QuIC Inputs on European Quantum Market Consolidation

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INTRODUCTION

The quantum business sector has experienced a recent boom in mergers and acquisitions (M&As). In 2025, three companies, Infleqtion [1], Xanadu [2] and Horizon Quantum Computing [3], announced mergers with special purpose acquisition companies (SPACs) to bring them to U.S. public markets. In early 2026, both IQM [4] and Pasqal [5], two quantum companies based in the European Union (EU), similarly announced mergers with U.S.-based SPACs with valuations near $2 billion. Publicly traded companies, such as Google [6] and ionQ [7], have also bolstered their quantum capabilities by acquiring several specialist companies.

These many announcements have been cheered by entrepreneurs and investors. They are signs of a maturing commercial sector. Yet, for several governments, they raise concerns over national sovereignty of a critical technology sector. In Europe, the Quantum Flagship strategy calls for the creation of an "Airbus of quantum" [8] as a means to secure one or several competitive European quantum champions on the global stage.

The European Quantum Industry Consortium (QuIC) has brought its community together to formulate common perspectives on the subject of M&As. This paper is structured in 5 different chapters:

- The importance of market consolidation for Europe's quantum industry
- Setting the right M&A conditions: the role of European political bodies and traditional large companies
- How might consolidation in Europe's look like?
- Sovereignty considerations
- How to facilitate M&As within Europe?

Methodology and Scope

The contents of this document are the result of a QuIC-wide consultative process. Contributions were gathered through a sprint series in March 2026, with open calls for inputs and dedicated alignment meetings.

To respect the EC's guidance on stakeholder engagement, the document is split in two sections: one featuring perspectives from EU-headquartered QuIC members, and one featuring inputs from non-EU-controlled QuIC members and affiliates [9]. Both EU- and non-EU-controlled joined forces and worked together during the initial brainstorming phase.

1 Infleqtion to Go Public Through Merger with Churchill Capital Corp X, September 2025

2 Xanadu's Business Combination with Crane Harbor Acquisition Corp., November 2025

3 Horizon Quantum Computing Pte. Ltd. and dMY Squared Technology Group, Inc. Announce $110 Million PIPE Investment to Support Business Combination, December 2025

4 IQM, a Global Leader for Quantum Computing, to Become the First Listed European Quantum Company, Through Merger with Real Asset Acquisition Corp., February 2026

5 Pasqal, A Global Leader in Neutral Atom Quantum Computing, to Go Public via Business Combination with Bleichroeder Acquisition Corp II, March 2026

6 Atlantic Quantum Joins Google Quantum AI, October 2025

7 IonQ Completes Acquisition of Oxford Ionics, Rapidly Accelerating Its Quantum Computing Roadmap, September 2025

8 Strategic Research and Innovation Agenda, Quantum Flagship, 2024

9 Affiliates are Europe-based subsidiaries of companies with a controlling entity located in selected foreign countries: Australia, Canada, India, Japan, New Zealand, the Republic of Korea (South Korea), Singapore, and the United States of America

Perspectives from EU-headquartered QuIC members

THE IMPORTANCE OF MARKET CONSOLIDATION FOR EUROPE'S QUANTUM INDUSTRY

Europe needs to foster a degree of **market consolidation in the quantum technology sector** in order to strengthen technological sovereignty and enable European companies to compete effectively on the global stage. The European quantum ecosystem is rich in innovation and talent but remains **highly fragmented**, with many small and medium-sized companies operating across the value chain. While this diversity has supported early innovation, the next phase of industrial development will require **companies with greater scale, resources, and market power** to compete internationally.

A key consideration is the **protection of Europe's quantum companies from foreign control.** The risk of non-European acquisitions of strategically relevant companies is real, particularly given the asymmetries in access to capital between European firms and their global competitors. Protecting European technological sovereignty can be pursued through several complementary mechanisms. **Regulatory tools**, such as foreign direct investment (FDI) screening and due-diligence mechanisms, already provide safeguards against unwanted takeovers of strategically important companies. At the same time, enabling European companies to grow into **larger, more resilient entities** is equally important, as larger firms are typically less vulnerable to acquisition and better positioned to defend their strategic autonomy.

The **sustainable growth of European quantum companies** requires a supportive industrial ecosystem. This includes access to sufficient capital—both private and public—along with programmes that support **scale-up, industrialisation, and commercialization.** Public procurement and other demand-side measures can play a decisive role by **creating early markets for quantum technologies** and encouraging companies to scale.

Public investment should remain focused on the most promising technological directions, ensuring that limited resources generate the greatest possible impact. Access to **non-European private capital** can also support growth, provided that such investment does not lead to a loss of European control over strategic technologies and capabilities.

Market consolidation represents one pathway to accelerate the scaling of European companies. Consolidation—through mergers, acquisitions, or strategic integration—can generate **economies of scale, technological synergies, and stronger market positioning.** It may also reduce duplication of effort and improve financial resilience. Importantly, larger companies are typically **less susceptible to foreign acquisition**, which further contributes to preserving European technological sovereignty.
At the **global level**, consolidation in quantum technologies is already underway. Without sufficient scale, European companies—particularly smaller ones—risk becoming acquisition targets for non-European players. This underlines the **urgency of strengthening the European ecosystem and enabling companies to reach critical mass.**

However, **market consolidation should not be artificially imposed.** Consolidation must make sense from a **business and technological perspective** and should emerge from market dynamics rather than being enforced through policy mechanisms. European policy should therefore focus on **creating favourable conditions and incentives** that enable consolidation where it is economically justified, while avoiding mechanisms that indirectly force consolidation—for example through programme structures requiring excessively large consortia.

Beyond consolidation itself, several **structural challenges** continue to limit the growth and competitiveness of the European quantum sector.

Regulatory fragmentation across Member States creates barriers to **cross-border collaboration, M&As, and scaling across the European market.** In parallel, fragmentation in European capital markets and the **limited availability of late-stage funding** constrain the ability of companies to grow into globally competitive players.

Technological sovereignty is also closely linked to the resilience of the supply chain. Europe currently depends heavily on foreign suppliers for a range of critical components used in quantum systems. Increasing transparency around these dependencies and strengthening European capabilities in **key enabling technologies and manufacturing capacities** will be an important complement to any consolidation strategy.

Finally, the **long-term competitiveness of the European quantum industry** depends on the availability and retention of talent. Europe produces a large number of highly qualified quantum scientists and engineers, but the risk of **brain drain** remains significant. Ensuring attractive career opportunities within Europe will therefore be essential to maintaining the continent's leadership in quantum research and innovation.

In summary, market consolidation can play an important role in strengthening Europe's quantum industry, but it should be understood as **one element of a broader strategy.** Policies that support company growth, reduce regulatory and financial fragmentation, strengthen supply chains, and retain talent will be equally critical to ensuring that **Europe remains a competitive and sovereign player in the global quantum technology landscape.**

Setting the right M&A conditions:

The role of European political bodies & traditional large corporations

The European quantum market—spanning **quantum computing, quantum communications, quantum sensing, and enabling technologies**—should evolve primarily through **market-driven dynamics,** while the European Union provides the policy framework necessary to support industrial development and healthy competition. The role of European political bodies should therefore be to **enable growth, remove structural barriers, and create favourable conditions for companies to scale and consolidate,** rather than to directly dictate industrial outcomes.

One of the main structural challenges is the **fragmentation of strategies across Member States.** National initiatives often prioritise domestic ecosystems, which can unintentionally lead to **isolated solutions and market fragmentation** across Europe. Quantum technologies should therefore be elevated from a national priority to a **strategic European priority**, enabling cross-border collaboration, competition, and consolidation. Reducing regulatory and investment barriers across Member States would help create a **truly integrated European quantum market** capable of supporting globally competitive companies.

Policies must also recognise the **different stages of company development,** particularly the transition from research to commercialisation. While consolidation among mature companies can support industrial scaling, it is equally important not to create barriers for **early-stage research ventures and innovative startups.** Premature consolidation or reductions in early-stage funding could weaken the ecosystem by limiting the diversity of technological approaches.

In addressing the large number of early-stage companies in the European ecosystem, policymakers should focus on **supporting companies to scale toward commercial readiness.**

Strategic consolidation around promising technological areas may help build globally competitive companies, but it should be accompanied by policies that strengthen **market access, industrial deployment, and company growth.**

To support this process, **transparent assessment and general benchmarking mechanisms** that are transferable across platforms should be implemented to identify the most promising ventures and technologies. Such mechanisms would allow resources to be directed efficiently, avoiding both the dilution of funding across too many actors and the premature withdrawal of support from technologies that require longer development timelines. Given the **non-linear nature of quantum technology development**, policy frameworks should remain flexible across the different quantum pillars.

In fostering consolidation, attention should be paid not only to **scalable technologies but also to scalable ventures**. Companies combining strong technology with validated business models, capable teams, manufacturability, and emerging revenue streams are better positioned to succeed in consolidation processes and industrial scaling. Policy should focus on developing public instruments to de-risk integration, reward traction, and allow market selection to act on a more mature and investable set of firms. Programmes focusing solely on technology development risk overlooking the importance of **commercial viability.**

Another practical challenge is the **global nature of funding in the quantum sector.** Many European quantum companies already rely partly on non-European capital, meaning that any attempt to steer consolidation must account for **international investment structures.**

Building on the Quantum Grand Challenge initiative, for instance, including in the future procurement and infrastructure, and emulating solutions like the AI Gigafactories, could help accelerate industrial development by encouraging **co-investment from large corporations** and strengthening the industrial dimension of the ecosystem. Incentivising industrial end users to participate would help elucidate and develop applications, increase funding and foster collaborations that could ergonomically lead to adoption of quantum technologies and M&As leading to the consolidation of the market. Integrated engineering approaches and robust benchmarking frameworks could further support consolidation by improving performance comparability.

At the same time, the role of **traditional European large corporations** must be considered within the global competitive landscape. In terms of financial scale, most European companies are **not currently in a position to compete directly with U.S. hyper-scalers.** Structural differences—including lower market capitalisation, a fragmented internal market, and more limited venture capital availability—make it difficult for European firms to match the investment capacity of major U.S. technology companies. European Capital Market Union (CMU) would help for the big European companies to access the required large amount of capital to finance such undertakings.

Rather than attempting to replicate the hyper-scaler model, Europe may benefit from **focusing on strategic opportunities where it can build competitive advantages,** including quantum computing, quantum communication, quantum sensing, and enabling technologies. Another complementary approach would be to **mobilise European industrial actors around large-scale bold and ambitious initiatives** capable of coordinating investment, industrial capabilities, and research efforts across the continent, such as DARPA QBI and Genesis Mission.

Finally, **state aid rules and regulatory frameworks should act as enablers rather than barriers** to industrial growth. Ensuring that European companies can access the investment, partnerships, and collaborations required to scale will be essential.

In summary, European policy should focus on **removing barriers**, e.g., through CMU, **creating the conditions for an integrated and competitive quantum market,** while allowing market dynamics to drive consolidation. **Stronger engagement from traditional European industrial players**—supported by appropriate policy frameworks—will be essential to translate Europe's scientific leadership in quantum technologies into **globally competitive industrial capabilities.** Policy should support diversity at the research phase and facilitate the transition into an industrial stage, where consolidation will be beneficial.

How might consolidation in Europe look like?

Consolidation across the European quantum ecosystem will be necessary to strengthen industrial competitiveness, but **timing and structure are critical.** Consolidating too early—before technologies and markets have matured—risks locking the ecosystem into inefficient structures or prematurely selecting technological approaches. Consolidation should therefore occur **progressively and strategically**, aligned with technological maturity and market development.

Although Europe does not have the same capital as U.S. hyper-scalers, we still need to **build vertically integrated companies** and **global champions in specific layers of the quantum technology stack,** ensuring that Europe occupies critical positions in the value chain where value creation can remain anchored in Europe. Achieving this will require both **horizontal consolidation,** to address fragmentation among companies developing similar solutions, and **vertical integration,** to improve coordination across the quantum technology stack.

In this context, **standardisation and benchmarking** are essential preconditions for effective consolidation. Without comparable performance metrics, it is difficult to identify which companies and technologies should receive support for scaling and consolidation. Transparent benchmarking frameworks would allow resources to be directed toward the **most competitive actors,** strengthening Europe's industrial position.

Once leading companies in specific layers of the stack are identified, **targeted consolidation can help accelerate industrial scaling.** However, an important structural gap remains: Europe currently lacks a **system integrator** capable of aligning the value chain, generating market demand, and driving standardisation. Without such an actor, consolidation efforts risk remaining fragmented.

A second major challenge is the **growing capital gap between European and U.S. quantum companies.** U.S. competitors have significantly larger financial resources, enabling them to sustain long development timelines and consolidate their position through acquisitions. The increasing willingness of European companies to accept foreign ownership largely reflects the **limited availability of European capital,** rather than a strategic preference for external investors.

Addressing this imbalance will require strengthening **European capital markets and investment capacity.** As long as European public markets remain less attractive than U.S. exchanges, companies will continue to list abroad, gradually shifting their centre of gravity outside Europe. Improving European financing conditions by a capital union should therefore be treated as a **structural priority.**

Public policy can also play an important role through **demand-side instruments,** particularly large-scale public procurement. By acting as an **anchor customer,** the European Union could stimulate market demand, support supply-chain development, and promote standardisation across the ecosystem. Such initiatives could also help create the market pull needed to accelerate technological maturation.

In parallel, the Commission should facilitate **cross-border M&As within the EU,** strengthen the single market for capital, and ensure that regulatory frameworks encourage companies to grow and consolidate within Europe. At the same time, global market access remains essential: building globally competitive companies requires **open international markets rather than restrictive investment policies.**

Looking across the different quantum pillars, **quantum computing represents the highest priority area for European consolidation.** It is the most technologically complex pillar, and the global race toward fault-tolerant quantum computing is intensifying. **Enabling technologies,** such as components, control systems, and software layers, should be treated as part of the same consolidation consideration, as fragmentation in these areas weakens the entire ecosystem.

Other pillars follow different maturity trajectories. Quantum communication ecosystems remain distributed and still require stronger market demand and standardisation before large-scale consolidation becomes effective. Quantum sensing, meanwhile, continues to develop across diverse application domains, and further technological maturation and clearer use cases will help determine the appropriate timing for consolidation.

In short, unlike their U.S. counterparts, European quantum companies generally lack **large capital reserves,** making direct competition with hyperscale technology firms difficult. Europe should **strengthen leadership in specific strategic layers of the quantum stack,** enabling leading companies to scale, acquire competitors, and expand into new markets while preserving the innovative diversity of the European ecosystem.

Sovereignty Considerations

Quantum technologies are seen as critical for national and economic security around the world. At the same time, quantum companies require access to large sums of capital to compete on the global market. For Europe, a careful balance must be struck between **securing European technology sovereignty** and **attracting foreign investments.**

Access to non-European capital should not automatically be equated with a loss of technological sovereignty. The critical factor is not simply the percentage of foreign ownership, but **where effective control resides.** This includes several elements: the location of company headquarters, where board decisions are taken, the ownership of intellectual property, where research and development activities take place, and where critical infrastructure and industrial capabilities are located. European R&D programmes and public procurement mechanisms already incorporate **Ownership and Control assessments** designed to ensure that governance and strategic decision-making remain anchored in Europe.

As long as these key elements remain located in Europe, **a limited degree of foreign ownership can support the growth and international scaling of European quantum companies** without undermining sovereignty. Nevertheless, for companies that are particularly strategic, safeguards may still be required to prevent external investors from acquiring **blocking minority positions or effective control.** Governance arrangements contained in shareholder agreements—such as preferential rights or veto rights—can influence decision-making and may not always be transparent, which makes appropriate due diligence important.

Governments already conduct **security and sovereignty reviews** through investment-screening procedures, although the strictness of these mechanisms varies across Member States. Some countries, such as France, tend to apply more restrictive approaches than others. A potential **European-level due-diligence framework** should therefore take into account the diversity of national regulatory systems while ensuring a consistent level of protection.

In parallel, it is important to clarify **how technological sovereignty should be interpreted in practice,** particularly in relation to the concept of **open technological sovereignty.** It implies the ability to develop and control critical technologies while remaining open to international cooperation. It does not require full self-sufficiency but rather reducing critical dependencies and ensuring that key assets and decision-making remain aligned with European interests and values.

In this context, it should be recognised that **market consolidation alone cannot eliminate Europe's dependencies on foreign supply chains,** as several critical components are currently not produced within Europe. Nevertheless, consolidation may strengthen the position of European companies by increasing their bargaining power with suppliers and enabling more integrated value chains.

Consolidation should therefore not be understood exclusively as a process among European companies. In some cases, **strategic partnerships or acquisitions involving non-European companies** may be necessary to secure access to key technologies and reduce supply-chain vulnerabilities.

Recent M&A activity in which European firms have acquired non-European ones illustrates how such international consolidation can help access technical capabilities that are not currently available within Europe. At the same time, there is a **risk of premature consolidation.** If consolidation occurs too early, smaller innovators may be excluded, and systemic risks could increase if a limited number of large actors dominate the ecosystem. A balanced approach is therefore needed: **continuing to support multiple technological approaches and manufacturing capabilities—such as through initiatives like Pilot Lines—while enabling consolidation at later stages when technologies and markets are more mature.**

Overall, consolidation can contribute to strengthening Europe's technological position but **will only partially reduce external supply-chain dependencies.** Initiatives such as Pilot Lines are primarily designed to **build manufacturing capabilities and technological maturity within the European ecosystem,** even if they may also contribute indirectly to reducing external dependencies over time.

How to facilitate M&As within Europe?

Several structural barriers currently hinder the consolidation and scaling of the European quantum ecosystem. Based on the analysis in this document, four major **roadblocks** have been identified.

First, **fragmentation of policies, regulation, and markets** significantly slows growth and consolidation. Diverse national strategies, fragmented procurement schemes, differing labour and business frameworks, inconsistent export controls, taxation and complex cross-border M&As create structural friction. In addition, administrative procedures are often **slow and complex,** limiting the ability of companies to scale across the European market.

Second, Europe faces **limited availability of high-risk and scale-up capital.** Venture capital and growth funding remain insufficient, private equity markets are relatively weak, and European public markets are often unattractive for deep-tech companies. As a result, foreign capital—particularly from the United States and Asia—frequently dominates later-stage funding rounds. This limits the ability of European companies to **scale, vertically integrate, or finance acquisitions,** making them more vulnerable to external ownership.

Third, the **technological maturity of quantum technologies remains uncertain.** It is still too early to identify a single dominant qubit modality or technological pathway.

This makes it nearly impossible to strategically select "winners" for consolidation across technology platforms and increases the risk that premature consolidation could eliminate promising approaches. High technological uncertainty also weakens **market demand,** reducing the number of anchor customers and investors willing to support large-scale deployment.

Fourth, the European ecosystem faces **structural ecosystem weaknesses.** National interests, organisational fragmentation, and limited collaboration between state-actors hinder consolidation processes. In addition, Europe lacks strong **system integrators, major industrial end-users, and independent benchmarking bodies,** all of which are essential for driving market demand and aligning the value chain.

To address these challenges, several policy directions have been identified.

Reducing **fragmentation across Member States** should be a priority. Stronger EU-level coordination could help align national programmes and reduce duplication. For example, replacing the current co-funding structure within initiatives such as EuroHPC with higher-level coordination among Member States could facilitate joint decision-making. A "coalition of the willing" among countries with strong national programs following the "Enhanced Cooperation" mechanism could help align strategies, standardise approaches, and transfer certain consolidation-related decisions from the national to the European level.

Simplifying governance and regulation would also support consolidation. This includes **faster decision-making, simpler cross-border M&As, and reduced administrative complexity.** Harmonised rules regarding company nationality, foreign listings, and foreign investment could provide greater clarity for companies operating across Europe. Similarly, a **"once-only" export control system**—where approval by one designated Member State authority grants EU-wide validity—could reduce regulatory barriers. A comparable approach should also be applied to investment screening.

Improving access to **deep-tech and scale-up capital** will be essential. Europe's priority should be to unlock private investment, strengthening European capital markets by creating and funding dedicated private growth funds and providing long-term loans to favour European-led M&As. As measures-of-last-resort to avoid undesirable foreign takeovers, Europe could introduce the possibility of public lead investors and long-term "evergreen" investment mechanisms, with appropriate safeguards that preserves fair market competition within Europe. It is obvious that bigger consolidation rounds will require private deep-tech funds with sufficient scale and risk appetite.

Public instruments alone cannot substitute for this role. Europe must therefore foster an ecosystem of growth and scale-up funds capable of writing large tickets and leading investment rounds. Closer engagement with European venture capital actors should be encouraged to align investment horizons and incentives with the long-term strategic objectives of the European quantum ecosystem. Public policy should catalyse this ecosystem by anchoring new funds and vehicles, supporting first closings, and reducing risk at the margin to crowd in institutional investors. In the short term, foreign capital will often be necessary given current European capital constraints. In the context of investment screening, public authorities should set **harmonized and low barrier** conditions for scale-ups receiving foreign investment, such as white-listed countries, ensuring governance structures, intellectual property protection, and long-term control to remain compatible with European sovereignty objectives.

Addressing **technological uncertainty** will require stronger market pull. Public procurement programmes, industrial challenges, and the involvement of anchor customers could help stimulate demand and accelerate the adoption of European technologies. Developing **European standards and benchmarking frameworks** will also be critical. Common standards for quantum computing performance and interfaces, quantum sensing specifications, and quantum communication security could help create transparency across the ecosystem, steer public procurements of quantum solutions, and guide consolidation toward the most competitive technologies. An **independent European benchmarking initiative**, such as the JTC-22 "Performance benchmarks of quantum computing applications" initiative [10], could also support more informed investment and consolidation decisions in this context.

In short, member states will have to step beyond their national interests and policymakers will need to balance **technological sovereignty with openness,** ensuring resilient supply chains while maintaining access to global markets. Improving ecosystem integration, mapping suppliers, and strengthening education and talent pipelines will also be essential to support long-term industrial growth.

10 Performance benchmarks of quantum computing applications, JTC-22

Conclusion

Europe stands at a critical juncture in the development of its quantum industry. While it benefits from world-class research, strong talent, and a diverse innovation ecosystem, **structural fragmentation and limited access to scale-up capital** continue to hinder its ability to compete globally. **Market consolidation can play a key role** in addressing these challenges by enabling European companies to reach critical mass and strengthen their market position.

However, consolidation alone is not a silver bullet. Europe must address **regulatory fragmentation, integrate and deepen its capital market,** and **maintain demand creation through procurement programmes.** Crucially, consolidation should remain **market-driven,** supported—but not dictated—by public policy, and aligned with the technological maturity of the different quantum pillars.

Europe must adopt a **pragmatic approach to technological sovereignty,** one that balances openness to international capital and collaboration with the need to retain control over **strategic assets, capabilities, and decision-making.** By creating the right conditions, Europe can enable the emergence of **globally competitive quantum companies** while preserving its long-term technological leadership.

Key conclusions and policy recommendations:

- Enable scaling and consolidation through favourable policies, not direct intervention.
- Build an integrated European quantum market supported by a strong, integrated capital market.
- Align consolidation with technological maturity, market forces and ecosystem diversity.
- Strengthen demand-side drivers and industrial leadership.
- Develop key enablers: standardisation, benchmarking, and system integration.
- Adopt a balanced approach to technological sovereignty and necessary access to foreign capital for European quantum companies .
- Reinforce ecosystem resilience beyond consolidation.

Perspectives from non-EU-controlled QuIC members and affiliates

Importance of EU Q. Market Consolidation

Europe has developed a **strong scientific and technological base in quantum technologies,** yet translating this leadership into **globally competitive industrial actors** remains a challenge. The European quantum ecosystem is characterised by **many highly specialised companies operating at relatively small scale.** While this diversity supports innovation, it can limit the ability of European companies to compete internationally with significantly larger organisations in other regions. **Market consolidation** is necessary to build companies capable of mobilising the **capital, talent and industrial capabilities** required for global competitiveness.

At the same time, **consolidation alone will not address the structural challenges** facing the European quantum sector. Access to growth and late-stage capital remains limited, as European capital markets are fragmented and often provide insufficient financing for **deep-technology scale-ups.** In addition, **supply chain dependencies on non-European components** remain significant and could become more critical as geopolitical competition intensifies.

The development of a **strong European home market** is essential. **Industrial adoption, public procurement and integration with European high-performance computing infrastructures** can help create early demand and support the scaling of European quantum companies. Market consolidation should therefore be considered as **one element within a broader strategy** aimed at strengthening Europe's quantum ecosystem.

While there is general agreement that market consolidation is needed, consolidation through artificial mergers or premature technology selection should be avoided. Policy makers should instead create favourable framework conditions that enable **organic, market-driven consolidation.**

Access to Capital and Investment Environment

Access to capital remains a pressing issue for the European quantum ecosystem. While early-stage funding mechanisms are relatively well developed, there is a structural gap in later-stage financing. This creates a situation in which promising companies become acquisition targets before they have the opportunity to scale independently. More fundamentally, this reflects a broader issue of **risk appetite,** both among investors and companies themselves, which limits ambition and long-term growth strategies.

Figures from **Global Quantum Intelligence (GQI)** highlight the scale of the challenge: in 2023–2024, **European investment fell by 40%,** while during the same period **U.S.-based quantum start-ups tripled their private investment,** leaving European quantum companies financially vulnerable and underfunded.

Europe lacks venture capital firms capable of leading **€100 million-plus rounds,** forcing scale-ups to seek funding from North America and Asia. In addition, there are **structural weaknesses in mobilising capital** from sovereign wealth funds, pension funds, and EU-level institutions. The **European Innovation Council (EIC)** support is also stretched too thin, with only **2–3 quantum companies expected to receive scale-up funding per year** under the current €300 million annual cap across all deep tech domains.

At the same time, **foreign investment screening regulations are creating additional complexity** for quantum technology investments, while venture capitalists are increasingly cautious about regulatory dynamics that may limit future export markets or exit opportunities.

Supply Chain Dependencies and Industrial Capacity

Supply chain dependencies represent a critical vulnerability for the European quantum ecosystem. Many key components in Europe's quantum technologies—including **cryogenics, precision lasers, control electronics, photonics, and advanced semiconductors**—are sourced from outside the EU, creating structural dependencies on non-European suppliers. **Scarcity of raw materials and specialised components** further exacerbates these bottlenecks.

Quantum hardware supply chains are also emerging as a **geopolitical issue.** Export controls on advanced semiconductor technologies pose significant challenges, and there is a clear need for Europe to establish **strategic "control points"** in the global quantum value chain, where European firms produce key enabling inputs.

At the same time, the quantum technology industry is inherently international. Many enabling technologies rely on a limited number of global vendors, often acting as **"chokepoints"** across regions. Strengthening Europe's position therefore requires both the development of domestic capabilities and the creation of **resilient, trusted supply chains across allied nations.** Such an approach would reinforce Europe's strengths in areas such as cryogenics and photonics while improving resilience and increasing global demand for these technologies.

Finally, Europe lacks sufficient **industrial-scale manufacturing capacity** to support the transition from research to large-scale production. Existing pilot lines, such as **Qu-Test and Qu-Pilot**, are promising but remain insufficient. Expanding **quantum chip fabrication, integration, and testing facilities** will be essential to enable industrial scaling.

Fragmentation, Coordination and Regulatory Environment

Fragmentation across Member States remains a structural barrier to scaling the European quantum ecosystem. While countries such as **Germany, France, the Netherlands, and Nordic nations** have developed strong national strategies, these efforts remain insufficiently coordinated at EU level. The result is a complex interplay between national interests and European objectives, limiting the emergence of a unified internal market.

There is a lack of a **harmonised legal environment for startups,** as well as limited frameworks to facilitate **intra-EU mergers and acquisitions.** Designing such frameworks is essential to enable consolidation between complementary quantum technology firms, allowing them to **build scale, integrate capabilities, and strengthen global positioning.**

At the same time, consolidation dynamics must be carefully balanced. The acquisition of smaller companies by large, traditional European corporations may risk **diluting the agility, disruptiveness, and innovation capacity** that characterise successful deep-tech startups. A **balanced approach** is therefore required.

Regulatory fragmentation is further reinforced by the lack of **harmonisation in export control regimes.** Quantum technologies are inherently **dual-use,** with applications across both civilian and defence domains. The current situation—where individual Member States such as **Finland, France, the Netherlands, Spain, and Italy** are introducing separate controls—risks **disrupting the internal market and creating uncertainty for companies.**

The European Commission is uniquely positioned to address this challenge by promoting **coordinated, bloc-wide export control frameworks.** Such alignment would **protect intellectual property and strategic assets,** avoid regulatory gaps, reduce the risk of **"forum shopping",** and support cross-border innovation. Coordination with **international partners** will also be essential to ensure secure and resilient supply chains.

Intellectual Property, Commercialisation and Talent

Europe continues to face a gap between scientific leadership and commercial translation. While Europe produces world-class academic output in quantum technologies, it lags behind global competitors in **intellectual property generation and commercialisation.** European companies remain **underfunded, under-patented, and often outpaced** by American and Chinese rivals.

Strengthening **intellectual property strategies** and incentivising the **valorisation of research outputs** should therefore be a policy priority. This includes ensuring that publicly funded research is effectively translated into **commercial applications and competitive European companies.**

Talent retention is another critical challenge. European quantum companies face increasing competition from better-funded international players, particularly in the United States. While academic and training programmes have improved in recent years, **workforce development remains insufficient** to meet growing industry demand.

Targeted measures—such as **fast-track visa programmes, tax incentives, and industry-oriented fellowships**—will be essential to attract and retain talent within Europe and support the long-term growth of the quantum ecosystem.

Role of European political bodies & traditional large corporations

Quantum technologies are strategically relevant for **Europe's economic competitiveness, technological sovereignty and security.** While consolidation should primarily emerge from market dynamics, **European and national institutions play a critical enabling role** by creating favourable conditions for industrial growth. This includes improving **regulatory coherence, facilitating cross-border cooperation, and strengthening European capital markets** to support deep-technology scale-ups.

Traditional European industrial companies also have an important role to play in the development of the quantum ecosystem. Europe hosts globally competitive actors in sectors such as **semiconductors, telecommunications, aerospace, energy, and high-performance computing.**

These companies can provide **industrial expertise, system integration capabilities, and access to global markets,** all of which are essential to scale quantum technologies.

Stronger engagement from large European corporations is necessary to accelerate the industrialisation of quantum technologies and support the emergence of globally competitive platforms. Collaboration between **startups, research organisations, and established industrial players** will therefore be essential to ensure both technological innovation and industrial scale. In this context, **facilitating the creation of partnerships and consortia—building on existing successful European models—should be a priority.**

Policy Actions to Support Quantum Market Consolidation

European institutions and Member States can actively support the development and consolidation of the quantum ecosystem through targeted actions across several key domains.

In terms of governance and coordination, there is a clear need to establish a more harmonised and integrated European framework. This includes the creation of a **harmonised legal regime for startups** and a dedicated framework for **intra-EU** mergers and acquisitions, enabling companies to scale across borders more effectively. At the same time, stronger coordination mechanisms should be introduced, such as a **European Quantum Coordination Office** to integrate national strategies, and a **European Quantum Research Coordination Platform** to align efforts across Member States and EU programmes. In parallel, the establishment of a **Quantum Infrastructure Point of Contact Group** would support coordination across the different quantum pillars—computing, communication, sensing, and chip manufacturing—while a **European Quantum Supply Chain Alliance** could help identify vulnerabilities, coordinate responses, and share best practices.

From a funding and investment perspective, more targeted and ambitious financial instruments are required. This includes **ring-fencing quantum technology budgets within the European Innovation Council (EIC)** and significantly increasing the **EIC Scale-Up budget in 2026 and 2027** to address the structural gap in late-stage financing. In addition, the creation of a **dedicated European quantum fund** would provide a strategic vehicle to support scaling companies. Efforts should also focus on **mobilising capital from sovereign wealth funds, pension funds, venture capital, and EU-level institutions,** including the European Investment Bank. Public authorities should further support **matched investment schemes** to incentivise private sector participation, alongside **public procurement programmes** that position governments as early adopters of European quantum technologies.

Infrastructure development is another critical pillar to enable industrial scaling. Europe must expand its **industrial-scale quantum chip fabrication and testing capabilities,** building on existing initiatives such as **Qu-Test and Qu-Pilot,** which remain promising but insufficient.

Additional efforts should include the establishment of **six quantum pilot lines under the Chips Joint Undertaking,** co-funded by Member States and the European Commission, as well as the development of a **cross-European network of Quantum Competence Clusters** to reduce fragmentation and strengthen regional ecosystems.

Market development and industrial adoption will also be essential to create demand and support scaling. This can be achieved through the launch of **competitive procurement challenges**, for example in the area of fault-tolerant quantum computing, as well as through the strategic use of public procurement—including hospitals, infrastructure agencies, and government departments—as early customers of quantum solutions. At the same time, Europe should actively support its position in **international standardisation bodies,** including **JTC 22 in Europe and JTC 3 globally,** to ensure influence over emerging global standards.

Ensuring strategic autonomy while maintaining openness will require a balanced and coordinated approach. The implementation of **harmonised export control regimes across the EU** is essential to avoid fragmentation and ensure the integrity of the Single Market. At the same time, EU-funded quantum projects should be required to prioritise **intellectual property creation and commercialisation,** strengthening Europe's competitive position. The development of **strategic "control points" in the global quantum supply chain,** where European firms produce key enabling components, will also be critical to reduce external dependencies.

Finally, talent and skills development remain fundamental enablers of the ecosystem. Europe should introduce **pan-European tax relief** to stimulate investment, alongside **fast-track visa programmes** to attract global talent. In parallel, the launch of a **Europe-wide education and mobility programme for quantum technologies,** including exchanges both within and beyond the EU, will be necessary to ensure a sustainable and competitive workforce.

Nature of European Q. Market Consolidation

Nature of European Quantum Market Consolidation

The European quantum ecosystem spans multiple technological layers, from enabling components to full systems and applications. As a result, **no single consolidation model is appropriate across the entire value chain,** and consolidation strategies must be tailored to the specific characteristics of each segment.

In hardware platforms, **closer vertical integration is often beneficial,** as quantum systems rely on highly specialised components such as cryogenics, photonics, control electronics, and advanced fabrication processes. In this context, consolidation can help secure supply chains, improve coordination across technological layers, and ensure system-level optimisation. This is particularly relevant where **supply-chain control, quality assurance, and integration across stages** represent the main bottlenecks. Recent policy and industry discussions around **technological sovereignty and trusted supply chains** further reinforce the case for vertically integrated approaches in sensitive parts of the quantum stack.

By contrast, in other segments—particularly **software, algorithms, and services**—horizontal consolidation across specialised companies may be more appropriate. In these areas, the primary constraint is often **scale, market access, and the ability to combine complementary capabilities,** rather than supply-chain control. Horizontal consolidation can therefore unlock efficiencies, strengthen market positioning, and support the development of competitive platforms, while maintaining technological diversity and competition.

A mixed approach combining vertical and horizontal integration is therefore likely to be the most effective strategy. The appropriate balance depends on the structure of each segment and the nature of the bottlenecks faced by companies within it.

The key practical takeaway is that consolidation strategies should prioritise removing the primary bottleneck—whether this relates to scale and market access, or to supply-chain security and system integration. There is no single "ideal" model between vertical and horizontal consolidation; rather, the optimal approach is **deal-specific and market-specific.** While both vertical and non-horizontal mergers can generate efficiencies, they may also raise competition concerns depending on their **ability, incentive, and effects** within the relevant market structure. A pragmatic, case-by-case assessment is therefore required.

The urgency and relevance of consolidation also differ across quantum pillars. **Quantum computing and enabling technologies** require significant industrial scale, integrated supply chains, and manufacturing capacity, making consolidation particularly relevant in these areas. By contrast, **quantum communication and sensing,** while strategically important, may require further technological maturation and clearer market demand before large-scale consolidation becomes appropriate.

Towards a More Structured Approach to Consolidation Decisions

To operationalise consolidation strategies effectively, **greater clarity is needed on the sectors and objectives where consolidation should be prioritised.** This includes identifying **target sectors**—such as quantum hardware, enabling technologies (e.g. semiconductors, photonics), telecommunications, and adjacent deep-tech domains—where consolidation could deliver the greatest strategic impact.

In parallel, it is important to clarify **what "global competitiveness" entails in each context.** In some segments, competitiveness may be driven primarily by **scale, cost efficiency, and market share,** while in others it may depend more on **resilience, supply security, and control over critical technologies.** These distinctions should guide the choice of consolidation strategy.

To support informed decision-making, **the development of structured assessment frameworks—such as decision trees incorporating clear criteria and potential risk indicators—could be beneficial.** Such frameworks would help evaluate when vertical integration is preferable to horizontal consolidation (and vice versa), while also identifying potential risks, including market foreclosure, reduced competition, or excessive concentration. Importantly, these tools should support **evidence-based, case-by-case evaluations,** rather than imposing rigid or one-size-fits-all approaches.

Consolidation as a Tool to Address Supply Chain Dependencies

European quantum market consolidation can play a **structural role in addressing supply chain dependencies on foreign components,** although it cannot fully eliminate them. The objective should therefore be to **reduce critical dependencies,** rather than to pursue complete technological self-sufficiency.

One key mechanism is the development of **strategic "control points" within the supply chain,** where European firms produce critical inputs that other actors depend on. This would provide not only greater resilience but also **geoeconomic leverage** in an increasingly competitive global environment. In parallel, consolidation can support the emergence of **industrial-scale manufacturing infrastructure,** including the expansion of quantum chip fabrication and testing facilities through initiatives such as **Qu-Test and Qu-Pilot**, as well as the development of pilot lines under the **Chips Joint Undertaking.**

At the ecosystem level, stronger coordination mechanisms—such as a **European Quantum Supply Chain Alliance**—can help identify vulnerabilities, map dependencies across the quantum stack (from raw materials to control electronics), and coordinate responses among Member States. Forthcoming initiatives, such as a **Quantum Technology Risk Assessment expected by 2026,** can further inform targeted mitigation strategies.

Consolidation can also support **strategic procurement and industrial policy objectives,** including the use of public procurement to prioritise domestic quantum technologies, as well as the diversification and selective onshoring of critical production capabilities. At the same time, **interoperability and standardisation,** particularly through European-led approaches, will be essential to ensure that consolidation does not lead to fragmentation or lock-in effects.

Importantly, Europe should build on its **existing strengths in enabling technologies,** including precision electronics, lasers, and photonics, where it already holds competitive advantages. Leveraging these capabilities within a consolidated industrial framework can reinforce Europe's position in the global quantum value chain.

At the same time, it must be recognised that **the quantum technology ecosystem is inherently global,** and that many key components will continue to be sourced internationally. The objective should therefore be to **balance strategic autonomy with international collaboration,** ensuring resilience without undermining openness and innovation.

Sovereignty

Technological sovereignty is a key consideration for Europe's quantum industry. However, sovereignty should **not be assessed solely on the basis of foreign ownership levels.** A more relevant perspective focuses on **where effective strategic control resides,** including the location of **headquarters, governance structures, intellectual property ownership and research and development activities.**

Within this framework, **limited levels of foreign investment** can remain compatible with European technological sovereignty, provided that **strategic control and key technological assets remain anchored in Europe.** Access to **international capital** may in fact be necessary for European quantum companies to grow and compete globally.

While **consolidation alone cannot eliminate supply chain dependencies,** it can contribute to strengthening resilience. **Larger companies** may be better positioned to **coordinate supply chains, invest in strategic components and develop vertically integrated industrial capabilities within Europe.**

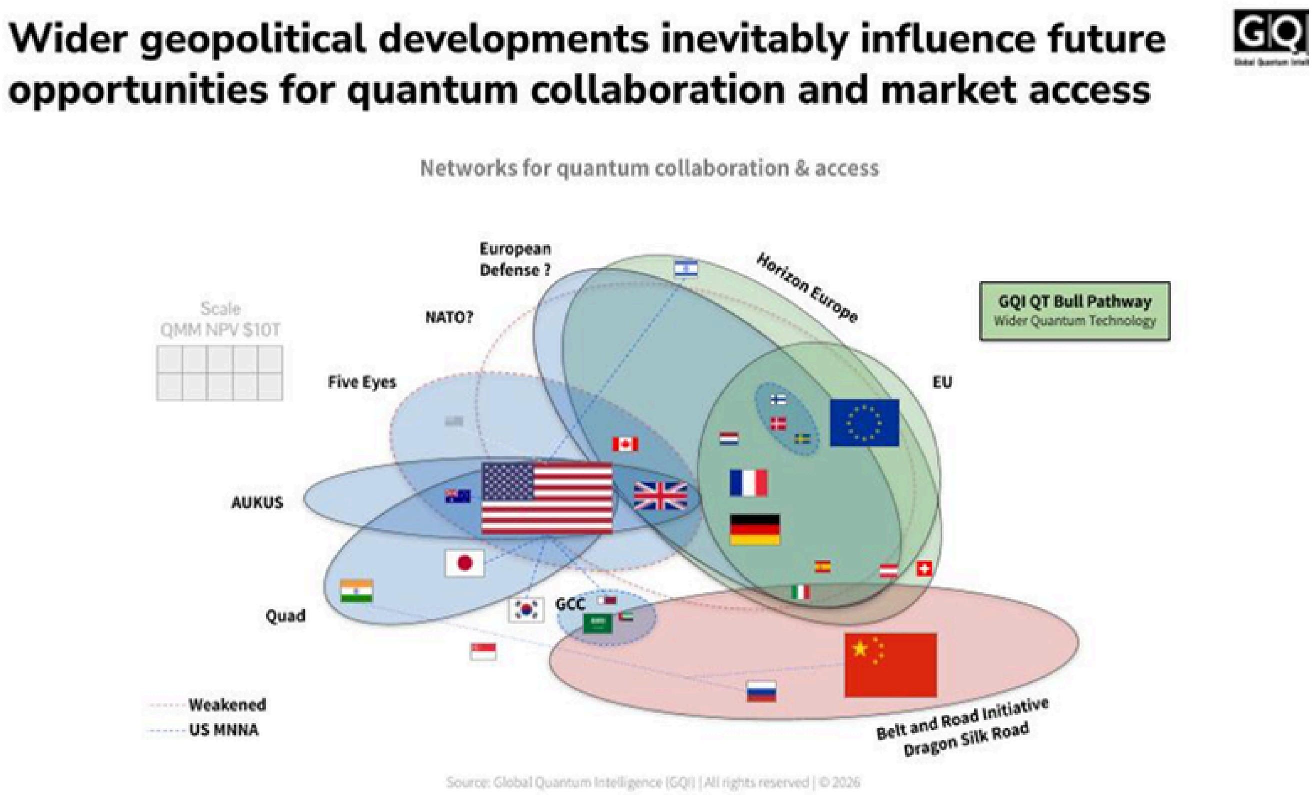
Horizontal consolidation helps create critical mass, while vertical consolidation helps control the value chain.

Promoting Quantum Prosperity Across Borders

The quantum ecosystem is inherently global, and international collaboration across both research and commercialisation is essential to bring quantum technologies from the laboratory to the marketplace. The quantum workforce and supply chains remain **fragile and highly specialised,** meaning that no single country can fully mobilise the necessary talent and enabling technologies **without cross-border alliances.**

A European approach that prioritises technological sovereignty **at the expense of cross-border collaboration** risks slowing innovation and limiting both the **speed and scale at which quantum technologies are brought to market.** Overly restrictive policies could reduce Europe's attractiveness as a partner in global value chains and **delay the transition from research to commercial deployment.**

At the same time, an excessively inward-looking approach may inadvertently favour countries operating under more **centralised or state-driven investment models,** which can mobilise resources rapidly across both civilian and defence applications. Europe should therefore adopt a **balanced approach,** combining the protection of strategic assets with openness to international collaboration, in order to **maximise innovation, resilience, and global competitiveness.**



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How to facilitate EU Q. Market Consolidation

- Several **structural barriers** currently limit the pace of consolidation wiLaurent Guiraud, Colibri TD
- Luc Gerardin, Universal Quantum

thin the European quantum ecosystem. **Fragmentation across national strategies, funding programmes and regulatory frameworks** complicates cross-border cooperation and industrial integration. In addition, **limited access to scale-up capital** and relatively underdeveloped **European public markets** constrain the ability of quantum companies to grow domestically. **Weak market pull** is another important challenge. Many industrial users require **mature and reliable systems** before adopting quantum technologies at scale. Without **early demand from large customers or public procurement initiatives,** companies may struggle to move from prototypes to commercial deployment.

European institutions and Member States can support consolidation by **improving coordination, simplifying cross-border investment processes and strengthening European capital markets. Public procurement programmes, industrial pilot projects and targeted investment mechanisms** can also help create demand and provide the **financial resources required for European quantum companies to scale.**

11 https://devl.global-qi.com/eu-quantum-strategy-response

Conclusion

All the aspects outlined in this document are **deeply interconnected and mutually reinforcing.** Addressing supply chain dependencies without solving capital access constraints, or investing in manufacturing capacity without ensuring talent retention, will not deliver the desired outcomes in terms of **technological sovereignty and global competitiveness.** A coordinated and systemic approach is therefore essential.

At the same time, **the need for action is immediate.** European quantum market consolidation should move forward without delay and should not be conditional on the prior integration of European capital markets. While structural weaknesses in Europe's financial ecosystem are well recognised, they cannot become a justification for inaction.

Current market dynamics clearly illustrate this urgency. **Europe lacks venture capital firms capable of leading €100 million-plus rounds,** forcing scale-ups to **seek funding from North America and Asia.** At the same time, **private investment in U.S.-based quantum start-ups has tripled, while European investment has fallen by 40%,** further widening the gap. **Waiting for capital market integration would only exacerbate this divergence,** reinforcing Europe's structural disadvantage.

Key Conclusions

- **Consolidation must proceed now**, using existing instruments rather than waiting for broader capital market reforms, **as this aggressive timeline cannot accommodate delay**
- **Europe's investment gap is widening,** and postponing consolidation would further increase the gap between European and global competitors
- **Europe lacks sufficient late-stage capital,** with no venture capital ecosystem capable of leading €100M+ rounds, **forcing scale-ups to seek funding from North America and Asia**
- **Delaying consolidation would increase foreign control without delivering European strategic benefit,** weakening Europe's position in the global quantum landscape
- **Immediate policy action is required,** including:
  - ring-fencing quantum funding
  - enabling intra-EU mergers and acquisitions
  - establishing a harmonised legal framework for startups
- **Foreign investment should be approached pragmatically,** ensuring that **strategic control and key assets remain anchored in Europe,** even when capital or listings are international
- **Europe must act at both speed and scale,** accelerating time-to-market while aligning with the **2030 timeline for fault-tolerant quantum computing**
- **Strategic autonomy must be balanced with openness,** through **carefully coordinated redundancies across trusted allied nations,** rather than pursuing full self-sufficiency
- **Not all critical suppliers will be based within the EU,** and Europe should therefore focus on **building a resilient network among like-minded partners,** rather than attempting complete localisation
- **Leveraging partnerships with trusted allies can reinforce Europe's existing strengths,** particularly in enabling technologies such as **cryogenics and photonics,** where Europe already holds deep expertise
- **Close coordination with allies can support secure cross-border supply chains,** as well as **commercial and academic partnerships,** while **safeguarding intellectual property and collective security**

Final Message

To strengthen European quantum leadership while respecting the EU's commitment to technological sovereignty, Europe must act decisively now. Consolidation, investment, and industrial coordination should advance in parallel, supported by both **internal capability building and external strategic partnerships.**

Delaying action will not preserve sovereignty—it will erode Europe's ability to compete globally.

About QuIC

The European Quantum Industry Consortium (QuIC) is a non-profit industry association, founded in 2021, dedicated to the growth of the commercial QT sector. QuIC operates as a collaborative hub throughout Europe, bringing together hundreds of SMEs, large corporations, investors, RTOs, and academic institutions, to build a strong, vibrant ecosystem. Together, members of the association address topics of common interest, such as standardisation, intellectual property, trade, and workforce development. Today, QuIC is part of the coordination and support action of the Quantum Flagship – a European project, which aims to make Europe a dynamic and attractive region for innovative research, business, and investments in this field. More information: www.euroquic.org

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