking following this call shall be considered to be designated as a strategic project within the meaning of Article 8(4) of Regulation (EU) 202X/XXX on the European Competitiveness Fund (ECF) [insert reference to ECF once adopted].

2. Subject to the consent of the applicant, the Commission may adopt a decision designating as strategic projects proposals not selected for funding by the EuroHPC Joint Undertaking, where they meet the applicable evaluation requirements laid down in the relevant call referred to in paragraph 1. That call and related application procedures shall clearly indicate the possibility of obtaining such designation. Each strategic project shall have an operator.

3. The operator of a strategic project may request the Commission to review the duration of the designation or to approve modifications to the operator's implementation plans, where the operator considers such a review duly justified by unforeseen external circumstances. On the basis of such a review, the Commission may revise the duration of the status of a strategic project granted or accept the modifications to the implementation plans.

4. Without prejudice to any suspension or termination of funding agreements between the operator and the EuroHPC Joint Undertaking, as applicable, where the Commission finds that a proposal designated as a strategic project in accordance with paragraph 1 or 2 no longer fulfils the requirements in the call for applications, or that the designation was based on incorrect information affecting compliance with those criteria, it may withdraw the designation by means of a decision.

5. Before adopting a decision pursuant to paragraph 4, the Commission shall inform the operator of the reasons for the envisaged withdrawal and shall give that operator the opportunity to submit observations within an appropriate time limit. The Commission shall take due account of those observations.

Article 14

Quantum Technology and Innovation Hubs

1. For the purposes of operational objective 2 set out in Article 4(2), point (b) ('grow quantum systems'), a limited number of Quantum Technology and Innovation Hubs shall be established in the Union.

2. To support the development of SMEs active in the quantum field and of individual innovators, the Quantum Technology and Innovation Hubs shall provide:

   (a) specialised technical or engineering expertise and services, which enable SMEs to address their major technological and engineering bottlenecks;

   (b) access to the quantum infrastructures necessary for their activities, including for testing and experimentation facilities and specialised equipment and tools;

   (c) access to dedicated talent and skills, and deliver specialised engineering training, as well as adoption and integration support linked to those facilities and infrastructures.

3. Services and access to relevant facilities and infrastructures shall be made available to users which are Union-controlled entities. The conditions of access shall ensure the protection of confidential information, trade secrets and intellectual property rights. Preferential access or reduced fees may be provided to SMEs, start-ups, universities and research organisations active in the quantum field.

4. Quantum Technology and Innovation Hubs shall be selected through open, transparent and competitive procedures. The call for applications shall identify the technological or application areas in which those hubs are to be established, to cover complementary domains and address identified capability gaps.

5. The Quantum Technology and Innovation Hubs shall form a coordinated Union network and shall coordinate their services, as well as with the services provided by the quantum competence and acceleration centres referred to in Article 17.

Article 15

European Quantum Regions of Excellence

1. The Commission may, by means of implementing acts, designate a European Quantum Region of Excellence and award a label, upon application by a regional authority, subject to endorsement by the respective Member State.

2. The application shall include a development plan for the candidate Quantum Region of Excellence setting out a strategic vision for the further development of the regional quantum ecosystem. The development plan shall describe the strengths and complementarities of the existing regional quantum ecosystem and its potential for further development, in particular with regard to the following:

   (a) quantum research and innovation;

   (b) added value for quantum enterprises and relevant industrial capabilities;

   (c) the availability of skills and capacity to attract talent;

   (d) the existence of Quantum Technology and Innovation Hubs or testing and experimentation infrastructures.

3. The Commission shall assess the application on the basis of the coherence and credibility of the development plan for the candidate Quantum Region of Excellence, the strength of the existing regional quantum ecosystem, and the commitment to further development.

4. The label referred to in paragraph 1 shall be granted for a period of five years and may be renewed where the region still meets the conditions set out in this Article, taking into account progress in implementing the development plan.

5. The Commission shall publish the list of designated European Quantum Regions of Excellence and may promote their visibility through relevant Union initiatives. Without prejudice to the applicable rules governing Union programmes and instruments, the label may be taken into account when assessing and selecting operations proposed under Union funding programmes.

Article 16

Network of European Quantum Regions of Excellence

1. A Network of European Quantum Regions of Excellence (‘the Quantum Regions Network’) is established.

2. The Quantum Regions Network shall organise its work autonomously. It may establish its own working methods, including organising meetings, the designation of a Chair on a rotating basis among participating regions, and the adoption of informal arrangements to facilitate cooperation and information exchange.

3. The Quantum Regions Network shall bring together regions awarded the European Quantum Regions of Excellence label pursuant to Article 15. Participation in the Quantum Regions Network shall follow automatically from the award of that label, without a separate selection procedure. The Quantum Regions Network shall have the following objectives:

   (a) to facilitate cooperation and exchange of best practices among quantum regions of excellence;

   (b) to promote the Quantum Regions Network and its activities among member and non-member regions through outreach, communication and dissemination activities to increase visibility and participation;

   (c) to promote synergies and complementarities between regional quantum ecosystems, including across different segments of the value chain;

   (d) to enhance the visibility and attractiveness of European Quantum Regions of Excellence for private investment and international partnerships;

   (e) to facilitate cooperation, where relevant, with the quantum excellence network referred to in Article 5, the Quantum Technology and Innovation Hubs referred to in Article 14, and the quantum competence and acceleration centres referred to in Article 17, in particular to support the transfer of scientific and technological knowledge into regional industrial ecosystems.

4. The Commission may organise meetings of the Quantum Regions Network, workshops or other activities to support information exchange and cooperation among participating regions.

Article 17

Quantum competence and acceleration centres

1. For the purposes of operational objective 5 set out in Article 4(2), point (e) (‘think and adopt quantum’), each Member State shall establish at least one quantum competence and acceleration centre (‘acceleration centre’) through an open and transparent call for applications. Each Member State may establish acceleration centres jointly with other Member States and partner countries.

2. The acceleration centres shall be established as a first-level access point for private and public sector entities. The acceleration centres shall support such entities in identifying relevant applications, finding suitable providers of technical and business support, and providing information on accessing quantum infrastructures, skills, and on finance, suppliers and procurement opportunities. This information shall be provided on an equal and non-discriminatory basis.

3. The acceleration centres shall perform at least the following activities to the benefit of the relevant stakeholders and in close cooperation with them, across the quantum value chain:

   (a) provide information on available private and public investment opportunities and financial support mechanisms;

(b) facilitating access to initial technical and business support necessary for the assessment, development and deployment of quantum technologies, and providing general technical information on such support;

(c) promoting synergies with innovation ecosystems and helping users by referring them to the Quantum Technology and Innovation Hubs referred to in Article 14, where applicable;

(d) supporting the development of quantum skills and talent in the Union through education, training and adoption support, upskilling and reskilling, especially for early adopters of quantum technologies and SMEs, and strengthening links between students, workers, education and training institutions, and quantum entities.

4. Member States shall designate candidate acceleration centres in accordance with their national procedures. When designating such centres, Member States may decide to base them on existing national, regional or sectoral structures.

Article 18

Standardisation, benchmarking and interoperability for quantum technologies

1. The Commission may support European and international standardisation, benchmarking and interoperability activities in the field of quantum technologies, taking into account existing Union and international activities and roadmaps. Such support shall address emerging needs and priorities, promote interoperability, and trustworthy deployment, and facilitate common terminology, interfaces, reference architectures, testing and validation methods, performance metrics, and technical specifications.

2. The European Quantum Alliance referred to in Article 32 may provide input to the standardisation, benchmarking and interoperability activities and their prioritisation.

Article 19

Voluntary quantum technology labelling scheme

1. The Commission shall encourage the development and uptake of voluntary labelling schemes intended for use across the Union for quantum technologies, components, products, services or systems. The schemes shall enable economic operators to provide reliable and verifiable information on the provenance, traceability and, where relevant, interoperability of such technologies, components and products.

2. The voluntary labelling scheme referred to in paragraph 1 may be developed, operated and governed by manufacturers, suppliers or other economic operators involved in the quantum value chain, individually or through organisations representing them, or by relevant metrology, testing or other bodies, including in cooperation with the relevant industry. The entities responsible for a scheme shall determine the applicable criteria, governance arrangements and verification mechanisms.

3. The voluntary labelling scheme referred to in paragraph 1 shall be based on clear, transparent and verifiable criteria, taking into account relevant standards and standardisation deliverables, available technical solutions and industry best practices. It shall be proportionate to the characteristics and maturity of the technologies and supply chains concerned.

SECTION 4

PROCUREMENT

Article 20

Procurement-related measures for quantum technologies

1. In public procurement procedures covered by Regulation (EU) 202X/XXX [Public Procurement Act] and concerning quantum technology products and services contracting authorities and contracting entities shall include requirements relating to the security of supply, interoperability, and lifecycle support of the tendered products or services, using, as appropriate, technical specifications, award criteria or contract performance conditions.

2. Public procurement procedures referred to in paragraph 1 shall be restricted to quantum technology products and services provided by Union-controlled entities and entities authorised to participate pursuant to Article 31. The same requirements shall apply to subcontractors and groups of economic operators. In the case of groups of economic operators, the majority of their members shall be Union-controlled entities.

3. For the purposes of this Regulation, an entity shall be deemed to provide a quantum technology product or service if it performs substantial development, manufacturing or processing of the product or service.

4. The Commission may, by means of implementing acts, further specify that certain quantum components which are critical for security interests of a quantum technology product or service shall be provided exclusively by Union-controlled entities. Such critical quantum components shall be identified based on the list established pursuant to Article 28 and on their availability in the Union. These implementing acts shall be adopted in accordance with the examination procedure referred to in Article 34(2).

5. In addition to the requirements referred to in paragraph 2 of this Article, for public procurement of innovation within the meaning of Article 60 of Regulation (EU) 202X/XXX [Public Procurement Act] that relates to quantum technology products and services, contracting authorities and contracting entities shall include, among the award criteria relating to quality, criteria to assess the tenderer's contribution to the development of the Union quantum ecosystem.

Article *21*

Procurement of post-quantum cryptography solutions

1. Public administration entities, as defined in Article 6(35) of Directive (EU) 2022/2555, which are in the scope of that Directive pursuant to Article 2(2), point (f), or Article 2(5), point (a), thereof, shall ensure that, in procurement procedures initiated on or after [OP: please insert the date falling six months after the entry into force of this Regulation], concerning products or services with digital elements identified in accordance with the criteria set out in paragraph 3, contracts are awarded only for products and services that support post-quantum cryptography and crypto-agility.

2. The Commission shall adopt implementing acts that set out the technical requirements under which products or services can be deemed to support post-quantum cryptography and crypto-agility. These implementing acts shall take into account the list of cryptographic mechanisms entitled "Agreed Cryptographic Mechanisms", drawn up by the European Cybersecurity Certification Group, Sub-group on Cryptography and published by the European Union Agency for Cybersecurity ('ENISA').

3. Products or services referred to in paragraph 1 shall be identified in accordance with the criticality of the systems of which they form part, based on the following criteria:

   (a) the sensitivity of the handled data, their importance for the performance of the relevant functions of the entity and their potential value to malicious actors;

   (b) time and effort required for migration of the system concerned; and

   (c) the potential societal and economic impact of a compromise of the system concerned.

4. Where suitable post-quantum cryptographic solutions are not yet available for a specific function, contracts may be awarded only if the products and services support crypto-agility and include a documented migration plan.

5. Where crypto-agility is not technically feasible for specific components or functions, the contracting authority or entity may grant a limited exception on the basis of a documented technical and security-risk assessment demonstrating that no suitable secure alternative exists. Such exceptions shall be limited to the components or functions affected and shall require compensating security measures and, where relevant, time-bound milestones for upgrading or replacement, without waiving applicable post-quantum cryptography requirements. Cost considerations alone shall not justify the exceptional award of a contract.

6. Member States shall take measures to encourage public administration entities other than those referred to in paragraph 1 to restrict procurements to products or services which support post-quantum cryptography and crypto-agility.

7. Post-quantum cryptography solutions developed and deployed pursuant to this Regulation shall, where appropriate, be interoperable with the European Union Critical Communication System (EUCCS), referred to in Regulation (EU) 202X/XXX [insert reference to EUCCS once adopted].

SECTION 5

IMPLEMENTATION

Article 22
Implementation

1. The Quantum Europe Framework Initiative referred to in Article 4 of this Regulation shall be implemented by the EuroHPC Joint Undertaking, in accordance with Regulation (EU) 2021/1173, unless otherwise provided for in this Regulation or, where the Commission decides to implement the relevant actions directly or to entrust their implementation to other bodies responsible for implementing relevant Union programmes and instruments, in accordance with the applicable legal

framework. That implementation shall not affect the implementation of actions related to quantum set out in Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 once adopted] through the Chips Joint Undertaking.

2. The Quantum Europe Framework Initiative shall be implemented at Union level, where necessary, in consultation with the Quantum Strategy Board.

3. The Quantum Europe Framework Initiative shall be funded by relevant Union programmes supporting quantum and post-quantum technologies. Such funding may be complemented by contributions from Member States and by other public and private sources, in accordance with applicable Union and national law.

4. Article 9(4), Article 11(3) and Article 20(2) shall apply in a complementary and coherent manner with the rules governing Union programmes, without prejudice to the specific provisions applicable to those programmes. In the event of a conflict between Article 9(4), Article 11(3) or Article 20(2) and a provision applicable to the relevant Union programme or programme, the latter shall prevail to the extent of that conflict.

Article 23

Equity investment vehicle for financial support to sovereign technologies – Sovereign Tech Equity Fund

1. The Union may establish and implement an equity investment vehicle for the financial support of technologies referred to in Article 1(1), point (b) (the 'vehicle'). The vehicle shall be established and implemented in accordance with the rules of Regulation (EU) 2024/2509, and during the period of the MFF 2028-2034, with the rules of the ECF InvestEU Instrument established in section 2 of Chapter I of Regulation (EU) 202X/XXX [insert reference to ECF once adopted] in complementarity with existing financial support instruments. The Union may participate in the vehicle as a shareholder together with the Member States and other public or private investors. The vehicle may be established in line with the requirements to be an implementing partner of the ECF InvestEU Instrument.

2. Member States shall be able to support the vehicle, including through contributions from relevant Union programmes, subject to the rules of the relevant programmes.

Chapter III
Strengthening the Union's Quantum Resilience

SECTION 1

POST-QUANTUM CRYPTOGRAPHY

Article 24

Monitoring and preparedness for post-quantum cryptography

1. Member States shall ensure the timely implementation of their commitments in accordance with the coordinated implementation roadmap on post-quantum cryptography.

2. The Commission shall monitor such progress by using existing cooperation structures and the ongoing work relating to the coordinated implementation roadmap on post-quantum cryptography.

3. Member States shall notify the Commission of their level of preparedness with regard to the transition to post-quantum cryptography. Member States and their national competent authorities shall provide the Commission with relevant information on such preparedness for assessment by [six months from the date of entry into force of this Regulation] and annually thereafter.

4. The Commission shall monitor research and technological developments in post-quantum cryptography, quantum and classical cryptanalysis and quantum computing to inform Union initiatives and the transition to post-quantum cryptography in the Union.

5. Where the Commission, based on its findings pursuant to paragraphs 2 to 4, concludes that binding requirements are necessary to ensure a timely and coordinated transition to post-quantum cryptography across the Union, in particular in light of significant delays in the deployment of available post-quantum cryptographic solutions and changes in the security level of cryptographic schemes, it may adopt delegated acts in accordance with Article 33 to supplement this Regulation by establishing specific milestones and timelines for that transition. Those delegated acts shall take into account the criticality of the systems concerned, and the time required for migration.

Article 25

Measures in support of the transition to post-quantum cryptography

The Commission shall, through existing national structures and arrangements, facilitate coordination among entities in sectors of high criticality listed in Annex I to Directive (EU) 2022/2555 and in other critical sectors listed in Annex II to that Directive to meet the objectives and milestones set out in the coordinated implementation roadmap for the transition to post-quantum cryptography, or any successor instrument.

Article 26

Standardisation, benchmarking and interoperability for post-quantum cryptography

The Commission may support European and international standardisation, benchmarking and interoperability activities in the field of post-quantum cryptography, taking into account Union and international initiatives and roadmaps.

SECTION 2

MONITORING AND RESILIENCE

Article 27

Strategic intelligence and dependency monitoring

1. The Commission shall carry out strategic intelligence and dependency monitoring for the purposes of this Regulation. That monitoring shall consist of the following activities:

(a) identifying and mapping the capabilities, activities and technological maturity of the entities active in the Union quantum value chain;

(b) identifying the most relevant quantum supply and value chains;

(c) monitoring the roles of the entities referred to in point (a) across the quantum value and supply chain;

(d) identifying dependencies, bottlenecks, and other vulnerabilities affecting the development, scale-up, deployment and uptake of quantum technologies in the Union;

(e) supporting early warning, preparedness and risk assessment activities in relation to disruptions affecting the quantum technology sector.

2. In carrying out the monitoring activities referred to in paragraph 1, the Commission shall cooperate with the Member States and shall involve relevant stakeholders, including providers and users of quantum technologies, contracting authorities and contracting entities, system integrators, research and technology organisations, SMEs and start-ups.

3. Where the Commission concludes that the Union's quantum ecosystem would benefit from the establishment of a digital twin of the quantum supply chain, it may adopt implementing acts laying down harmonised provisions for establishing a market intelligence platform.

The implementing acts referred to in the first subparagraph of this paragraph shall be adopted in accordance with the examination procedure referred to in Article 34(2).

4. Where appropriate and technically feasible, and without prejudice to the specific objectives of Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 Regulation once adopted], the market intelligence platform referred to in paragraph 3 of this Article may be integrated with the Business-to-Business Supply Chain Platform referred to in Article 33 of Regulation (EU) 202X/XXX [insert reference to Chips Act 2.0 Regulation once adopted].

Article 28

Critical quantum components and entities

1. The Commission shall establish and regularly update a list of critical quantum components and entities that are of strategic importance for the Union's quantum capacities and capabilities and that are at risk of supply disruption.

2. Where necessary and proportionate, the list referred to in paragraph 1 shall be used for the following purposes:

(a) monitoring dependencies and vulnerabilities in the quantum supply-chain;

(b) establishing early warning and alert arrangements;

(c) carrying out risk assessments, scenario exercises and contingency planning;

(d) supporting the diversification of sources of supply;

(e) identifying investment priorities;

(f) identifying certain critical components for which specific requirements for public procurements shall be introduced pursuant to Article 20(4).

3. The Commission shall identify shortages in labour and expertise and to support actions in the areas of education, training, reskilling and talent development. For those purposes, the Commission shall monitor the skills needs relating to the critical quantum components and entities referred to in paragraph 1.

4. Critical quantum components referred to in paragraph 1 shall be identified on the basis of an assessment of their importance for the Union's quantum value and supply chains, taking into account their availability, substitutability and concentration of supply and, where relevant, the capabilities or position of entities involved in their development, manufacturing or supply. Such assessment may include risks arising from acquisitions by third-country entities or the relocation of relevant activities outside the Union.

Chapter IV

Governance

SECTION 1

QUANTUM STRATEGY BOARD

Article 29

Establishment and tasks of the Quantum Strategy Board

1. A Quantum Strategy Board is established.

2. The Quantum Strategy Board shall provide the Commission with advice and assistance on measures to strengthen the Union's quantum ecosystem and on Union quantum policy. It shall also facilitate coordination and support the consistent and effective application of this Regulation, in particular by carrying out the following tasks:

   (a) facilitating cooperation among Member States and exchange of information on issues relating to this Regulation;

   (b) providing advice on a strategy on the Union quantum policy;

   (c) providing advice on matters in this Regulation, including on the Quantum Europe Framework Initiative and the operational objectives set out in Article 4;

   (d) advising the Commission on post-quantum cryptography, interoperability, testing, standardisation, and labelling for quantum technologies;

   (e) identifying new areas for strategic quantum infrastructures referred to in Article 9 and strategic projects referred to in Article 11;

   (f) advising the Commission on international cooperation and strategic partnerships related to quantum technologies referred to in Article 31.

3. The Quantum Strategy Board shall ensure structured cooperation with the NIS Cooperation Group, ENISA, the European Cybersecurity Certification Group

established by Article 62 of Regulation (EU) 2019/881 of the European Parliament and of the Council[72], and, where appropriate, other relevant cybersecurity bodies.

Article 30

Structure and operation of the Quantum Strategy Board

1. The Quantum Strategy Board shall be composed of high-level representatives from all Member States and shall be chaired by a representative of the Commission. The Commission shall provide administrative and secretariat support for the activities of the Quantum Strategy Board.
2. The Quantum Strategy Board may establish standing or temporary sub-groups for the purpose of examining specific questions. Member States shall nominate appropriate representatives with specific relevant technical expertise in accordance with the specific mandate of the sub-group.
3. The Quantum Strategy Board shall adopt its rules of procedure on a proposal from the Chair by simple majority of its members. The rules of procedure shall govern the convening of meetings, the preparation of agendas, the decision-making process, and the functioning of sub-groups.

SECTION 2

INTERNATIONAL COOPERATION ON QUANTUM TECHNOLOGIES

Article 31

International cooperation and strategic partnerships on quantum technologies

1. The Quantum Strategy Board shall advise the Commission on matters relating to international cooperation with partner countries and in multilateral forums in the field of quantum technologies, and shall, for that purpose, periodically discuss, in particular, the following topics:
   (a) the extent to which the international cooperation of the Union in the field of quantum technologies including strategic partnerships on quantum technologies, including in international forums contributes to the following objectives:
      (i) reducing strategic dependencies and strengthening the security of supply and resilience of the Union quantum supply chain;
      (ii) enhancing cooperation along the quantum value chain between the Union and partner countries, including in the field of research and innovation;
      (iii) addressing shortages and mismatches in knowledge and skills by attracting, mobilising and retaining talent in the Union;
   (b) the coherence and potential synergies between, bilateral cooperation between Member States, partner countries and multilateral organisations, on the one hand, and actions carried out by the Union in the context of international

[72] Regulation (EU) 2019/881 of the European Parliament and of the Council of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013 (Cybersecurity Act) (OJ L 151, 7.6.2019, p. 15, ELI: http://data.europa.eu/eli/reg/2019/881/oj).

cooperation in the field of quantum technologies, including strategic partnerships on quantum technologies, on the other hand;

(c) the partner countries to be prioritised for partnerships on quantum technologies.

2. The Commission shall facilitate and support the cooperation between the Quantum Strategy Board and other relevant coordination forums, including those established under the Global Gateway framework.

3. Member States and the Commission shall strengthen bilateral cooperation with partner countries and the Union's international cooperation in the field of quantum technologies, including non-binding strategic partnerships. Member States shall also support the Commission in the implementation of measures adopted in that context.

4. Where a partner country is associated with a Union funding programme providing financing for quantum activities, including strategic projects, and the applicable association agreement provides for reciprocal participation of Union-controlled entities in comparable activities, entities established in that partner country may be eligible to participate in the activities concerned, subject to the conditions and restrictions laid down in the association agreement.

5. The eligibility to participate referred to in paragraph 4 of this Article shall be without prejudice to the restrictions laid down in the applicable Union programme rules, including Regulation (EU) 202X/XXX [FP10 proposal] and Regulation (EU) 202X/XXX [ECF proposal]. Where permitted by the applicable Union programme rules and subject to the applicable association agreement, the Commission may restrict participation in or access to specific activities, impose additional requirements on such participation or access, or exclude entities from that third country from those activities, where strictly necessary to protect the Union's security or essential strategic interests.

6. For strategic quantum infrastructures referred to in Article 9, access by entities established in third countries shall be subject to the relevant Union programme and, where relevant, the rules governing the EuroHPC Joint Undertaking. In accordance with those rules, access to specific activities may be restricted where strictly necessary to protect the Union's security or essential strategic interests.

7. Where a partner country is not covered by paragraph 4 or 6, but the Union has established or participates in a strategic partnership with a third country in the field of quantum technologies, and such partnership provides for the possibility of reciprocal participation in quantum activities, the Commission may authorise entities established in that third country, or entities that do not qualify as Union-controlled entities, to have access to strategic quantum infrastructures or to participate in strategic projects.

Such access or participation may be authorised where all the following conditions are fulfilled:

(a) it is in the Union's interest and provides clear added value to the activity concerned;

(b) it does not pose a risk to the security, resilience or technological interests of the Union; and

(c) it is subject, where necessary, to conditions concerning access to results, intellectual property, security of information, supply-chain resilience and exploitation of results in the Union.

8. Where the Union has made or makes relevant commitments to a partner country under an agreement in the area of public procurement which cover the provision of quantum technology products, systems and services, legal entities established and controlled in that partner country shall be entitled to participate in the respective public procurement procedures. Such participation shall be without prejudice to the use of exceptions provided for under the applicable agreement or other applicable justifications for restrictions, in particular relating to the protection of security interests. Where no such commitments exist or apply, the reciprocal participation in procurement activities related to quantum technology may be authorised on the basis of the strategic partnerships referred to in paragraph 7, subject to appropriate safeguards.

SECTION 3

EUROPEAN QUANTUM ALLIANCE

Article 32
European Quantum Alliance

1. A European Quantum Alliance (the 'Alliance') is established.

2. The Alliance shall bring together relevant stakeholders and shall assist the Commission and the Member States on matters relevant to the quantum industry of the Union and to identify current geopolitical, technological, market and industry developments in quantum technologies.

3. The Alliance shall engage in a regular strategic dialogue with the Quantum Strategy Board. The Quantum Strategy Board may request input from the Alliance on matters falling within its tasks.

4. In carrying out its tasks referred to in paragraph 2, the Alliance shall in particular:

(a) identify dependencies, gaps and opportunities across the quantum value chain, including as regards critical components or entities;

(b) set up a demand forum to promote market uptake and cross border cooperations, industrial partnerships and pilot deployments.

5. The demand forum referred to in paragraph 4, point (b), shall in particular have the following tasks:

(a) facilitate the showcasing of quantum technologies and the matchmaking between providers of quantum technologies, quantum technology facilities or strategic projects and potential public and private users and purchasers;

(b) identify user needs, expected demand, and obstacles of a factual or economic nature affecting end-user demand, market uptake and public procurement, on the basis of aggregated or industry-wide information, without facilitating the exchange of commercially sensitive information or the coordination of the commercial strategies of undertakings.

6. The Commission shall appoint the members of the Alliance. The members of the Alliance shall be representatives of the quantum value and supply chain in the Union, including developers, manufacturers, suppliers and users of quantum technologies, and shall fulfil all the following criteria:

   (a) they have demonstrated experience, knowledge and capabilities in quantum technologies, including, where relevant, in their development, production, deployment or use;

   (b) they have a relevant presence in the Union or have committed to establishing such a presence in the Union; and

   (c) where relevant, they contribute, or have committed to contribute, to the resilience of the quantum value chain.

7. A representative of the Commission shall chair the Alliance.

8. The Alliance shall adopt its rules of procedure on a proposal from the Chair by simple majority of its members. The rules of procedure shall govern the convening of meetings, the preparation of agendas, the decision-making process and the functioning of the standing or temporary working groups

9. The Alliance shall meet in plenary assembly at least once a year. It may hold extraordinary meetings at the request of its Chair. The Chair shall convene the meetings and draw up the agenda in accordance with the rules of procedure of the Alliance and with its tasks pursuant to this Article.

10. The Alliance may establish, standing or temporary working groups to examine specific questions. The establishment of such working groups shall be subject to the approval of the Chair.

Chapter V
Delegation of Power and Committee Procedure

Article 33
Exercise of the delegation

1. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in this Article.

2. The power to adopt delegated acts referred to in Article 6(2), Article 7(3), Article 10(2), Article 12(2), and Article 24(5) shall be conferred on the Commission for an indeterminate period of time from [OP: insert date of entry into force].

3. The delegation of power referred to in Article 6(2), Article 7(3), Article 10(2), Article 12(2), and Article 24(5) may be revoked at any time by the European Parliament or by the Council. A decision to revoke shall terminate the delegation of the power specified in that decision. It shall take effect on the day following that of its publication in the Official Journal of the European Union or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.

4. Before adopting a delegated act, the Commission shall consult experts designated by each Member State in accordance with the principles laid down in the Interinstitutional Agreement of 13 April 2016 on Better Law-Making. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

5. A delegated act adopted pursuant to Article 6(2), Article 7(3), Article 10(2), Article 12(2), and Article 24(5) shall enter into force only if no objection has been expressed either by the European Parliament or by the Council within a period of two months of notification of that act to the European Parliament and the Council or if, before the expiry of that period, the European Parliament and the Council have both informed the Commission that they will not object. That period shall be extended by two months at the initiative of the European Parliament or of the Council.

Article 34
Committee procedure

1. The Commission shall be assisted by a committee. The Committee shall be a committee within the meaning of Regulation (EU) No 182/2011.

2. Where reference is made to this paragraph, Article 5 of Regulation (EU) No 182/2011 shall apply.

Chapter VI
Final Provisions

Article 35
Treatment of confidential information

1. The Commission and the Member States, and any other natural or legal person involved in the application of this Regulation shall ensure the confidentiality of information and data obtained in carrying out their tasks. In particular, they shall protect personal data, intellectual property rights and commercially sensitive information or trade secrets.

2. The information collected pursuant to this Regulation shall be made accessible to national statistical authorities and to Eurostat for the sole purpose of compiling European statistics in accordance with Regulation (EC) 223/2009 of the European Parliament and Council[73], ensuring statistical confidentiality.

Article 36
Evaluation and review

1. By [OP: insert date for five years after date of entry into force of this Regulation], the Commission shall submit a report on the evaluation and review of this Regulation to the European Parliament and to the Council. The report shall be made public.

2. For the purposes of the evaluation and review of this Regulation, the Quantum Strategy Board, the Member States and national competent authorities shall provide the Commission with information upon request.

[73] Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and repealing Regulation (EC, Euratom) No 1101/2008 of the European Parliament and of the Council on the transmission of data subject to statistical confidentiality to the Statistical Office of the European Communities, Council Regulation (EC) No 322/97 on Community Statistics, and Council Decision 89/382/EEC, Euratom establishing a Committee on the Statistical Programmes of the European Communities (OJ L 87, 31.3.2009, pp. 164–173, ELI: http://data.europa.eu/eli/reg/2009/223/oj).

3. In carrying out the evaluation and review of this Regulation the Commission shall take into account the positions and findings of the Quantum Strategy Board, of the European Parliament, of the Council, and of other relevant bodies or sources.

Article 37
Entry into force

This Regulation shall enter into force on the *tw*entieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the European Parliament	*For the Council*
The President	*The President*

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1. FRAMEWORK OF THE PROPOSAL/INITIATIVE

1.1. Title of the proposal/initiative

Regulation of the European Parliament and of the Council on a framework of measures for strengthening the Union's quantum ecosystem (Quantum Act)

1.2. Policy area(s) concerned

A new plan for the Union's sustainable prosperity and competitiveness, research and innovation, infrastructures, economic security and resilience.

1.3. Objective(s)

1.3.1. General objective(s)

The Quantum Act has two general objectives, as specified in the Explanatory Memorandum:

First, to sustain the Union's scientific and technological leadership and strengthen its competitiveness and industrial deployment capacity in quantum technologies by translating research excellence into manufacturable and deployable technologies, scaled Union's firms and competitive products and services.

Second, to improve the Union's resilience, trusted and quantum-safe deployment, and economic security in strategically relevant quantum value chains and infrastructures.

1.3.2. Specific objective(s)

Specific objective No 1

Support quantum research and innovation activities for consolidating Union's excellence across the Union to lead in quantum science and technology and transform the Union into a quantum industrial powerhouse and a global market leader in quantum technologies.

Specific objective No 2

Support the scale-up and market uptake of innovative quantum technologies and solutions by strengthening access to finance, facilitating engagement with users, promoting public and private procurement, and accelerating industrial deployment across the Union.

Specific objective No 3

Strengthen quantum value chain resilience, in particular by enabling the identification of strategic dependencies to prevent supply-chain disruptions, and support preparedness for the transition towards quantum-safe infrastructures and solutions.

1.3.3. Expected result(s) and impact

Specify the effects which the proposal/initiative should have on the beneficiaries/groups targeted.

The competitiveness of the Union's quantum ecosystem will improve and the ultimate goal is the reduction of strategic dependencies.

The Union's quantum industry should benefit from support to large-scale technological capacity building in emerging quantum technologies that will reinforce

the capabilities of the Union in industrial deployment. Industry should benefit as well from strategic projects in design and manufacturing.

The Union's quantum users in all sectors should benefit from increased security of supply of quantum technologies without disruptions and from efforts to promote closer relations with the quantum industry. In addition, critical sectors should benefit from enhanced security of supply of quantum technologies and preparedness for the transition to post-quantum cryptography (PQC).

1.3.4. Indicators of performance

Specify the indicators for monitoring progress and achievements.

The measurable indicators to monitor the implementation of the Regulation towards the achievement of its general and specific objectives are the following:

- EU–Member State programming/review cycles and follow-up to agreed priorities
- Facility participation and utilisation; SME and cross-border access; progression to validation/qualification
- Progress in the establishment of strategic quantum infrastructures
- Companies financed; public/private capital mobilised; follow-on financing and progress of strategic projects
- Reference deployments; progression from pilots to repeat procurement
- People trained; mobility; users supported; skills-gap indicators
- Common benchmarks/testing methods used; standards uptake; PQC implementation-coordination outputs
- Critical inputs assessed; alternative suppliers qualified; mitigation actions; supply timeliness

1.4. The proposal/initiative relates to:

☒ a new action

☐ a new action following a pilot project / preparatory action[74]

☐ the extension of an existing action

☐ a merger or redirection of one or more actions towards another/a new action

1.5. Grounds for the proposal/initiative

1.5.1. Requirement(s) to be met in the short or long term including a detailed timeline for roll-out of the implementation of the initiative

The Regulation enters into force on the twentieth day following its publication in the Official Journal. Specific provisions set additional deadlines for certain measures, including those relating to PQC procurement. The indicative financial estimates in Section 3 assume a gradual implementation phase in 2028–2029, with the planned operational capacity reached from 2030. This does not affect the legal deadlines established by the Regulation.

The Commission performs the governance, coordination, designation and monitoring tasks assigned to it. The Framework Initiative is implemented through the EuroHPC

[74] As referred to in Article 58(2), point (a) or (b) of the Financial Regulation.

Joint Undertaking (JU), without prejudice to the responsibilities of Member States and subject to the JU's applicable legal mandate.

1.5.2. Added value of EU involvement (it may result from different factors, e.g. coordination gains, legal certainty, greater effectiveness or complementarities). For the purposes of this section 'added value of EU involvement' is the value resulting from EU action, that is additional to the value that would have been otherwise created by Member States alone.

Union action can add value in four main ways.

First, alignment: by aligning Union and national priorities to focus resources where European scale is required, while allowing Member States to support areas reflecting their scientific and industrial strengths.

Second, economies of scale: by enabling specialisation and shared access to costly infrastructure (e.g., pilot lines, testbeds), especially for start-ups, SMEs and users located in Member States lacking such facilities.

Third, market leverage: by coordinating procurement and strengthening links between firms, users and investors, Union action can create stronger demand and give firms a larger home market in which to scale, while strengthening the Union's collective position.

Fourth, identifying and managing strategic dependencies: by aggregating information across firms, infrastructures and Member States, Union action can reveal concentration and chokepoints that would not be visible from a national perspective and facilitate coordinated diversification.

1.5.3. Lessons learned from similar experiences in the past

This is the first legislative instrument aiming to regulate quantum technologies at Union level.

Union action is necessary to tackle fragmentation of national efforts and to complement national measures where objectives require critical mass, shared infrastructure, cross-border market formation or aggregated supply-chain visibility.

1.5.4. Compatibility with the multiannual financial framework and possible synergies with other appropriate instruments

The implementation of the Quantum Act would be entrusted to existing bodies, the mandate of which already covers quantum aspects. In particular, the EuroHPC JU, or its successor under the next Multiannual Financial Framework (MFF), would implement the quantum R&I and infrastructure actions falling within its legal and budgetary mandate.

The initiative needs to be also seen in the context of the preparation of the next MFF, the proposed European Competitiveness Fund and the next Research Framework Programme. In particular, the Quantum Act would not create automatic funding entitlements but any planning ranges would be subject to the future MFF, programme legislation and individual funding decisions.

1.5.5. Assessment of the different available financing options, including scope for redeployment

Without prejudice to the outcome of negotiations on the next MFF, appropriations and staffing from 2028 onwards are indicative. The revised resource scenario differentiates ongoing responsibilities from new duties under the Quantum Act. The Commission staffing scenario comprises 25 FTEs. Existing staff would continue to support ongoing quantum research and innovation activities, established EuroHPC governance and programmes, EuroQCI and ongoing policy coordination. The additional statutory duties will be addressed through prioritisation and internal reallocation within constant Commission resources. EuroHPC JU staffing requirements are assessed separately.

1.6. Duration of the proposal/initiative and of its financial impact

☐ **limited duration**

– ☐ Limited duration dates: not applicable.

– ☐ Limited duration financial period: not applicable.

☒ **unlimited duration**

– Implementation with a start-up period from 2028 to 2029,

– followed by full-scale operation from 2030. Financial tables cover 2028-2034. The IA uses a separate 2028–2037 analytical horizon; it does not establish appropriations after 2034. Payments on existing commitments may continue after 2034 under the applicable agreements.

1.7. Method(s) of budget implementation planned

☒ **Direct management** by the Commission

– ☒ by its departments, including by its staff in the Union delegations;

– ☐ by the executive agencies

☐ **Shared management** with the Member States

☒ **Indirect management** by entrusting budget implementation tasks to:

– ☐ third countries or the bodies they have designated

– ☐ international organisations and their agencies (to be specified)

– ☐ the European Investment Bank and the European Investment Fund

– ☒ bodies referred to in Articles 70 and 71 of the Financial Regulation

– ☐ public law bodies

– ☐ bodies governed by private law with a public service mission to the extent that they are provided with adequate financial guarantees

– ☐ bodies governed by the private law of a Member State that are entrusted with the implementation of a public-private partnership and that are provided with adequate financial guarantees

– ☐ bodies or persons entrusted with the implementation of specific actions in the common foreign and security policy pursuant to Title V of the Treaty on European Union, and identified in the relevant basic act

– ☐ bodies established in a Member State, governed by the private law of a Member State or Union law and eligible to be entrusted, in accordance with sector-specific rules, with the implementation of Union funds or budgetary guarantees, to the extent that such bodies are controlled by public law bodies or by bodies governed by private law with a public service mission, and are provided with adequate financial guarantees in the form of joint and several liability by the controlling bodies or equivalent financial guarantees and which may be, for each action, limited to the maximum amount of the Union support.

Comments

Quantum research, quantum grand challenges, quantum strategic infrastructures, hub and other funding actions may be implemented by the EuroHPC Joint Undertaking or its successor under indirect management only within its applicable mandate and programme legislation. The Joint Undertaking manages calls, awards, contracts and project monitoring

entrusted to it; it does not take the Commission's statutory strategic project designation decisions.

The Commission retains direct responsibility for national-strategy alignment, Commission designation and withdrawal decisions on strategic projects, the Quantum Strategy Board and Alliance, monitoring and preparedness for post-quantum cryptography, strategic intelligence, critical-component assessment and oversight of implementation. Delegated acts and implementing acts are to be prepared only where the Quantum Act Proposal confers the relevant powers. Routine individual decisions and programme implementation should use existing procedures where legally possible.

2. MANAGEMENT MEASURES

2.1. Monitoring and reporting rules

This Statement includes expenditure for Commission staff and incremental implementation support. Standard expenditure rules apply. The Commission will report annually on Framework Initiative implementation and submit a public evaluation and review report five years after entry into force, in accordance with the proposal.

Additionally, as a Union body, the EuroHPC Joint Undertaking functions under strict monitoring rules.

Monitoring is performed through:

- its own internal audit capacity and the audit service of the Commission;

- the supervision of the Governing Board. The Executive Director will supervise the Joint Undertaking's operations internally;

- mid-term and final evaluations of the programme by external experts, under the supervision of the Commission;

- the Joint Undertaking's Work Programme and its Annual Activity Report.

It can be expected that similar rules would apply to any successor, where relevant.

2.2. Management and control system(s)

2.2.1. Justification of the budget implementation method(s), the funding implementation mechanism(s), the payment modalities and the control strategy proposed

The Regulation establishes a new policy framework for strengthening the Union quantum ecosystem and for enhancing the competitiveness and industrial deployment of quantum technologies, and strengthening economic security and resilience in strategically relevant quantum value chains and infrastructures.

These objectives require reinforced Union-level coordination and operational capacity, which in turn require targeted and proportionate budgetary resources. The proposal introduces proportionate changes, establishing a governance coordination scheme with new Union-level tasks, while ensuring that decision-making remains at the most efficient level. The chosen governance model aims to build on existing structures and mandates, and allowing the budget to be implemented through established administrative and financial arrangements, ensuring cost effectiveness and predictability of expenditures.

Commission implementation is based on 25 FTEs. These resources will in principle stem from internal redeployment within the DG, following a reprioritisation of existing activities.

Payments follow the Financial Regulation, applicable funding agreements and annual budgets within the MFF ceilings. No fee financing is assumed. Expenditure is subject to ex ante checks, risk-based ex post controls, performance monitoring and reporting under the Commission and implementing-body internal control frameworks.

For other parts, indirect management is justified because the EuroHPC Joint Undertaking is a public-private partnership with part of the co-financing brought in via contributions from Participating States and via in-kind contributions by private

members. Each year, the decision on the Union contribution to the EuroHPC Joint Undertaking will be taken by virtue of the Union budget adopted for that year.

A Framework Financial Partnership Agreement signed between the European Commission and the EuroHPC Joint Undertaking will indicate that for the tasks to be carried out each year the Commission will pay a contribution upon conclusion of a contribution agreement with the EuroHPC Joint Undertaking, and the issuing, by the Joint Undertaking, of corresponding payment requests to the members other than the Union.

The Commission will ensure that the rules applicable to the EuroHPC Joint Undertaking fully comply with the requirements of the Financial Regulation. In compliance with Article 71 of Regulation (EU, Euratom) 2024/2509, the Joint Undertaking will respect the principle of sound financial management. The EuroHPC Joint Undertaking shall also comply with the provisions of the Model Financial Regulation applicable to the Joint Undertaking. Any departure from this Model Financial Regulation, required for the purpose of the Joint Undertaking's specific needs, shall be subject to the Commission's prior consent.

Oversight through Union representation in the competent governing bodies, applicable contribution agreements, annual activity reporting and audit arrangements supports Commission accountability to the College and Budgetary Authority. Each implementing body follows its own basic act.

2.2.2. Information concerning the risks identified and the internal control system(s) set up to mitigate them

This proposal is accompanied by an impact assessment report, which provides the analytics underpinning the chosen policy approach. The preparation of the initiative also drew on a public consultation as well as targeted consultations with industry stakeholders, Member States and trade associations, which ensured the collection of relevant data, information, and feedback. Nonetheless, unintentional consequences or unforeseen impacts may still occur during implementation. These will be identified through the monitoring procedures set out in the Regulation, allowing the Commission to address them in an appropriate and timely manner.

Additionally, various measures have been established to mitigate the inherent risk of conflict of interest within the EuroHPC Joint Undertaking, especially:

- conflict-of-interest prevention and management under the applicable basic act and financial rules;

- documented approval and oversight of work programmes by the competent bodies;

- separation of independent evaluation, funding decisions and beneficiary interests;

- selection of the Executive Director by the Governing Board based on a proposal by the Commission,

- independence of staff,

- evaluations by independent experts based on published evaluation criteria together with appeal mechanisms and full declarations of any interests,

- a requirement for the Governing Board to adopt rules for the prevention, avoidance and management of conflicts of interest in the Joint Undertaking in accordance with the financial rules of the Joint Undertaking and with the Staff Regulations in respect of staff.

The continuation of existing ethical and organisational values will be one of the key roles of the Joint Undertaking and will be monitored by the Commission.

The Executive Director, as Authorising Officer, establishes a cost-effective internal control system and reports on its operation under the applicable financial rules.

The Commission will monitor the risk of non-compliance through the reporting system that it will develop, as well as by following the results of ex post audits on the recipients of Union funds from the EuroHPC Joint Undertaking, as part of ex post audits covering the whole of the successor of Horizon Europe and the European Competitiveness Fund.

There is a clear need to manage the budget in an efficient and effective manner, and to prevent fraud and waste. However, the control system needs to strike a fair balance between attaining an acceptable error rate and the control burden required and avoid lowering the attractiveness of the Union's programmes.

2.2.3. Estimation and justification of the cost-effectiveness of the controls (ratio between the control costs and the value of the related funds managed), and assessment of the expected levels of risk of error (at payment & at closure)

Controls use the systems of the financing programmes and implementing bodies. No additional Quantum Act-specific control structure is created. Control-cost ratios and error estimates are monitored through annual activity reporting; no independent numerical rate is assumed before the future programme rules and portfolio are established. Risk-based controls will balance assurance with beneficiary burden.

2.3. Measures to prevent fraud and irregularities

The Commission will ensure that procedures to fight against fraud at all stages of the management process are applied by the EuroHPC Joint Undertaking.

The Commission will ensure that appropriate measures are in place to ensure that, when actions financed under this Regulation are implemented, the financial interest of the Union is protected by the application of preventive measures against fraud, corruption and any other illegal activities, by effective checks and, if irregularities are detected, by the recovery of the amounts wrongly paid and, where appropriate, by effective, proportionate and deterrent penalties.

The Court of Auditors shall have the power of audit, on the basis of documents and on-the-spot checks, over all grant beneficiaries, contractors and subcontractors who have received Union funds under the Programme. The European Anti-fraud Office (OLAF) may carry out on-the-spot checks and inspections on economic operators concerned directly or indirectly by such funding in accordance with the procedures laid down in Regulation (Euratom, EC) No 2185/96 with a view to establishing whether there has been fraud, corruption or any other illegal activity affecting the financial interests of the Union in connection with a grant agreement or grant decision or a contract concerning Union funding. The Joint Undertakings will also need to accede to the Interinstitutional Agreement of 25 May 1999 between the European Parliament, the Council of the European Union and the Commission of the European Communities concerning internal investigations by the European Anti-fraud Office (OLAF). The European Public Prosecutor's Office may carry out investigations in accordance with the provisions and procedures laid down in Council

Regulation (EU) 2017/1939, with a view to investigating criminal offences affecting the financial interests of the Union.

3. ESTIMATED FINANCIAL IMPACT OF THE PROPOSAL/INITIATIVE

The estimated impact on expenditure and staffing for 2028 and beyond is added for illustrative purposes only and does not pre-judge the next Multiannual Financial Framework. The source of financing and scope of Union financial commitment in the post-2027 period remain subject to the outcome of interinstitutional negotiations on the MFF 2028-2034 and thereafter shall be determined through the annual budgetary procedure. All appropriations and staffing allocations as of 2028 are indicative.

3.1. Heading(s) of the multiannual financial framework and expenditure budget line(s) affected

- Existing budget lines: no specific 2028–2034 identifiers are available at this stage. Budget nomenclature and line allocations remain subject to confirmation under the next MFF.

- New budget lines requested, no standalone Quantum Act line is presumed. The table identifies prospective programme allocations; future line numbers and third-country contributions follow the applicable budget nomenclature and programme association rules.

Heading of multiannual financial framework	Budget line	Type of expenditure	Contribution			
	Number	Diff./Non-diff.	from EFTA countries	from candidate countries and potential candidates	from other third countries	other assigned revenue
	ECF	Diff.	Programme rules	Programme rules	Programme rules	NO
	FP 10	Diff.	Programme rules	Programme rules	Programme rules	NO

3.2. Estimated financial impact of the proposal on appropriations

3.2.1. Summary of estimated impact on operational appropriations

The tables below quantify indicative gross implementation expenditure carried forward from the submitted LFDS: shared-capacity services, digital functions implementing-body delivery support. They are not the financing envelope for the entire Quantum Europe Framework Initiative. Wider research, quantum grand challenges, strategic quantum infrastructure, strategic projects, deployment, skills and horizontal actions are financed under the applicable Union programmes, work programmes and individual awards. Programme-resource planning ranges are reported separately in section 3.2.6 and are not mechanically added to these implementation estimates.

– ☐ The proposal/initiative does not require the use of operational appropriations

– ☒ The proposal/initiative requires the use of operational appropriations, as explained below, as explained below.

3.2.1.1. Appropriations from voted budget

EUR million (to three decimal places)

Heading of multiannual financial framework	2	

DG CNECT			Year	Year	Year	Year	Year	Year	Year	**TOTAL MFF 2028-2034**
			2028	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	
Operational appropriations										
ECF	Commitments	(1a)	1,500		1,500	4,000	2,500	2,500	2,500	2,500	**17,000**
	Payments	(2a)	1,125		1,350	3,375	2,625	2,650	2,500	3,375	**17,000**
FP10	Commitments	(1b)	0,800	1,300	0,600	3,100	0,600	0,600	0,600		**7,600**
	Payments	(2b)	0,600	1,095	0,725	2,545	0,975	0,850	0,810		**7,600**
Appropriations of an administrative nature financed from the envelope of specific programmes										
Research staff BL		(3)	**2,379**		**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**16,653**
TOTAL appropriations	Commitments	=1a+1b+3	**4,679**		**5,179**	**6,979**	**7,979**	**5,479**	**5,479**	**5,479**	**41,253**
For DG <CONNECT…….>	Payments	=2a+2b+3	**4,104**		**4,824**	**6,479**	**7,549**	**6,004**	**5,729**	**6,564**	**41,253**

EuroHPC JU	Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL 2028-2034
Staff expenditure	1,552	1,552	1,552	1,552	1,552	1,552	1,552	**10,864**
Infrastructure and operating expenditure								**0,000**
Operational expenditure	1,029	1,029	1,029	1,029	1,029	1,029	1,029	**7,203**
TOTAL of appropriations covered by the EU budget	**2,581**	**2,581**	**2,581**	**2,581**	**2,581**	**2,581**	**2,581**	**18,067**

An indicative amount of EUR 7.203 million over 2028–2034 (EUR 1.029 million annually) is envisaged for operational implementation support through the EuroHPC Joint Undertaking, subject to its applicable mandate and future programme and budgetary decisions. The separate requirement for eight additional JU FTEs and its associated staffing costs remains subject to confirmation.

		Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL MFF 2028-2034
TOTAL operational appropriations (including contribution to JU)	Commitments	(4)	4,881	5,381	7,181	8,181	5,681	5,681	5,681	**42,667**
	Payments	(5)	4,306	5,026	6,681	7,751	6,206	5,931	6,766	**42,667**
TOTAL appropriations of an administrative nature financed from the envelope for specific programmes		(6)	2,379	2,379	2,379	2,379	2,379	2,379	2,379	**16,653**
TOTAL appropriations under HEADING <2….> of the multiannual financial framework	Commitments	=4+6	**7,260**	**7,760**	**9,560**	**10,560**	**8,060**	**8,060**	**8,060**	**59,320**
	Payments	=5+6	**6,685**	**7,405**	**9,060**	**10,130**	**8,585**	**8,310**	**9,145**	**59,320**

Heading of multiannual financial framework	4	'Administrative expenditure'[75]

DG: CNECT		Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL MFF 2028-2034
• Human resources		1,676	1,676	1,676	1,676	1,676	1,676	1,676	**11,732**
• Other administrative expenditure									
TOTAL DG CNECT	Appropriations								
TOTAL appropriations under HEADING 4 of the multiannual financial framework	(Total commitments = Total payments)	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**11,732**

EUR million (to three decimal places)

		Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL MFF 2028-2034
TOTAL appropriations under HEADINGS 1 to 4	Commitments								**71,072**
of the multiannual financial framework	Payments	**8,361**	**9,081**	**10,736**	**11,806**	**10,261**	**9,986**	**10,821**	**71,072**

The EUR 7.203 million (operational credits JU) delivery-support provision is EUR 1.029 million per year for tasks entrusted to existing implementing bodies: network and facility-service coordination; processing and quality assurance of implementation data; monitoring of funded actions; stakeholder and user support; and operational reporting. It is retained as a provisional aggregate provision from the submitted LFDS, not converted into an unsupported headcount estimate. It excludes Commission staff costed under Heading 4,

[75] The necessary appropriations should be determined using the annual average cost figures available on the appropriate BUDGpedia webpage.

hub/centre service grants under the EUR 17.000 million line, and platform IT development and maintenance under the EUR 7.600 million line. Actual financing and cost categories follow programme allocations and the relevant contribution or service agreements.

Annual commitments and payments are presented on the same-year basis used in the submitted LFDS. This is a simplifying implementation-cost assumption, not a forecast of pre-financing or settlement under individual agreements. Actual payments follow delivery milestones and applicable grant, contract or contribution terms; outstanding liabilities will be honoured beyond 2034 where necessary. All totals are calculated for the stated seven-year costing period.

This provision is intended to cover operational implementation services, including coordination of shared facilities, technical support for calls and monitoring, data validation and user assistance. The annual amount remains provisional and will be validated against the expected volume of activities, required deliverables and eligible service costs. This operational provision excludes additional EuroHPC JU staff costs, which are assessed separately.

3.2.1.2. Appropriations from external assigned revenues

No assigned revenue is assumed for the quantified implementation-support scenario: EUR 0.000 million.

3.2.2. Estimated output funded from operational appropriations (not to be completed for decentralised agencies)

The table identifies outputs of the quantified support tranche. Shared quantum capacity contributes to Specific Objectives 1 and 2, while the Quantum Service Platform contributes primarily to Specific Objective 2. The remaining IA objectives are implemented through Commission tasks and relevant programme actions. Output counts describe costing assumptions, not legal selection of facilities or projects. The EUR 17 million estimate comprises 25 hub-years at EUR 0.5 million per hub-year and 15 centre-support tranches at EUR 0.3 million each. These are illustrative costing assumptions, not limits on the number of facilities or centres supported under the Regulation.

Commitment appropriations in EUR million (to three decimal places)

Indicate objectives and outputs			Year **2028**	Year **2029**	Year **2030**	Year **2031**	**Years 2032, 2033 and 2034**	**TOTAL**
	OUTPUTS							

⇩	Type [76]	Average cost	No	Cost	No	Cost	No	Cost	No	Cost	**No 2032**	**Cost 2032**	**No 2033**	**Cost 2033**	**No 2034**	**Cost 2034**	Total No	Total cost
Specific Objectives 1 and 2. Shared quantum capacity and user support																		
- Technology and innovation hubs in operation	Hub-yr	0.500	–	–	–	–	5	2.500	5	2.500	5	2.500	5	2.500	5	2.500	**25**	**12.500**
- Competence and acceleration centres connected	Centre	0.300	5	1.500	5	1.500	5	1.500	–	–	–	–	–	–	–	–	**15**	**4.500**
Subtotal for specific Objectives 1 and 2				**1.500**		**1.500**		**4.000**		**2.500**		**2.500**		**2.500**		**2.500**		**17.000**
Specific Objectives 1 and 2. Shared quantum capacity and user support																		
Quantum-related digital services, including Article 8 platform functions (provisional scope and costs)	Platform	n.a.	1	0.800	1	1.300	1	0.600	1	3.100	1	0.600	1	0.600	1	0.600	**1**	**7.600**
Subtotal for specific Objectives 1 and 2				**0.800**		**1.300**		**0.600**		**3.100**		**0.60**		**0.600**		**0.600**		**7.600**

[76] Outputs are products and services to be supplied (e.g. number of student exchanges financed, number of km of roads built, etc.).

										0						
TOTALS		**2.300**		**2.800**		**4.600**		**5.600**		**3.100**		**3.100**		**3.100**		**24.600**

3.2.3. Summary of estimated impact on administrative appropriations

– ☐ The proposal/initiative does not require the use of appropriations of an administrative nature

– ☒ The proposal/initiative requires the use of appropriations of an administrative nature, as explained below

3.2.3.1. Appropriations from voted budget

VOTED APPROPRIATIONS	Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL 2028 - 2034
HEADING 4								
Human resources	1,676	1,676	1,676	1,676	1,676	1,676	1,676	**11,732**
Other administrative expenditure	0,000	0,000	0,000	0,000	0,000	0,000	0,000	**0,000**
Subtotal HEADING 4	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**11,732**
Outside HEADING 4								
Human resources	2,379	2,379	2,379	2,379	2,379	2,379	2,379	**16,653**
Other expenditure of an administrative nature	0,000	0,000	0,000	0,000	0,000	0,000	0,000	**0,000**
Subtotal outside HEADING 4	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**16,653**
TOTAL	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**28,385**

The estimated impact on expenditure and staffing for 2028 and beyond is added for illustrative purposes only and does not pre-judge the next Multiannual Financial Framework. The source of financing and scope of Union financial commitment in the post-2027 period remain subject to the outcome of interinstitutional negotiations on the MFF 2028-2034 and thereafter shall be determined through the annual budgetary procedure. All appropriations and staffing allocations as of 2028 are indicative.

The appropriations required for human resources and other expenditure of an administrative nature will be met by appropriations from the DG that are already assigned to management of the action and/or have been redeployed within the DG, together, if necessary, with any additional allocation which may be granted to the managing DG under the annual allocation procedure and in the light of budgetary constraints.

3.2.3.2. Appropriations from external assigned revenues

Administrative expenditure from assigned revenue: EUR 0.000 million

3.2.3.3. Total appropriations

TOTAL VOTED APPROPRIATIONS + EXTERNAL ASSIGNED REVENUES	Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	TOTAL 2028 - 2034
HEADING 4								
Human resources	1,676	1,676	1,676	1,676	1,676	1,676	1,676	**11,732**
Other administrative expenditure	0,000	0,000	0,000	0,000	0,000	0,000	0,000	**0,000**
Subtotal HEADING 4	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**1,676**	**11,732**
Outside HEADING 4								
Human resources	2,379	2,379	2,379	2,379	2,379	2,379	2,379	**16,653**
Other expenditure of an administrative nature	0,000	0,000	0,000	0,000	0,000	0,000	0,000	**0,000**

Subtotal outside HEADING 4	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**2,379**	**16,653**
TOTAL	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**4,055**	**28,385**

3.2.4. Estimated requirements of human resources

– ☐ The proposal/initiative does not require the use of human resources

– ☒ The proposal/initiative requires the use of human resources, as explained below

3.2.4.1. Financed from voted budget

Estimate to be expressed in full-time equivalent units (FTEs)

VOTED APPROPRIATIONS		Year **2028**	Year **2029**	Year **2030**	Year **2031**	Year **2032**	Year **2033**	Year **2034**
Establishment plan posts (officials and temporary staff)								
Headquarters and Commission representations - line to be confirmed		7	7	7	7	7	7	7
Budget line to be confirmed (EU Delegations)		–	–	–	–	–	–	–
(Indirect research)		9	9	9	9	9	9	9
(Direct research)		–	–	–	–	–	–	–
Other budget lines (specify)		–	–	–	–	–	–	–
External staff (inFTEs)								
Contract agents - line to be confirmed		3	3	3	3	3	3	3
Budget line to be confirmed (AC, AL, END and JPD in the EU Delegations)		–	–	–	–	–	–	–
Admin. Support line	at Headquarters	–	–	–	–	–	–	–
Programme support line	in EU Delegations	–	–	–	–	–	–	–
(AC, END - Indirect research)		6	6	6	6	6	6	6
(AC, END - Direct research)		–	–	–	–	–	–	–
Other budget lines (specify) - Heading 4		–	–	–	–	–	–	–
Other budget lines (specify) - Outside Heading 4		–	–	–	–	–	–	–
TOTAL		**25**	**25**	**25**	**25**	**25**	**25**	**25**

The estimated impact on expenditure and staffing for 2028 and beyond is added for illustrative purposes only and does not pre-judge the next Multiannual Financial Framework. The source of financing and scope of Union financial commitment in the post-2027 period remain subject to the outcome of interinstitutional negotiations on the MFF 2028-2034 and thereafter shall be determined through the annual budgetary procedure. All appropriations and staffing allocations as of 2028 are indicative.

The staff required to implement the proposal (in FTEs):

	To be covered by current staff available in the Commission services	**Exceptional additional staff***

		To be financed under Heading 4 or Research	To be financed from BA line	To be financed from fees
Establishment plan posts	14	2	N/A	
External staff (CA, SNEs, INT)	6	3		

Considering the overall strained situation in Heading 4, in terms of both staffing and the level of appropriations, the human resources required will be met by staff from the DG who are already assigned to the management of the action and/or have been redeployed within the DG or other Commission services.

EuroHPC JU staffing requirements are assessed separately.

Description of tasks to be carried out by the **Commission**:

Officials and temporary staff	**Existing** responsibilities in relation to quantum technologies are undertaken by 20 FTEs, split across official/temporary-agent and contract-agent roles: ongoing quantum research and innovation activities; established EuroHPC governing/programme coordination; EuroQCI policy and deployment liaison; existing stakeholder, Member State, strategic and inter-service coordination. The additional statutory duties will be addressed through prioritisation and internal reallocation within constant Commission resources. **Additional tasks** under the Quantum Act include ensuring alignment between the Quantum Europe Framework Initiative and national/regional strategies and monitoring of relevant implementation, preparedness and monitoring for post-quantum cryptography; assessment and designation of quantum strategic projects; strategic quantum infrastructure and oversight of the activities of the implementing body; coordination of quantum grand challenges, including monitoring of milestones and deliverables, Quantum Technology and Innovation Hubs and competence and acceleration centres; Quantum Service Platform for Science and Industry and digital means to communicate information for these activities support governance mechanisms, including the Quantum Strategy Board and the European Quantum Alliance, international cooperation and setting up strategic partnerships with third countries; strategic-dependency monitoring; legal and financial supervision; and support for industrial uptake, standards, and skills, providing technical and legal guidance for procurement of systems integrating innovative quantum solutions and/or post-quantum cryptography solutions. Detailed allocations remain subject to workload validation.
External staff	Idem

3.2.4.2. Financed from external assigned revenues

Not applicable.

3.2.4.3. Total requirements of human resources

Estimate to be expressed in full-time equivalent units (FTEs)

VOTED APPROPRIATIONS		Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034
Establishment plan posts (officials and temporary staff)								
Headquarters and Commission representations - line to be confirmed		7	7	7	7	7	7	7
Budget line to be confirmed (EU Delegations)		–	–	–	–	–	–	–
(Indirect research)		9	9	9	9	9	9	9
(Direct research)		–	–	–	–	–	–	–
Other budget lines (specify)		–	–	–	–	–	–	–
External staff (inFTEs)								
Contract agents - line to be confirmed		3	3	3	3	3	3	3
Budget line to be confirmed (AC, AL, END and JPD in the EU Delegations)		–	–	–	–	–	–	–
Admin. Support line	at Headquarters	–	–	–	–	–	–	–
Programme support line	in EU Delegations	–	–	–	–	–	–	–
(AC, END - Indirect research)		6	6	6	6	6	6	6
(AC, END - Direct research)		–	–	–	–	–	–	–
Other budget lines (specify) - Heading 4		–	–	–	–	–	–	–
Other budget lines (specify) - Outside Heading 4		–	–	–	–	–	–	–
TOTAL		**25**	**25**	**25**	**25**	**25**	**25**	**25**

3.2.5. Overview of estimated impact on digital technology-related investments

The EUR 7.600 million policy IT estimate is an indicative provision for quantum-related digital services. Its functional scope, allocation between the European Quantum Service Platform under Article 8 and other relevant digital functions, and the proposed enhancement in 2031 remain subject to technical validation. The estimate will be revised as necessary to reflect the final scope, implementation arrangements and cost assumptions, while maximising reuse of existing EuroHPC and Commission infrastructure and avoiding duplication of expenditure.

TOTAL Digital and IT appropriations	Year 2028	Year 2029	Year 2030	Year 2031	Year 2032	Year 2033	Year 2034	**TOTAL MFF 2028 – 2034**
IT expenditure (corporate)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Subtotal HEADING 4	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Outside HEADING 4								
Policy IT expenditure on operational programmes	0.800	1.300	0.600	3.100	0.600	0.600	0.600	**7.600**
Subtotal outside HEADING 4	**0.800**	**1.300**	**0.600**	**3.100**	**0.600**	**0.600**	**0.600**	**7.600**
TOTAL	**0.800**	**1.300**	**0.600**	**3.100**	**0.600**	**0.600**	**0.600**	**7.600**

3.2.6. Compatibility with the current multiannual financial framework

The proposal/initiative:

– The current 2021–2027 MFF is not affected by the estimates presented here. Financing from 2028 follows the next MFF and programme decisions; no use of current unallocated margins, special instruments or revision of the current MFF is assumed.

The successor of Horizon Europe and the European Competitiveness Fund are prospective financing sources for Framework Initiative implementation, subject to the next MFF and programme legislation. The implementation-support scenario retains EUR 24.600 million in operational support and EUR 18.067 million in provisional implementing-body delivery support, plus EUR 28.385 million in gross Commission staff costs. The total is EUR 71.052 million over 2028–2034, not the financing envelope for substantive Quantum Act programmes. The EUR 18.067 million delivery-support provision remains subject to validation and must not duplicate Commission staff costs or other programme delivery expenditure.

Estimation sources and reconciliation: The Commission staffing estimates originate with the updated Impact Assessment Annex 4 (Tables 4.13–4.14) and the supporting CBA model v8.0. The detailed staff categories, budgetary costing and annual phasing over 2028–2034 remain subject to validation with the relevant HR and budget services. The illustrative funding tranches for hubs and centres in Section 3.2.2 do not establish limits on the number of facilities supported under the Regulation.

3.2.7. Third-party contributions

The proposal/initiative:

– ☐ does not provide for co-financing by third parties

– ☒ provides for the co-financing by third parties estimated below:

Appropriations in EUR million (to three decimal places)

	Year **2028**	Year **2029**	Year **2030**	Year **2031**	Year **2032**	Year **2033**	Year **2034**	Total
Participating States of the implementing Joint Undertakings (EuroHPC JU, Chips JU) - matching contributions under the JU basic acts.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	**p.m.**
Private members of the implementing Joint Undertakings	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	**p.m.**
Member States and host entities technology and innovation hubs competence and acceleration centres	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	**p.m.**

TOTAL appropriations co-financed	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	**p.m.**

Co-financing may arise under the applicable programme rules, implementing-body basic acts and individual financing decisions. The Quantum Act does not fix an aggregate matching contribution for all measures. EuroHPC and Chips Joint Undertaking contributions must be identified separately by action and instrument. No additional Chips Joint Undertaking resources are assumed without a documented task allocation and costing.

3.3. Estimated impact on revenue

– ☒ The proposal/initiative has no financial impact on revenue.

– ☐ The proposal/initiative has the following financial impact:

4. DIGITAL DIMENSIONS

Detailed PQC migration and procurement costs for Union institutions and bodies will be assessed through their cybersecurity and IT planning. Any additional costs attributable specifically to this Regulation should be distinguished from expenditure already required under the existing cybersecurity framework. No separate migration appropriation is established in this Statement.

4.1. Requirements of digital relevance

Reference to requirement	Requirement description	Actors affected	High-level processes	Categories
R1 -Article 3	National strategy notifications and Framework Initiative monitoring. Member States notify adoption and changes of national strategies; the Commission monitors alignment and reports annually to the Quantum Strategy Board.	Member States; Commission; Quantum Strategy Board	Notification, validation, alignment review and annual monitoring	Data; digital public service
R2 -Articles 11–13	Strategic project designation and related records. Funding selection and possible designation of non-selected proposals follow draft Article 11–13; record decisions, evidence and any withdrawal. Application volumes and annual compliance reporting in the earlier LFDS are analytical assumptions, not statutory requirements.	Applicants and project operators; Member States; Commission; EuroHPC JU	Selection/designation, decision recording and withdrawal	Data; digital public service

R3 -Articles 27–28	Strategic intelligence, capability mapping and critical quantum entities and components. The Commission monitors dependencies in cooperation with Member States and stakeholders, and establishes and updates the list of critical quantum components and entities. The current draft does not establish mandatory reporting duty for undertakings.	Commission; Member States; quantum suppliers and users; research bodies; procurers	Mapping, data validation, dependency analysis, early warning and list updates	Data; digital public service
R4 - Article 27(3)– (4); optional	Optional quantum supply-chain market intelligence platform or digital twin. The Commission may establish it by implementing act after consulting the Board and may integrate it with the Chips supply-chain platform. The current draft does not establish a separate mandatory Quantum market intelligence platform or a fixed 2031 delivery deadline.	Commission; Quantum Strategy Board; suppliers, users and investors; potential platform operator	Conditional establishment, scenario analysis and controlled information exchange	Data; digital solution; digital public service
R5 – Article 21	PQC procurement evidence and verification under applicable procurement requirements. No additional general grant-reporting obligation.	Contracting authorities and relevant suppliers	Procurement compliance checks and evidence management	Data; digital public service
R6 -Article 24–26	PQC monitoring, preparedness and coordination. The Commission will build on existing cybersecurity cooperation structures for monitoring the transition to post-quantum cryptography, facilitating coordination and supporting procurement implementation. Existing	Commission; Member States; Union institutions; bodies, where covered by the final provisions; relevant cybersecurity structures	Preparedness assessment/reporting, coordination, exercises	Data; digital public service

	reporting arrangements will be reused wherever possible.			
R7 - Article 8	Federated access to quantum computing, simulation, emulation and related software services, using existing EuroHPC and other eligible infrastructures.	Commission, EuroHPC JU, researchers, industry and service providers	Service discovery, access coordination and user support	Digital solution; digital public service

4.2. Data

Type of data	**Reference to the requirement(s)**	**Standard and/or specification (if applicable)**
National-strategy notifications and Framework monitoring information	R1	National-strategy identifiers and notification metadata; Core Organisation/Location Vocabularies where applicable; DCAT-AP for dataset catalogue descriptions.
Designation records and compliance evidence for Strategic Projects	R2	Stable project and decision identifiers; Core Business/Organisation Vocabulary where applicable; documented evidence schema and retention rules.
Critical quantum components and entities list supporting taxonomy and strategic-dependency indicators	R3	Domain taxonomy and component identifiers to be agreed; NACE and Combined Nomenclature where appropriate; DCAT-AP for catalogue metadata only.
Information for the optional quantum market intelligence platform, if established	R4	Reuse component taxonomy and supplier identifiers; documented JSON/CSV exchange schemas; DCAT-AP for catalogue metadata.
PQC procurement and compliance evidence	R5	Possible reuse of existing procurement, formats; evidence requirements follow the applicable procurement rules and Article 21.
PQC preparedness information	R6	Possible aggregate preparedness indicators and reporting templates, to be agreed with the relevant

		cybersecurity structures within Article 24(2)'s information requirements. The Act does not require transmission of detailed cryptographic inventories.

Alignment with the European Data Strategy

Technical formats, semantic assets and data-management practices described in Sections 4.2–4.5 are possible implementation choices. They create no additional legal obligations or reporting duties; applicable legal requirements remain governed by the Act and other relevant legislation.

Structured data and metadata will support authorised reuse and avoid parallel collection. Non-confidential datasets may be published in reusable formats. Confidential business information, security-sensitive supply-chain information and personal data will be protected under Article 35 and the applicable data-protection rules. No automatic connection to a common European data space is assumed.

Alignment with the once-only principle

Implementation will prioritise reuse of Commission programme data and existing national and cybersecurity reporting arrangements, with lawful access and purpose limitation. Additional collection will be limited to information necessary for the final provisions. The IA estimates business administrative burdens at EUR 3.55 million NPV over 2028–2037, equivalent to approximately EUR 0.405 million annually; this is an analytical estimate and must be reconciled with the final legal scope, particularly PQC and the absence of a general undertaking-reporting duty.

Where datasets are used, implementation should provide stable identifiers, clear ownership, versioned schemas, metadata, validation rules and documented update schedules. Catalogue metadata may use DCAT-AP where suitable; entity descriptions may reuse relevant Core Vocabularies. Access will be role-based for restricted data. Public outputs will contain only cleared non-confidential information; data quality checks, provenance and correction procedures will support reliable reuse.

Data flows

Type of data	Requirements	Provider	Receiver	Trigger	Frequency
National strategies and changes; Framework progress	R1	Member States; Commission for annual report	Commission; Quantum Strategy Board	Adoption or change of strategy; annual monitoring cycle	On adoption/change; annual Commission progress report
Capability and dependency information	R3	Member States and relevant stakeholders	Commission and authorised implementing bodies	Necessary mapping or monitoring under Articles 27-28; existing	As necessary; no blanket annual undertaking duty

				sources first	
Designation records	R2	Applicants; EuroHPC JU; Commission	Commission; applicants; public for cleared decisions	Funding selection; designation request/decision; withdrawal	Event-based; additional reporting only where lawfully required
Dependency analysis and cleared public outputs	R1, R3, R4	Commission	Board; Member States; public for cleared outputs	Validation and confidentiality review	Article 3 annual progress; other outputs as needed
PQC preparedness information	R6	Member States; relevant Union institutions and bodies, where applicable	Commission; relevant cybersecurity structures, subject to applicable rules	Reporting or assessment under Article 24(2)	Subject to the final Article 24(2); reuse existing reporting arrangements
Procurement evidence	R5, R6	Bidders and contractors	Contracting authorities and entities	Relevant tender and contract milestones	Per procedure/contract
Optional platform information	R4	Participants and authorised data sources	Platform operator; authorised users	Establishment of platform and authorised participation	To be specified if the platform is established

The Article 8 Platform is provided for by the Act; the Article 27 market intelligence platform remains optional. Other entries below describe administrative support through existing tools and workflows, not separate mandatory systems.

4.3. Digital solutions

Digital solution	Reference(s) to the requirement(s)	Main mandated functionalities	Responsible body	How is accessibility catered for?	How is reusability considered?	Use of AI technologies (if applicable)
European Quantum Service Platform for Science	R7	Common access interface for quantum	Commission, in cooperation with EuroHPC	Accessible interfaces in accordanc	Reuse existing EuroHPC access systems and	No mandatory AI functionali

and Industry (Article 8)		computing, simulation, emulation and related services	JU and relevant infrastructure operators	e with applicable Union requirements	Commission components	ty
Optional quantum market intelligence platform	R4	Supply-chain scenarios and controlled market intelligence under Article 27(3)– (4), if established. Reuse or integration with the Chips platform will be assessed before a separate build.	The Commission (DG CNECT), with operation capable of being entrusted to an implementing body.	Accessible web interfaces and documents; EN 301 549 and WCAG criteria used in design, procurement and testing, as applicable; accessible alternatives and user support.	The platform builds on existing Union enterprise and innovation portals rather than creating a parallel registry.	No mandatory AI use. Any optional AI functionality requires design-stage legal classification, data safeguards and human oversight; no automated designation or funding decision.
Administrative support for capability mapping and dependency analysis	R3	Capability mapping, component list and dependency analysis under Articles 27–28; authorised collection, quality checks and early warning. No mandatory 45-undertaking	The Commission (DG CNECT), supported by implementing bodies for collection and quality assurance.	Accessible web interfaces and documents; EN 301 549 and WCAG criteria used in design, procurement and testing, as applicable; accessible alternativ	Reuse existing programme data, shared entity identifiers, documented schemas and Commission components; modular implementation and controlled interfaces.	No mandatory AI use. Any optional AI functionality requires design-stage legal classification, data safeguards and human oversight; no automated

		annual return assumed.		es and user support.		designation or funding decision.
Strategic-project designation records and workflows	R2	Application intake, assessment workflow, designation records, monitoring under the applicable rules, and withdrawal.	The Commission (DG CNECT)	Accessible web interfaces and documents; EN 301 549 and WCAG criteria used in design, procurement and testing, as applicable; accessible alternatives and user support.	Built on existing Commission grant and designation workflows rather than as a standalone system.	No mandatory AI use. Any optional AI functionality requires design-stage legal classification, data safeguards and human oversight; no automated designation or funding decision.

Shared policy alignment for the digital solutions listed above - scope and responsibilities to be verified separately for each deployed module.

Applicable policy	Alignment
AI Act	Any use of AI systems in the context of the digital solutions above will be done in compliance with Regulation (EU) 2024/1689 (AI Act). To that end, it will be assessed whether such AI system is subject to any rules under the AI Act already at the design stage.
Cybersecurity	Commission/Union-entity systems follow Regulation (EU, Euratom) 2023/2841 and applicable Commission security rules; national actors follow NIS2 where in scope. PQC readiness and crypto-agility follow the final Act, applicable roadmap and system risk assessment.

eIDAS	Reuse EU Login and appropriate assurance levels; assess eIDAS and EU Digital Identity Wallet integration where applicable.
Single Digital Gateway and IMI	Assess Regulation (EU) 2018/1724 applicability per procedure. Neither SDG nor IMI integration is presumed; use only where the relevant legal scope and functionality justify it.
Data protection and interoperability	Apply Regulation (EU) 2018/1725 to Commission personal-data processing and GDPR where applicable to other actors. Document minimisation, lawful access, retention and security. Assess Regulation (EU) 2024/903 applicability for each cross-border service and binding requirement.

4.4. Interoperability assessment

Digital public service/category	Description	Requirements	Interoperable Europe Solutions	Other solutions
Quantum coordination and monitoring service	Proposed common service for national strategy notifications, Framework progress and dependency information. Shared access, identity and data exchange support Commission–Member State cooperation; PQC preparedness uses a segregated interface or existing cybersecurity channels where appropriate. Consolidation is an implementation recommendation,	R1, R3, R6	Core Vocabularies and DCAT-AP where applicable	EU Login; documented interfaces; eDelivery if justified; reuse existing programme/cybersecurity reporting. OOTS only if its legal and technical scope is met.

	not a new statutory service. Existing Commission tools, such as CIRCABC or Futurium, may also support coordination between the Science Network, hubs, acceleration centres, Board and Alliance.			
Federated quantum service access	Service discovery and access coordination for quantum computing, simulation and emulation	R7	Core Vocabularies and DCAT-AP, where applicable	Reuse existing EuroHPC access systems and interfaces
Strategic project and procurement procedures; optional market intelligence service	Reuse grant/designation and procurement systems for cross-border applications and evidence. Assess the optional market intelligence service if established. Business-facing services are not automatically excluded from cross-border interoperability assessment.	R2, R4, R5, R6	Relevant Core Vocabularies; DCAT-AP for published dataset catalogues	Existing funding/tender portals and identity services; documented schemas and APIs. Assess interoperability separately if a distinct service or binding requirement is introduced.

Impact of the requirement(s) as per digital public service on cross-border interoperability

Digital public services - legal organisational semantic and technical assessment

Assessment level	Measures	Potential remaining barriers
Legal	Coordination and monitoring: Article 35 govern the relevant information and confidentiality arrangements. Federated access: Article 8 and the applicable infrastructure access and allocation rules apply. Designation: Articles 11–13; PQC procurement: Article 24 and the applicable procurement rules. Any market intelligence platform remains conditional under Article 27(3)–(4). Assess relevant binding cross-border requirements under the Interoperable Europe Act; protect lawful access, purpose limitation and confidentiality	Different eligibility, allocation and procurement rules may constrain cross-border procedures. Sensitive PQC and supply-chain information requires restricted exchange; lawful access remains limited by purpose, confidentiality and applicable data-protection rules.
Organisational	Coordination and monitoring: the Commission works with national contact points and existing cybersecurity structures. Federated access: the Commission, EuroHPC JU and infrastructure operators coordinate discovery, access and user support within their mandates. Designation uses the competent Commission and implementing-body workflows; procurement remains with the relevant contracting authorities. Any optional platform operator and service arrangements would be determined if established. Define access roles and correction and escalation procedures through implementation arrangements.	National capacities, infrastructure allocation calendars, procurement workflows and support levels differ. Responsibilities and service levels depend on the applicable mandates and implementation arrangements; the optional platform's operator remains undecided.
Semantic	Possible semantic support includes common descriptions and identifiers for national strategies, quantum capabilities and components; resource descriptions and access conditions for federated services; project and decision identifiers for designation; and consistent descriptions of procurement evidence. Any platform data model would depend on its establishment and design. Suitable existing vocabularies and catalogue	National data, resource descriptions, component classifications and procurement-evidence formats differ. Shared mappings may be needed; the Act

	metadata may be reused; none of these technical choices creates an additional reporting duty.	does not impose a mandatory common vocabulary or a general business reporting return.
Technical	Prioritise existing Commission, cybersecurity, EuroHPC, funding and procurement systems. For federated access, assess compatibility of identity services, interfaces and resource schedulers. For designation and procurement, reuse suitable secure document and evidence workflows. For any optional platform, assess reuse or integration with the Chips supply-chain platform before a separate build. Apply accessibility and risk-based security and test cross-border exchange; particular APIs and schemas remain implementation choices.	Legacy systems, authentication methods, interfaces and resource schedulers differ. Security restrictions and heterogeneous evidence formats may limit automated exchange. The optional platform's design and integration remain undecided.

4.5. Measures to support digital implementation

Measure	Requirements	Commission role	Actors	Timeline
Critical-component list and monitoring arrangements	R3	Establish/update the list under Article 28; organise proportionate monitoring under Article 27. Do not presume an implementing act power or compulsory undertaking reporting beyond applicable provisions.	Member States; Board; industry; research bodies	Establishment 2028–2029 assumed; legal deadlines prevail
Taxonomy and data specifications	R1, R3, R4	Agree versioned schemas and access rules; publish cleared reusable specifications.	Member States; DIGIT; JRC; relevant standards bodies	Design 2028–2029 assumed

Strategic project procedures	R2	Define guidance and decision workflow within Articles 11–13; reuse funding-selection records.	EuroHPC JU; Member States; applicants	Before first applicable call/designation
Strategic quantum infrastructure coordination	Articles 8–9	Coordinate implementation, access arrangements and monitoring with relevant implementing bodies	EuroHPC JU, Member States and infrastructure operators	During establishment and operation
National notification and progress-report templates	R1	Provide strategy-notification and annual monitoring arrangements; reuse available funding data.	Member States; national funding bodies; Board	Set-up; annual Commission report under Article 3
Optional market intelligence platform	R4	Consult the Board; assess benefits, reuse and cost; decide on any implementing act under Article 27(3)– (4); commission development only if established.	DIGIT; Chips platform operator; businesses; implementing bodies	Conditional; subject to a separate decision and cost assessment. No standalone platform expenditure is assumed in this LFDS.
PQC preparedness and procurement support	R5, R6	Use existing cybersecurity cooperation structures; monitor PQC preparedness under Article 24(2), facilitate coordination under Article 25 and support procurement implementation under Article 21.	Member States; Union entities; institutions, bodies, offices and agencies; relevant cybersecurity structures; procurers	Preparedness reporting and assessment in accordance with the final Article 24(2); procurement according to Article 21.
Verification,	R1–R7	Validate quality	Member	Ongoing

exercises and evaluation		and implementation progress; coordinate relevant scenarios/exercises; evaluate the Act under Article 36.	States; Board; implementing bodies; relevant cybersecurity structures; external evaluators	monitoring; exercises as needed; evaluation five years after entry into force