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NQSTI
National Quantum Science and Technology Institute

Quantum for Italy the Dataset

MISSIONE 4
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PREFACE: *NQSTI*, the *National Quantum Science and Technology Institute*

Claudio Pettinari
NQSTI President,
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Quantum science and technology is rapidly reshaping the frontiers of innovation, offering transformative potential across communication, computation, sensing, and secure information. In this dynamic context, Italy has taken a decisive step forward with the establishment of the ***National Quantum Science and Technology Institute*** **(***NQSTI***)** — a coordinated national effort designed to strengthen the country's leadership and competitiveness in the quantum domain, a consortium that was founded by 20 Italian entities, but is currently expanding.

Supported by PNRR investments, *NQSTI* has created an integrated ecosystem that connects universities, research institutes, and industrial partners. This network not only enhances access to state-of-the-art infrastructures but also promotes technology transfer, cross-disciplinary collaboration, and advanced training for the next generation of quantum scientists and engineers. A recent and relevant milestone achievement in this process has been the creation of **Quantum Technology Fabs** designed to support industry and academy researchers in prototyping and validation of quantum devices - a concrete foundation for long-term life and sustainability and innovation capacity.

Today, *NQSTI* represents both a scientific hub and a strategic instrument for national growth. Its coordinated model supports Italy's participation in the European quantum agenda and ensures alignment with international initiatives. Through its open and collaborative approach, *NQSTI* stands as a **fundamental bridge between research, industry, and policy**, providing expert insight and evidence-based guidance for building the future of quantum technologies in Europe.

The fall of 2021 saw the creation of a group of 23 experts from Academia and Research institutions, following the publication of the Italian government guidelines. These experts shared an analysis of the QST know-how available in the country, of the obstacles to its full valorization and translation into economic growth and sustainable development, and a vision of the main directions capable of bringing the radical innovation requested by the guidelines. This study was then shared with leading enterprises operating in Italy: new goals and needs completed the report. The analysis represented the starting point for the elaboration of the ***National Quantum Science and Technology Institute*** as a PNRR proposal. The *NQSTI* coordination's programs aim **to overcome the current structural weaknesses** of the Italian systems, such as fragmentation of research lines and organizations, scarcity of personnel, poor funding, inadequate digital infrastructure, and lack of exploitation of the existing facilities/laboratories.

NQSTI's vision is that the extraordinary PNRR funding must be used to update technical facilities and strengthen the QST community in the next few years, but even more importantly, it must be channeled to drive the national community into an ordinary and sustainable condition of increased impact, visibility, and capacity to modernize and support the competitiveness of the Italian economy.
The ***National Quantum Science and Technology Institute*** (*NQSTI*) is a consortium that intends to:
(i) team up Italian entities carrying out competitive and innovative research in the field of quantum science and technology (QST), and
(ii) stimulate future industrial innovation in the field, providing a forum in which novel ideas and opportunities are transferred to companies.
In order to ensure a long-term positive effect on the Italian economic growth and development, the whole innovation chain was considered: from the strengthening and coordination of the low-TRL research, to its translation into prototypes, favoring interfacing with industrial needs thanks to strong outreach and continued-education programs.
The ***National Quantum Science and Technology Institute*** long term goal is to contribute to the establishment in Italy of a Knowledge Transfer (KT) System for Quantum Technology i.e. to manage the activities and the processes through which knowledge, expertise and qualified personnel flow between the research system (institutes, universities, research centers) and the community of end users in the industrial sectors, in commerce, in the service and in the public sectors.
Within *NQSTI,* the goal is to create a dedicated **single-point provider for SMEs** where they will be able to find educational programs for their existing staff, new QST-trained personnel, and opportunities to innovate products and processes by participating, through dedicated open calls, in collaborative projects with our project participants. ***NQSTI* aims particularly to effectively connect low-TRL research with companies' R&D divisions**, either by leveraging on the existing industrial infrastructure or by stimulating the creation of new companies.

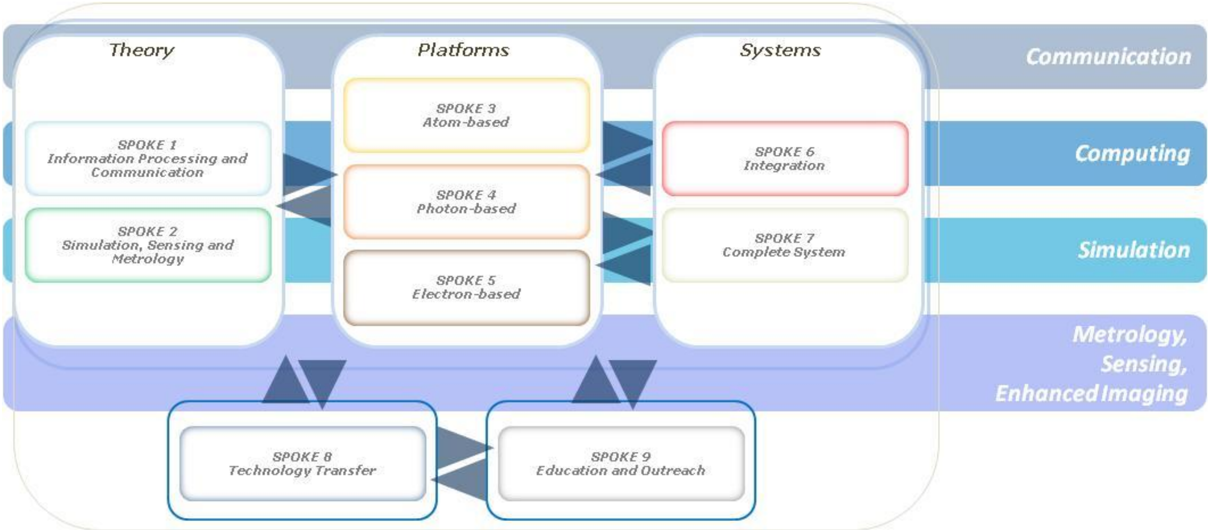
Serafino Sorrenti
NQSTI Honorary Chair
Chief Information Security Officer (CISO)
Presidency of the Council of Ministers of the Italian Government

The ***National Quantum Science and Technology Institute* (*NQSTI*)** constitutes a precious national asset for the advancement of quantum technologies in Italy. Its **coordinated structure, scientific excellence, and deep understanding** of both the national and international quantum ecosystem make it an **indispensable partner** to the vigorous governmental initiatives currently shaping this strategic domain.
Thanks to its technical competence and **extensive network**, *NQSTI* serves as an **authoritative interface** between the research community, industry, and policy makers. In this pivotal phase of

the digital transition, it plays a crucial role in supporting the integration of quantum-driven innovation into Italy's technological and industrial fabric.
This document is a tangible example of how ***NQSTI*** can serve as a **reliable and timely source of information and analysis** to assist policy makers in monitoring progress and shaping informed strategies for the future of quantum technologies in Italy.

***NQSTI* is organized in 9 Spokes**: the first 2 dedicated to establishing the theoretical and conceptual framework of the systems to be developed, and the following 3 dedicated to the technological platforms needed to implement those concepts defined in terms of the quantum of choice (atoms or molecules, photons, electrons), Spoke 6 dedicated to the integration of the developed devices into functional modules, Spoke 7 dedicated to research on system architectures. Spokes 8 and 9 are transversal Spokes dedicated to Technology Transfer and Education and Outreach, respectively (see *figure 1*).

Figure 1. The NQSTI Spokes' structure



Overall, the Partnership comprises 20 participants (public, non-profit entities, and private companies). The Hub was set up in the form of a limited liability consortium (SCARL) with the involvement of all public participants and is hosted in CNR central seat in Rome.
Its mandate is:

- ensure the coordination and management of the overall program towards the Italian Ministry of Research (MUR) and the Spokes, according to the agreement with the MUR and European/national rules for expenditures;
- monitor Spokes and participants, address gender-equality issues and diversity management;
- provide recommendations on the most appropriate solutions for achieving the selected research results;

- coordinate and promote interactions among “Spokes” and with stakeholder organizations;
- provide centralized program management support (e.g., periodic workshops, website hosting, etc.);
- promote educational programs and workforce development.

Within the Hub organization described above, *NQSTI* is scientifically coordinated by a steering committee formed by the Spoke leaders and chaired by Professor Fabio Beltram. Each Spoke is organized with a scientific coordination team comprising all activity leaders, and managing coordination is ensured by the Participants’ representatives.

Fabio Beltram
NQSTI Scientific Coordinator
Full Professor of Experimental physics of matter and applications
Scuola Normale Superiore

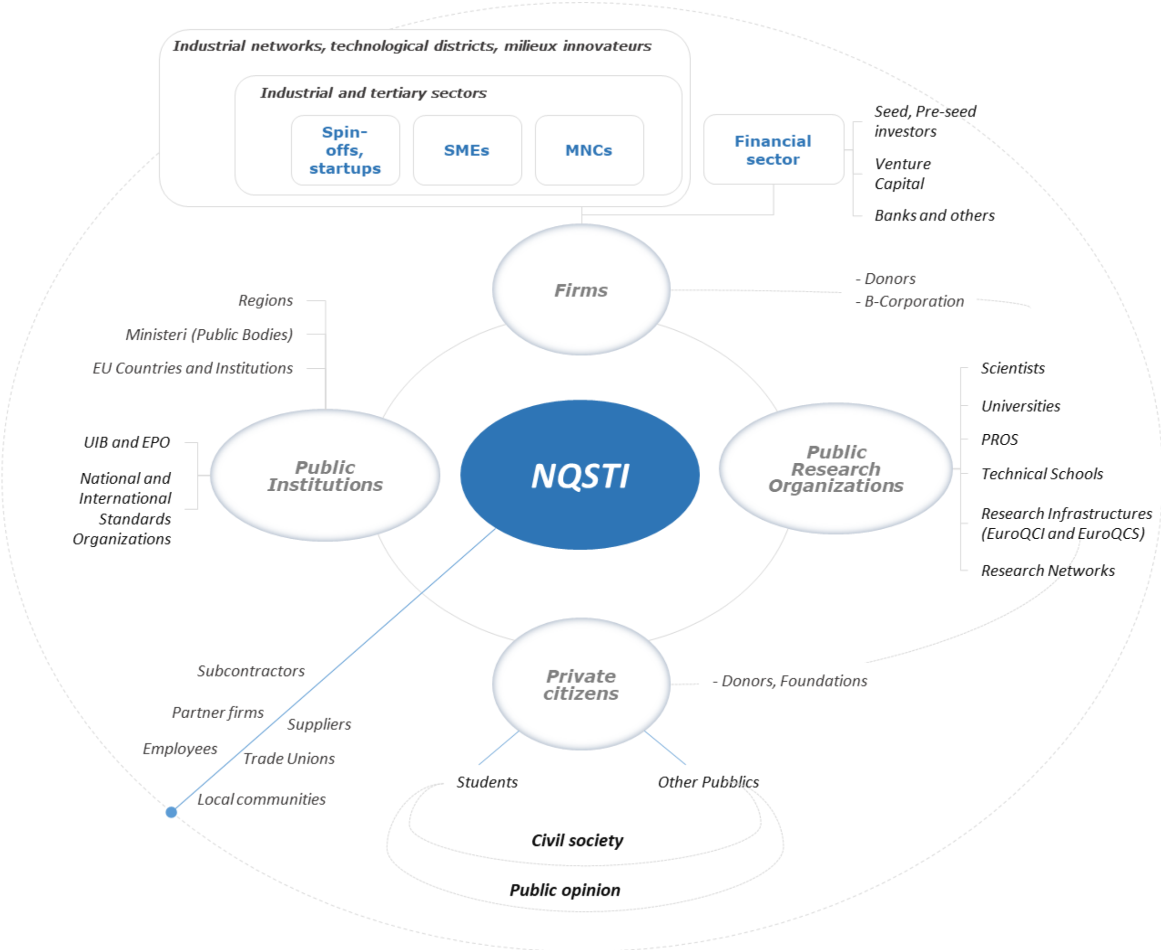
The ***National Quantum Science and Technology Institute*** **(*NQSTI*)** represents a strategic national initiative aimed at consolidating and advancing Italy’s capabilities in quantum technologies. Through coordinated action and the support of **PNRR** funding, *NQSTI* has **modernized research infrastructures**, fostered collaboration among universities, research centers, and industry, **and trained a new generation of scientists**. Its **open and integrated model** has successfully unified national competences, enhanced technological platforms, and stimulated innovation and technology transfer. The recent establishment of **Quantum Technology Fabs** is particularly relevant since it ensures long-term sustainability by providing **shared facilities for the design, prototyping, and certification of quantum devices and systems**.
This document reflects ***NQSTI*’s strategic vision and outlines the national landscape of quantum technologies**, highlighting their essential role in strengthening Italy’s scientific excellence, industrial competitiveness, and contribution to a vibrant quantum ecosystem.

The knowledge transfer system for QST

NQSTI is designed to effectively coordinate the efforts to bring science and development within all main stakeholders, *in primis* Research Organizations, Universities, and Industry, reconciling the different purposes and time horizons (*figure 2*). This coordination will make it possible to overcome the current structural weakness that limits the ability to transform Italian *blue-sky* research into innovation. The aim is to create products and services with high added value, generating great opportunities for the social and economic well-being of the community (health, safety, energy, environment). It is equally necessary to combine the effort in research and innovation with a suitable upgrade of the education and training system. The goal to be achieved is the creation of a **learning ecosystem** capable of transferring the basic concepts of quantum science at all levels, from school to professional environments. It is necessary that the key concepts of quantum mechanics become an integral part of the training curriculum for all innovation actors, starting with engineers and computer scientists, as well as, naturally, chemists and physicists. This not only serves to train workers ready for the quantum revolution but also to create an advanced, informed society with open knowledge and attitudes towards quantum technology.

The long-term vision of *NQSTI* is the establishment of a national institute capable of structuring human resources, technical infrastructures, public and private investments to promote scientific research, technological development, and, in the medium term, industrial adoption of QST. In other words, a new ecosystem of innovation in which today's ability to study and manipulate single quantum objects (atoms, photons, molecules, nano-devices) results in tomorrow's industrial applications (see *box 1*).

Figure 2. The NQSTI Stakeholders



Box 1. The National Research Plan for QST

The *National Research Plan 2021-2027* (*MUR*, 2020) sets a series of overarching objectives. Within the scope of the Extended Partnership and taking into account the other efforts financed within *M4C2* and by EC, the successful completion of our program will realize those objectives:

- Make Italy a key player of QST, both as a supplier of qualifying technologies, as a developer of integrated platforms and algorithms, and as an industrial end-user.
- Make Italy technologically independent by creating vertical production chains of quantum devices.
- Demonstrate the possibilities of QST for the increase in the efficiency of devices and systems and for improving the sustainability of industrial processes and the energy efficiency of consumer products.
- Set up at the national level a ***QT supply chain*** for:

i) integrated electro-optical, photonic and scalable hybrids;

ii) devices based on semiconductors, superconductors, molecular nanomagnets, photonic, atomic and hybrid systems;

iii) miniaturized quantum sensors based on neutral atoms, superconductors and opto-electro-mechanical devices;

iv) quantum imaging devices;

v) quantum interfaces capable of combining different platforms;

vi) test, validation and certification of QST systems.

All this is obtained by completing existing infrastructures, complementary in different areas (superconductivity, cryogenics, etc.).

- Create a *National Institute for Quantum Technologies* that allows to preserve and enhance the great national human capital and the key technologies for industrial development. *NQSTI* will have a federative role in the national community, and provide coordination and support between research and industrial development as well as between the different QST, within a network, and in synergy with the European strategy.
- Create new interdisciplinary paths of Higher Education (master's degree and doctorate) in this advanced and rapidly evolving scientific sector to prepare highly specialized staff and in possession of transversal skills involving industrial realities in training and academic research.

SPOKE 8 “Technology Transfer”

Among the various mechanisms to encourage the transfer of academic knowledge, the commercialization of research results (IPRs, licensing, spinoffs) is the tool that has generated the greatest number of insights in the last thirty years, both within the scientific literature and within institutional reports (*OECD* 2011, 2013, 2019). Although patenting and licensing activities represent effective ways to contribute to the development of the economy and society, several other ways exist through which scientific knowledge flows between public research bodies and non-academic organizations (see *box 2*).

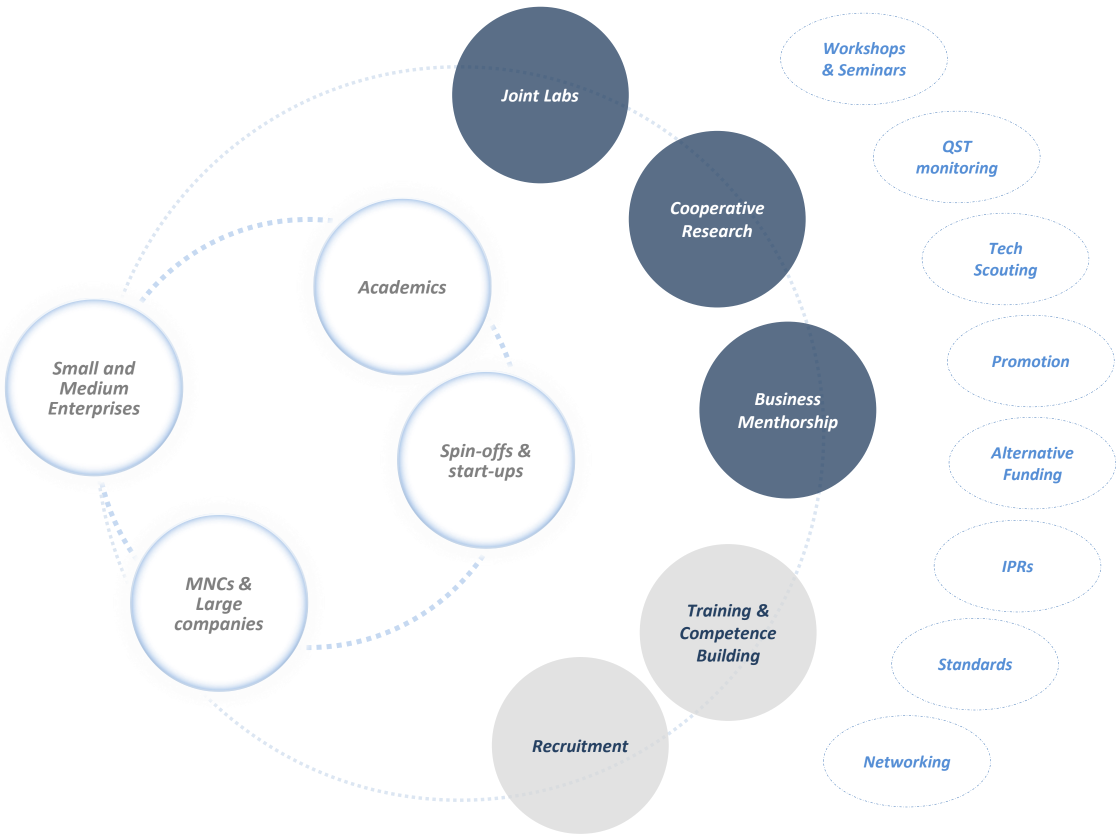
Box 2. The Knowledge transfer (KT) for the EU

Knowledge transfer (KT) is a concept used broadly to describe the **flow of (scientific) knowledge between research organizations (including universities and PROs) and business**, with the objective of creating socio-economic impact through promoting better use of the (public) research base. This concept replaced the formerly used “Technology Transfer” (TT) to reflect the wider knowledge base than just technology being transferred. Nowadays, the term “knowledge exchange” is used instead to reflect the fact that **the**

flow of knowledge is neither one-dimensional in the direction "research organization to industry', nor only between the players on this scale (multidimensional), *European Commission* (2014).
The *European Commission* (2020) underlines how Knowledge Transfer **is a complex process that involves many non-scientific and non-technological factors**, as well as many different stakeholders. Good or high-quality research results are not enough for successful technology transfer; **general awareness and willingness,** both at the level of organizations and individuals, as well as skills and capacity related to specific aspects, such as access to risk finance and intellectual property (IP) management, are also necessary components.

NQSTI intends to push for the adoption of the most diverse mechanisms of knowledge transfer, both formal and informal, with an interdisciplinary and holistic approach: cooperative research, joint laboratories, personnel exchanges, participation and organization of roadshows and fairs (see *figure 3*). The several channels of technology transfer, in fact, play a different role according to the specific context in which they develop and according to the objectives declared by the organizations participating in the process (see *box 3*). Furthermore, informal mechanisms are often important catalysts for more formal instruments of exchange (Debackere and Veugelers, 2005). [1]

Figure 3. The NQSTI "Knowledge Transfer" activities



[1] For more Information on NQSTI Spoke 8 "Technology Transfer" activities: https://nqsti.it/technology-transfer

Gaia Raffaella Greco, PhD
Spoke 8 "Technology Transfer" Coordinator
Researcher
Istituto di Calcolo e Reti ad Alte Prestazioni del Consiglio Nazionale delle Ricerche

"As actors in the *National Quantum Science and Technology Institute*'s technology transfer activities, we first have to **analyze and understand the national QST system**. Knowledge on the international and Italian industrial quantum structure is scarce and scattered across multiple sources (academic literature, consulting and institutional reports, *EU-Cordis* repositories, IPRs, and VC's datasets).
Incomplete Information could lead to incorrect or worthless decisions at the national level and in companies' long-term choices. **Strategic monitoring is** always **ongoing**"

Box 3. The main goals of NQSTI Knowledge Transfer

Main Goals of *NQSTI* "Knowledge Transfer" are:

- *to translate **basic research** into **applied knowledge**;*
- *to know and to **collaborate** with **science-based companies**;*
- *to **develop** "**academic engagement**" in knowledge transfer;*
- *to boost the **"absorptive capacity" of companies**;*
- *to **create trust** and promote **team spirit** within the NQSTI network;*
- *to **reduce** socio-cultural, organizational and technical **barriers** between academia and companies;*
- *to take advantage of all **formal** and **informal** collaboration tools;*
- *to encourage the creation of **new companies** in the sector;*
- *to train a **new class of scientists and entrepreneurs** in the sector;*
- *to **attract investments** and talents, also through internalization processes;*
- *to **inform** main stakeholders about Quantum Technologies, scientific developments, initiatives, and use cases implemented at the national and international level;*
- *to obtain the maximum **economic and social benefit to society** from research activities on the technological frontier.*

SPOKE 9 "Education and Outreach"

Carrying out the ambitious and highly innovative program of *NQSTI* requires highly qualified and specialized personnel who are able to operate within scientific and industrial organizations both at the national and international level in an extremely advanced and rapidly evolving scientific sector. From the point of view of human resources training, these characteristics pose non-trivial challenges, also considering that interdisciplinary skills are required, transversal with respect to the usual disciplines into which the university system is divided.
These needs originate from the academic/research world and are driven more and more from the industrial demand, where the interest in QT has rapidly increased in the last decade, initially stimulated by large multinational companies, and progressively also from small/medium enterprises and spinoffs, focused on specific devices and/or applications.

The level of Italian university education is generally very high and internationally appreciated. In the QT sector, at the time of the writing of the proposal, a few specific degree courses dedicated to QT were present, coming mostly from physical science. Recognizing the relevance of human resources training from the perspective of a longer-term horizon of the *PNRR* duration, *NQSTI* has decided to invest in the development of quantum-technology-oriented education and training via the activities and resources of *Spoke 9*. In this effort, special care has been devoted to guaranteeing wide access to the QST field, taking into account factors such as gender equality and diversity.
The activities carried out by *Spoke 9* encompass all the levels from high school to higher education, but it also includes the essential training at the professional level both of high-school teachers and of industry employees, which is required to increase the amount of highly qualified personnel towards quantum technology (see *box 4*).

Elisabetta Paladino, PhD
Spoke 9 "Education and Outreach" Coordinator
Full Professor of Theoretical physics of matter, models, mathematical methods and applications
Università degli Studi di Catania

"An extremely **advanced and rapidly evolving scientific sector** poses non-trivial challenges. We need an **interdisciplinary training system** that goes beyond actual academic departments. The industrial ecosystem, as well as the ambitious and highly innovative program of *NQSTI*, requires **highly qualified and specialized personnel**"

The effectiveness of these actions is tightly connected to the general awareness of the extraordinary revolution that QTs are bringing closer and closer to everyday life, as witnessed by the decision of the *United Nations General Assembly* to declare 2025 the *International Year of Quantum Science and Technology*. Because of the broadness of the research, knowledge transfer, education and outreach activities carried out at the national level and within international collaborations, *NQSTI* is one of the *Distinguished Partners* of the *IYQ*[2].
Another aim of *Spoke 9* is to raise awareness on QST of civil society, particularly with companies and professional organizations that do not yet know the potential of quantum technology but might become relevant stakeholders in the future. A vast number of outreach initiatives at all levels have been undertaken and are in progress in the course of 2025[3].
To implement this work program *NQSTI* has exploited the expertise on education and outreach of the consortium partners, firmly based on the output of the *Quantum Flagship Initiative* under the *QTEdu Coordination and Support Action* and on the

[2] More Information is on: *https://quantum2025.org/*.
[3] Detailed Information is on: https://nqsti.it/index.php/activities/outreach.

recommendation of the Italian *Programma Nazionale per la Ricerca 2021-2027* (*MUR, 2020*).

Box 4. The main goals of NQSTI Education and Outreach

Main goals of *NQSTI* "Education and Outreach" are:

- ***Identification of QST educational strategies*** *and available infrastructures and services;*
- *Establishment of* ***training courses for high school teachers*** *on QST topics;*
- *Establishment of* ***scholarships for specialized QST-training in industry*** *or joining academia/industry labs;*
- *Activation of* ***specialization internships*** *within existing Masters;*
- ***Activation*** *of new I and II level* ***Masters*** *in dedicated academic/****industrial laboratories****;*
- *Organization of* ***outreach events for civil society*** *and of info days dedicated to industries.*

The *NQSTI* Report: purpose and objectives

NQSTI objective for all the academic institutions involved is to strengthen cooperation with the private sector in two complementary directions: inducing the research community to respond to the needs of industry and encouraging the latter to contribute to a re-launch of the technologies available to QST researchers.
Within the process of research valorization, one of the actions envisaged was the drawing up of a dataset of possible users of the knowledge produced inside the academic institutions. Furthermore, *NQSTI* aims at informing the academic, the industrial and the institutional stakeholders on major technical advances, state of development, use cases implemented, real-market applications, and standards definition at national and international levels.

The Italian industrial sector analysis was driven by the need to understand the main dimensions of the *Quantum Science and Technology National System*, to comprehend the principal variables of the internal market (geography, size, collaborations, and industries involved), and to fully channel fundamental Technology Transfer, Education, and Communication initiatives (see *figure 4*).

Figure 4. The first NQSTI TTOs' evidence

"The priority is to understand the context in which we are moving"

Needs

- ***Need of national coordination*** *- For Knowledge Transfer Activities in the Quantum Science and Technology field of research (benchmark to which to refer)*
- ***What do industrial partners do in this field?*** *- Who are true industrial partners? What research do they conduct? What do they need? How to build long-term relationships with them? What are their education needs?*
- ***Need to create a relationships and knowledge network***
- ***Need of professional figures as bridges between scientific and industrial research activities***

Actions

- ***Scientific outreach and sensibilization activities***
- ***Proof of concept (POC) to advance TRLs (Technology readiness Levels); challenges to sustain Research 2 Business***
- ***Incubation and consulting services to RTDA and PhDs to form new entrepreneurial science-based firms***
- ***Companies dataset in Quantum Science and Technology Industries (data collection and analysis)***
- ***Coordination activities with the other Spokes (Methods and timing); internal Communication Strategy***
- ***Technology Transfer seminars and education program***
- ***Events participation definition (Communication Strategy)***

It emerged early in the first meetings among the *NQSTI* partners that there was a need for a clear understanding of the national Quantum technological context, analyzing the essential characteristics, the value chain, the collaboration capacity, the research cooperation culture, and the propensity of the firms in Italy. Specific questions remain:

- *How many firms in Italy work on QST research projects?*
- *Where are they?*

- *What are the main characteristics?*
- *Who is collaborating with whom?*
- *What are the main topics of investigation?*
- *In which industries do they operate?*
- *How do they build their cooperative networks?*

Science-based firms are defined as organizations where the main source of technology lies in the R&D activities of the companies themselves (Niosi, 2000). The knowledge resulting from research, pure and applied, which is carried out in universities and other public research centers flows, thanks to the collaborative activities carried out to companies. However, only a knowledge base created thanks to internal R&D activities allows the company to benefit from the research that is carried out in other organizations (Cohen and Levinthal, 1989).

The backbone of Italian enterprises is represented by SMEs that in many cases do not have the resources and expertise to take advantage of the Quantum Revolution that is going to be pervasive and will influence several economic sectors. Is this vision fully authentic?

Through the construction of an *original dataset of firms*, the *NQSTI* Report intends to represent a first picture of the Italian QST Knowledge system, shedding light on the leading actors, analyzing primary industrial sectors and applications, investigating the geographical distribution of companies and spinoffs, questioning the strategic missions, and reflecting on emerging trends.
The scope of the document is to describe the current efforts towards the implementation and deployment of quantum technology (QT) in Italy, through the presentation of the main global dynamics and politics. Notably, the report includes four separate Chapters.

The *First Chapter* presents an investigation of the *institutional and consulting literature on quantum technology and markets*, analyzing industrial segments (quantum communication, quantum computing and simulation, and quantum sensing), public and venture capital financing, outlooks, and trends on a global scale. The aim of the Chapter is to represent international dimensions broadly by comparing the most relevant references and offering insights for further in-depth analysis.

The *Second Chapter* introduces European policies related to Quantum Science and Technology, explicitly describing the *Quantum Flagship* initiative and the *Quantum Europe Strategy*. The scope of the Chapter is not to analyze single European national policies, but to contextualize the Italian national system of innovation inside the European general framework.

The *Third Chapter* analyzes the QST system by investigating the original *NQSTI* dataset. It presents a *comprehensive overview of Italian companies entering the quantum industrial sectors*. Several key highlights emerged, including the geographical distribution of these companies, the industries to which they belong, and the markets they serve. One particular section focuses on the role of Italian startups, emphasizing their growing importance in this field (a list of these startups is provided in the text).

Finally, the Fourth Chapter aims to represent and analyze each Quantum "vertical" (computing, communication, simulation, and sensing), further highlighting synergies and interdependencies among them, and evidencing the relevant role played by supporting firms and other industries. Along with the analysis of the quantum sectors of application, a *particular focus will be on Italian research and industrial excellence, analyzing specific business case studies*.

Direct interviews were conducted to give voice to the protagonists who live in the Quantum industrial and scientific systems. Indeed, a specific set of questions has been asked to: ***academics*** with specific Technology Transfer backgrounds (*Chapter One*), ***venture capitalists*** operating in Italy (*Chapter Three*), and ***CEOs and research managers*** of QST firms (in *all Chapters*).
Relevant questions pertain to actual and future QST industrial applications, supply chain challenges, the current state of final markets, hypothesized outlooks, and underlying significant difficulties faced in strengthening coordination and excellence.
The report aims to provide an initial representation of the state of the art in national industrial sectors, offering a valid tool for discussion among all stakeholders of the Quantum Science and Technology system to support the development of an Italian research infrastructure and future strategic programs.

The Methodological Note

Several purposes drove creation of the database of firms that operate inside QST. In particular:

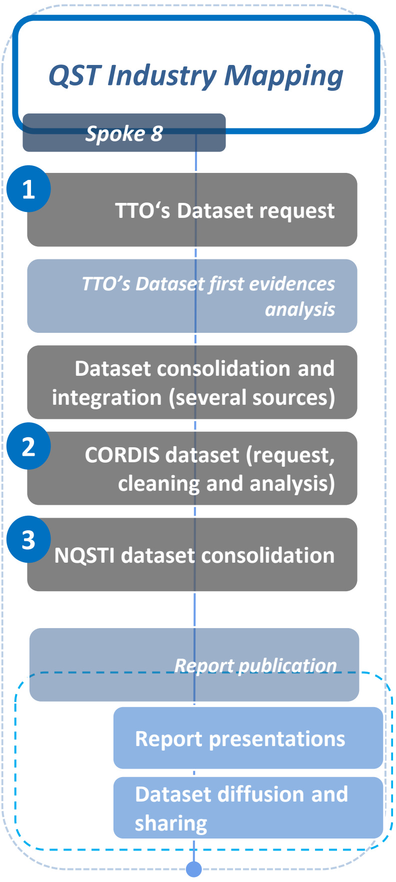
1. to investigate firms that effectively conduct research and production projects, utilizing QST properties;

2. to draw up a list of firms representative of the national QST business world;

3. to enlarge as much as possible the sample of organizations considered (as for geographical scope, as for sectors involved);

4. to gather up-to-date information about the organizations considered;

5. to have a set of variables on which to draw some first considerations.



It is possible to recognize several different steps in sampling. At the beginning of the *NQSTI* project, the author tried to define first reliable sources for the extraction of the firms interested in the research (TTOs' partnerships, scientific literature, economic and consulting reports, newspapers' articles, participation in Conferences and Technological Fairs).

Then the main activity was the definition of the QST activity of the organizations (product and services offered, or research project conducted). The third stage of the investigation was the collection and consolidation of the data and variables for all the firms of the sample and, finally, the elaboration of the first results. All the research activities have been developed between January 2023 and March 2025. In particular, it is possible to identify three specific phases in the collection of information on the QST companies.

Phase 1— the Technology Transfer Organizations panel

To start Quantum Science and Technology analyses in the Italian context, we begin collecting Information on the research collaborations put in place by all the partners participating in *Spoke 8* (15 TTOs)[4]. We started investigating companies that already cooperate or are about to start joint research and development projects with universities, EPRs, and foundations that are part of the *NQSTI* Extended Partnership. Obviously, we considered only companies that consider fields of applied research within the QST sectors and wanted to collaborate in these specific

[4] 15 are the organizations participating to *NQSTI* Spoke 8 "TT" are: *CNR- National Research Council, University of Naples – Federico II, Bruno Kessler Foundation, IIT - Italian Institute of Technology, Scuola Superiore Sant'Anna, Scuola Normale Superiore, University of Catania, University of Pavia, University of Padova, INFN – National Institute of Nuclear Physics, University Milano-Bicocca, University of Firenze, Sapienza University, University of Trieste, University of Camerino*.

scientific domains. The main questions were about the industrial sectors, the mechanism of cooperation, and the existence of shared IPRs.

First evidence of the elaboration of the dataset has been presented to the *First NQSTI Annual Meeting* (Rome, 15-16 January 2024). The dataset has been sent to the *Steering Committee* and to *Spoke 8* groups' coordinators to allow a discussion on the next steps to follow.[5]

Phase 2—the Cordis dataset

The *Cordis'* dataset[6] allows the investigation of information about EU research and development projects. Established in 1994, it gives free access to EU-funded research and innovation, where you can find data on projects, topics, and publications funded by the EU's research programs. *Cordis* belongs to the *Research and Innovation community platform of the European Commission*.

Science-based firms form public-private partnerships to join EU projects with the aim of addressing the most pressing challenges through concerted research and innovation initiatives. European Partnerships are a key implementation tool of *Horizon Europe* and significantly contribute to achieving the Union's political priorities, reducing the fragmentation of the research and innovation landscape[7].

It has special meaning, consequently, to analyze the private partners that participated in the European research programs.

Dataset - HORIZON EUROPE - Projects with at least an Italian organization (Public or private)
Extraction date: 14th May 2024 (from the beginning of 2021 to)
Keyword: Quantum
Total number of projects extracted: 197
Total number of projects analyzed for the discussion: 183[8]
Main Information: abstract, financial measure, research fields, typology of the organization, dimension of the firm, dimension of the investment, network of organizations (participating institutions), beginning and end of the project.

The cleaning of the dataset has been realized through reading the project abstracts. Particularly, several research projects contained the words "quantum leap" in the description. Some projects have as core research activities directly linked to QST, other research programs investigate, on the contrary, specific problems through the QST lens (partially, not as core research activity).

Phase 3—the NQSTI dataset consolidation

After completing the dataset with information available in institutional reports, in consulting and technological literature, specialized magazines, and the companies participating in TT and technological events, the scientific literature on QST was collected (see Bibliography). The reports describing QST sector structure in a general way or presenting specific industrial fields (sensing, computing, imaging) were then investigated. Still, to have an idea of the companies

[5] From the first meetings of the participants emerged clearly that there were Disclosure Agreements between PROs and companies that limited the complete gaining of the Information on Technology Transfer Mechanisms and partnerships.

[6] https://cordis.europa.eu. Accessed May 2024.

[7] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en. Accessed September 2024.

[8] Consequently, 14 projects are not considered for this analysis, specifically: *ANDREAH* (101046846), *ARCHIMEDES* (101057527), *CUE-GO* (101058349), *ELOQUENCE* (101094065), *ETTS* (101096405), *EVAI* (101104404), *IMPACT4MECH* (101112118), *ISPLASH* (101112295), *MAPWORMS* (101114050), *MEETWEEN* (101116257), *NEXTGEM* (101135916), *OLAMUR* (101135916), *PRESTO* (190181809), and *QUANTUM* (190190195).

directly involved in the QST research, the datasets belonging to *Quantum Flagship* (*Quantera*[9]), *QUIC* (*Quantum Industry Consortium*[10]) and *EPO* (*European Patent Office*) reports (*EPO*, 2023a; *EPO,* 2023b) have been analyzed.
Participants in international trade fairs and conferences are another meaningful source of QST firms. Trade fairs always show companies active in different markets, looking for new clients, new partnerships, and new collaborations. Firms participating in several workshops, summer schools, and public-private meetings were considered.[11]
The various sources gave birth to a first list of private organizations that exploit QST. Many firms, of course, were cited several times in the papers, in the economic reports and on the websites. For every single company, the authors preliminarily verified whether the firm belonged to the QST sector (in the case of non-specific events). They gathered this information through the official website that describes the products, or the services offered, the markets served and the research processes they are conducting. In the case of companies' websites that resulted poor in the description of the activities or, on the contrary, too big to understand if there exists a direct link to QST, they made use of other references, particularly of newspapers and magazines' articles (interviews and business case studies presented on the firms' websites on the page "Press releases or media").

The variables and limits

The information gathered for all the companies in the sample is:

- *Business name;*
- *Head Office (city, state);*
- *Websites URL;*
- *Dimension: spinoff, SMEs, other;*
- *Year of establishment;*
- *Short description of the products or services offered (mission);*
- *ATECO codes;*
- *Markets served;*
- *QST sectors;*
- *Others (general notes).*

To have a clear classification of the QST fields, the author followed the taxonomy realized by *CEN-CENELEC* exposed in van Deventer *et al.* (2022)**.** The representation of the QST pillars made to orient standardization actions at European levels illustrates a simple and shared description of the main quantum sectors (a schematization of the model is offered in the first Chapter, *figure 5*). It has been decided, nevertheless, to consider only the platforms and systems classification.
The dataset aims to represent a first step through the gathering and analysis of the QST Italian Industrial System. Authors hope in the next editions to add other relevant sources of information, such as VCs' investments in the national territory or specific IPRs analysis.

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[9] Quantera, Quantum Landscapes Database. Accessed July 2024. https://quantera.eu/wp-content/uploads/D6.1_Database_updated-version-_Feb2021_no_contacts-1.pdf
[10] European Quantum Industry Consortium, QUIC Member List. Accessed September 2024. https://www.euroquic.org/members-list/
[11] All the Knowledge Transfer events participated by *NQSTI* members are cited here: https://nqsti.it/activities/knowledge-transfer

The Italian Dataset

https://docs.google.com/spreadsheets/d/1qf0zLszLeym3w_zfuJnxHDaG-hTwts6o/edit?usp=sharing&ouid=109747324304263637924&rtpof=true&sd=true

Company	Spin-off	SME	City-Headquarter	Region	State	Activity - Mission	Ateco Code	industry	*Year of foundation*
Aerospazio Tecnologie	No	Yes	Rapolano Terme (SI)	Toscana	Italia	Electric Rocket Propulsion	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*2000*
AFR MILANO	No	Yes	San Donato Milanese	Lombardia	Italia	Optical Components for Telecommunications	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**Enabling Technologies**	*2000*
Aindo	Yes	No	Trieste	Friuli Venezia Giulia	Italia	AI-Based Solutions / to enable artificial intelligence to add value to society while respecting our rights and freedoms	63 ATTIVITÀ DEI SERVIZI D'INFORMAZIONE E E ALTRI SERVIZI INFORMATICI	**ICT**	*2018*
AIRBUS	No	Yes	Roma	Lazio	Italia	Aerospace Design and Manufacturing	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*1970*
AKKODIS ITALY SRL	no	No	Roma	Lazio	Italia	IT Consultancy	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1949*
AlmaVivA	No	Yes	Roma	Lazio	Italia	IT Consulting	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2001*
AM Microsystems	No	Yes	Macerata	Marche	Italia	Embedded Electronic Systems	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*2014*
ARGOTEC SRL	no	Yes	Torino	Piemonte	Italia	Small Satellites and Astronaut	62PRODUZIONE DI SOFTWARE,	**Aerospace**	*2008*

						Comfort Solutions	CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE		
ASM TERNI SPA	no	No	Terni	Umbria	Italia	Energy Production and Distribution	35FORNITURA DI ENERGIA ELETTRICA, GAS, VAPORE E ARIA CONDIZIONATA	**Energy**	*1960*
AtomSensors s.r.l.	Yes	Yes	Sesto Fiorentino	Toscana	Italia	Quantum Sensors	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2015*
BEDIMENSIONAL SPA	Yes	No	Genova	Liguria	Italia	Energy Storage and Conversion, Coatings, and Composites / Innovate industrial processes and create new performing solutions	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Energy**	*2016*
BioAge Srl	No	Yes	Lamezia Terme	Calabria	Italia	High-tech scientific instruments and design services.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2003*
Bit4ID	No	Yes	Napoli	Campania	Italia	Digital identification and electronic signatures	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2004*
Bluetensor Srl	No	No	Trento	Trentino Alto Adige	Italia	AI-Based Business Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2006*
Sensortech Italy (Bosch)	No	Yes	Milano	Lombardia	Germania	Quantum sensors	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*2005*
BRIGHT SOLUTIONS SRL	No	Yes	Cura Carpignano	Lombardia	Italia	Laser Technology	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E	**Enabling Technologies**	*1998*

							ATTIVITÀ CONNESSE		
Bright101	Yes	Yes	PISA	Toscana	Italia	Industrial development of optical systems with LED or laser sources	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2019*
CAEN SpA	No	Yes	Viareggio	Toscana	Italia	Particle physics, nuclear physics, and industrial electronics	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1979*
CAMBRIDGE RAMAN IMAGING SRL	Yes	Yes	Verona	Veneto	Italia	Chemometric Imaging for Cellular Analysis / To offer highly precise and detailed imaging of tissues and cells, allowing for more accurate diagnoses of diseases and a better understanding of their underlying mechanisms.	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*2005*
CELLEX SRL	NO	Yes	Roma	Lazio	Italia	Innovative Solutions for Human Life and Environment	72RICERCA SCIENTIFICA E SVILUPPO	**Others**	*2018*
CENTRO NAUTICO PERMARE S.R.L.	NO	Yes	SANREMO	Liguria	Italia	Nautical Industry Solutions	33RIPARAZIONE, MANUTENZIONE ED INSTALLAZIONE DI MACCHINE ED APPARECCHIATURE	**Others**	*1973*
Centro Ricerche Astrea Scarl	No	Yes	Lamezia Terme	Calabria	Italia	Development of sensors	72RICERCA SCIENTIFICA E SVILUPPO	**Sensing**	*2009*
Cisco	No	Yes	Vimercate	Lombardia	Italia	Networking and IT technologies	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**ICT**	*1984*

Civitanavi	No	Yes	Civitanova	Marche	Italia	Development and production of advanced navigation and inertial stabilization systems	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*2012*
COMMPLA SRL	NO	Yes	Pisa	Toscana	Italia	User-Centered Digital Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2010*
Consorzio CREO	No	Yes	L'Aquila	Abruzzo	Italia	Metamaterials	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2009*
Copan Italia	No	No	Brescia	Lombardia	Italia	Manufacturing of chemicals	20FABBRICAZIONE DI PRODOTTI CHIMICI	**Others**	*1979*
Crisel Instruments	No	Yes	Roma	Lazio	Italia	Wide-field confocal epifluorescence microscopy systems	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*1994*
CSR CONSORZIO STUDI E RICERCHE SRL	NO	No	RIMINI	Emilia Romagna	Italia	Industrial Research and Acoustic Studies	82ATTIVITÀ DI SUPPORTO PER LE FUNZIONI D'UFFICIO E ALTRI SERVIZI DI SUPPORTO ALLE IMPRESE	**Sensing**	*1976*
COHARENTIA	Yes	Yes	Milano	Lombardia	Italia	Cohaerentia has developed an innovative diagnostic system that allows real-time monitoring of plants, machineries or civil infrastructures to improve the quality and efficiency of production processes in manufacturing industries and	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**Sensing**	*2015*

						security in the civil sector.			
CUBIT s.c.a.r.l.	Yes	Yes	Cascina (PI)	Toscana	Italia	Consulting / Adopting an operational model which integrates technological research and industrial experience with a continuous process of innovation and technology transfer, capable of increasing the competitiveness of companies.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2007*
DATAPOWER SRL	NO	Yes	Cagliari	Sardegna	Italia	Economic and Technological Consulting	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Consulting**	*2021*
DAY ONE SOCIETA A RESPONSABILITA LIMITATA	NO	Yes	Roma	Lazio	Italia	Venture Building and Funding	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Consulting**	*2013*
DGS SPA	NO	No	Roma	Lazio	Italia	Cybersecurity and IT Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1997*
Digital Superconducting Quantum Machines (DSQM)	Yes	Yes	Pisa	Toscana	Italia	Development of advanced IT solutions	27FABBRICAZIONE DI APPARECCHIATURE ELETTRICHE ED APPARECCHIATURE PER USO DOMESTICO NON ELETTRICHE	**Enabling Technologies**	*2022*

DOMPE FARMACEUTICI SPA	NO	No	Milano	Lombardia	Italia	Pharmaceutical Supply Chain	21FABBRICAZIONE DI PRODOTTI FARMACEUTICI DI BASE E DI PREPARATI FARMACEUTICI	**Others**	*1940*
DYNAMIC OPTICS	Yes	Yes	Padova	Veneto	Italia	Development of optical and photonic technologies / Providing unique innovative transmissive wavefront modulators, ultra-high reflectivity deformable mirrors and solutions for wavefront sensing metrology.	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*2017*
E 4 COMPUTER ENGINEERING SPA	NO	Yes	Scandiano	Emilia Romagna	Italia	High-Performance Computing and AI	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2002*
EHT	No	Yes	Catania	Sicilia	Italia	Heat pumps and solar panels	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Energy**	*2016*
Else Nuclear	No	Yes	Busto Arsizio (VA)	Lombardia	Italia	Environmental monitoring, spectrometry, and shielding	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2008*
Elt Group	No	Yes	Roma	Lazio	Italia	Electrical systems	72RICERCA SCIENTIFICA E SVILUPPO	**Energy**	*1985*
EMOLED SOCIETA A RESPONSABILITA LIMITATA	Yes	Yes	Firenze	Toscana	Italia	Medical Devices / Developing highly innovative medical devices, the result of advanced research in the field of photonics	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Others**	*2014*
EMOTION SRL	NO	Yes	Galatina Le	Puglia	Italia	Electric Vehicle Charging Systems	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Energy**	*2014*

ENEA	No	Yes		Campania	Italia	Research, technological innovation, and the provision of advanced services	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Energy**	*1982*
ENEL	No	Yes	Roma	Lazio	Italia	Energy Production and Distribution	35FORNITURA DI ENERGIA ELETTRICA, GAS, VAPORE E ARIA CONDIZIONATA	**Energy**	*1962*
ENERBRAIN S.R.L.	No	Yes	Torino	Piemonte	Italia	IT consulting	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2015*
ENGINEERING - INGEGNERIA INFORMATICA SPA	NO	No	Roma	Lazio	Italia	Digital Transformation	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1980*
ENGYS SRL	NO	Yes	Trieste	Friuli Venezia Giulia	Italia	CFD Software Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2009*
ENI	No	Yes	Roma	Lazio	Italia	Oil extraction	06ESTRAZIONE DI PETROLIO GREGGIO E DI GAS NATURALE	**Energy**	*1953*
EPHOS	Yes	Yes	Milano	Lombardia	Italia	Integrated Photonic Circuits / Minimizing signal loss, enabling customers to build scalable quantum infrastructures.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2022*
ERICSSON TELECOMUNICAZIONI SPA	No	No	Roma	Lazio	Italia	Telecommunications	61TELECOMUNICAZIONI	**TLC**	*1876*
ETG RISORSE E TECNOLOGIA SRL	No	Yes	Chivasso	Piemonte	Italia	Gas Analysis	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E	**ICT**	*1996*

							ATTIVITÀ CONNESSE		
Exprivia spa	No	Yes	Molfetta	Puglia	Italia	Design and development of innovative software technologies and IT services for the banking, medical, industrial, telecommunications, and public administration sectors	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2000*
FOCOOS AI	No	Yes	Torino	Piemonte	Italia	Development of AI solutions for optimizing complex processes through real-time data analysis	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2022*
FORESEE BIOSYSTEMS SRL	Yes	Yes	Genova	Liguria	Italia	Gas Analysis and Biosensors / Developing innovative solutions for the assessment of in-vitro cardiotoxicity.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2021*
GEM Elettronica	No	No	San Benedetto del Tronto	Marche	Italia	Quantum Nautical Industry Solutions	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*1977*
GEMATEG ITALIA S.R.L.	No	Yes	Perugia	Umbria	Italia	Sale of technological equipment and components	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**ICT**	*2018*

GEMRAD	No	Yes	San Benedetto del Tronto	Marche	Italia	Radar sensors production	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*1977*
GEOMATICS RESEARCH & DEVELOPMENT SRL	Yes	Yes	Lomazzo	Lombardia	Italia	Geodesy and Remote Sensing Services / Structure displacement monitoring, Ground displacement monitoring, Gravity field modelling and inversion, Atmospheric sensing	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2000*
GLASS TO POWER S.P.A.	Yes	Yes	Rovereto	Lombardia	Italia	Glass-based energy conversion technologies / To develop transparent, aesthetically pleasing photovoltaic glazing that can be invisibly integrated into the architecture of buildings to align them with theNear Zero Energy Building (NZEB) standards, restoring and improving the living comfort of those who occupy them	72RICERCA SCIENTIFICA E SVILUPPO	**Energy**	*2016*

GRAFTONICA S.R.L.	Yes	Yes	Milano	Lombardia	Italia	Solutions and consulting in technology and medicine / Use of new methodologies in order to compatibilize and disperse inorganic nanometric fillers within polymer matrices	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2015*
HAMAMATSU PHOTONICS ITALIA S.R.L.	No	Yes	Milano	Lombardia	Italia	roduction of photonic sensors and optical equipment	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1953*
Hero (robotics) srl	No	Yes	Martina Franca	Puglia	Italia	Development of robotic solutions	72RICERCA SCIENTIFICA E SVILUPPO	**Others**	*2018*
HEWLETT-PACKARD CUSTOMER DELIVERY SERVICES ITALIA SRL	No	No	Roma	Lazio	Italia	IT Support Services	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1939*
IBM Italia	No	Yes	Milano	Lombardia	Italia	Technology solutions, IT services, cloud computing, artificial intelligence, and consulting	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1927*
IDC ITALIA SRL	No	No	Milano	Lombardia	Italia	Market Research and ICT Consulting	70ATTIVITÀ DI DIREZIONE AZIENDALE E DI CONSULENZA GESTIONALE	**Consulting**	*1964*
IDEAS & MOTION SRL	No	Yes	Alba	Piemonte	Italia	High-Tech Automotive Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2010*
ILLYCAFFE S.P.A	No	No	Trieste	Friuli Venezia Giulia	Italia	Coffee Roasting	10INDUSTRIE ALIMENTARI	**Others**	*1993*

Infibra Technologies	Yes	Yes	PISA	Toscana	Italia	Development of technologies and solutions in the field of optical fibers / Designing and manufacturing of next-generation fiber optic sensors systems, while also offering engineering services. Energy, Oil & Gas, Transportation and Civil Engineering are our target markets, with solutions even suitable for harsh environments.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2014*
INTEGRATED SYSTEMS ENGINEERING SRL	No	Yes	Brugherio	Lombardia	Italia	Systems Engineering Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2007*
Intesa San Paolo	No	Yes	Torino	Piemonte	Italia	Banking and financial services	64ATTIVITÀ DI SERVIZI FINANZIARI (ESCLUSE LE ASSICURAZIONI E I FONDI PENSIONE)	**Others**	*2007*
ITALTEL SPA	No	No	Roma	Lazio	Italia	Telecommunications	61TELECOMUNICAZIONI	**TLC**	*1921*
Itsvil srl	No	Yes	Salerno	Campania	Italia	Development of advanced IT solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE"	**ICT**	*2005*
Ivert	No	Yes	Matera	Basilicata	Italia	Sale of industrial and technological equipment	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**ICT**	*2018*
JASCO EUROPE SRL	No	No	Milano	Lombardia	Italia	Scientific Instruments	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**Sensing**	*1958*
Kayser	No	Yes	Livorno	Toscana	Italia	Design and production of systems and instruments for space missions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Aerospace**	*1986*

LEITHA SRL	No	No	Bologna	Emilia Romagna	Italia	Digital Transformation	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2020*
Leonardo	No	No	Roma	Liguria	italia	Defense and Aerospace	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*1948*
Level Quantum	Yes	Yes	MILANO	Lombardia	Italia	Advanced IT Solutions / providing unconditional security to communications	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2022*
Lutech Advance Solutions	No	Yes	Milano	Lombardia	Italia	Provision of consulting services, system integration, managed services, cloud operations, big data, and cybersecurity solutions.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2023*
MBDA Systems	No	Yes	Roma	Lazio	Italia	Design and production of missile systems and defense solutions	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*2001*
Mespac	No	Yes	Torino	Piemonte	Italia	Development of advanced models and technologies for monitoring and forecasting marine weather conditions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2022*
Micro Photon Devices	Yes	Yes	Bolzano	Trentino Alto Adige	Italia	Development of single-photon devices for scientific research, medical, and industrial applications / Production and commercialisation of advanced single-photon counting modules with unmatched photon-timing capabilities and overall performance	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*2004*
MICRON SEMICONDUCTOR ITALIA S.R.L.	No	Yes	Vimercate	Lombardia	Italia	Production of semiconductors and memory solutions	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E	**Enabling Technologies**	*1978*

							OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI		
NARRANDO SRL	Yes	Yes	SALERNO	Campania	Italia	Dosimeters for Radiology	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2017*
NATURE 4.0 SOCIETA BENEFIT SOCIETA A RESPONSABILITA LIMITATA	No	Yes	Viterbo	Lazio	Italia	Experimental R&D in natural sciences and engineering	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2018*
NC - New Cleo	No	Yes	Torino	Piemonte	Italia	roduction of electronic and connectivity equipment	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*2006*
NetCom Engineering SpA	No	Yes	Napoli	Campania	Italia	Advanced and innovative engineering consulting and services.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2006*
NEWRONIKA SPA	Yes	Yes	Milano	Lombardia	Italia	Advanced Neurostimulation Solutions / Restoring brain and body functions with neural devices	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Others**	*2013*
NEXTWORKS	No	Yes	Pisa	Toscana	Italia	ICT Solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2002*
NIREOS SRL	Yes	Yes	Milano	Lombardia	Italia	Optical Instruments / High Tech Solutions in Spectroscopy and Photonics	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2018*
NOKIA SOLUTIONS AND NETWORKS ITALIA SPA	No	No	Milano	Lombardia	Italia	Provision of telecommunications infrastructure, services, and solutions for	61TELECOMUNICAZIONI	**TLC**	*1865*

						network operators			
NTT Data Italia	No	No	Milano	Lombardia	Italia	IT consulting, system integration, and outsourcing	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1988*
NUOVO PIGNONE TECNOLOGIE S.R.L.	No	Yes	Firenze	Toscana	Italia	Production of solutions for the energy industry, including gas turbines and compressors	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Energy**	*2000*
OCEM	No	Yes	Bologna	Emilia Romagna	Italia	Manufacturing of lighting equipment, including LED and halogen lights	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1961*
Optoi	No	Yes	Trento	Trentino Alto Adige	Italia	Manufacturing of optoelectronic sensors for industrial, medical, and automation applications	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Sensing**	*1995*
Optoprim	No	Yes	Vimercate	Lombardia	Italia	Manufacturing of laser components and solutions for various industries, ranging from scientific research to industrial production	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1994*
OSPEDALE SAN RAFFAELE SRL	No	No	Milano	Lombardia	Italia	Healthcare Services and Research	86ASSISTENZA SANITARIA	**Others**	*1969*
PANGAIA GRADO ZERO SRL	No	Yes	MONTELUPO FIORENTINO	Toscana	Italia	Technology Transfer	74ALTRE ATTIVITÀ PROFESSIONALI, SCIENTIFICHE E TECNICHE	**Consulting**	*2001*

Photon Technology Italy SRL	Yes	Yes	Napoli	Campania	Italia	Production and distribution of single-photon detection systems based on superconducting materials (nanowires/microstrips)	72RICERCA SCIENTIFICA E SVILUPPO	**Enabling Technologies**	*2023*
PicoStats	Yes	Yes	Trieste	Friuli Venezia Giulia	Italia	Innovative solutions for satellite communication, maritime navigation, Earth observation, and space sustainability / aspiring to an interconnected world where people can use space-derived resources to improve community life in a sustainable way	72RICERCA SCIENTIFICA E SVILUPPO	**Sensing**	*2018*
Planckian	Yes	Yes	PISA	Toscana	ITALIA	Quantum-powered energy management	72RICERCA SCIENTIFICA E SVILUPPO	**Enabling Technologies**	*2022*
Planetek	No	Yes	Bari	Puglia	Italia	Provision of geospatial solutions for Earth observation, spatial data management, and environmental monitoring / To enable people to act in an aware and timely manner in order to live better and preserve the Earth. We simplify the adoption of geospatial data in order to	72RICERCA SCIENTIFICA E SVILUPPO	**Sensing**	*1994*

						understand the world better			
PPQSENSE SRL	Yes	Yes	Sesto Fiorentino	Toscana	Italia	High-Quality Electronics for Laser Systems / aiming to contribute to the ecological transition and the emergence of the Net Zero carbon initiative by providing new technologies to researchers and industries.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*2016*
Promete Srl	Yes	Yes	Napoli	Campania	Italia	Research and development in advanced technologies / R&D projects that have as their ultimate goal to promote the growth of competitiveness of SME	72RICERCA SCIENTIFICA E SVILUPPO	**Consulting**	*1997*
PROMOSCIENCE SRL	No	Yes	Trieste	Friuli Venezia Giulia	Italia	Visual and digital solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2004*
QBrain	No	Yes	Milano	Lombardia	Italia	AI application in medical diagnostics and clinical research	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2022*
Qsensato	Yes	Yes	Bari	Puglia	Italia		72RICERCA SCIENTIFICA E SVILUPPO	**Sensing**	*2024*

QUNaTech	Yes	Si	Napoli	Campania	Italia	Superconducting Nanowire Single Photon Detectors	72RICERCA SCIENTIFICA E SVILUPPO	**ICT**	*2024*
QTI - Quantum Telecommunications Italy	Yes	No	Firenze	Toscana	Italia	Advanced technologies for quantum telecommunications / developing and produce reconfigurable quantum key distribution architectures	61TELECOMUNICAZIONI	**TLC**	*2020*
QuantaBrain	No	Yes	Pisa	Toscana	Italia	AI application in medical diagnostics and clinical research	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2023*
Quantum Design Europe	No	Yes	Roma	Lazio	Italia	Wholesale trade of equipment for materials science, microscopy, imaging, spectroscopy, photonics, nanotechnology, and life sciences	46COMMERCIO ALL'INGROSSO (ESCLUSO QUELLO DI AUTOVEICOLI E DI MOTOCICLI)	**Enabling Technologies**	*1970*
QuantumNet Srl	Yes	Yes	Napoli	Campania	Italia	Development of skills and solutions using quantum technologies	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2021*
Quantum2Pi	Yes	Yes	Napoli	Campania	Italia	Our mission is to develop and implement cutting-edge Quantum Computing solutions that overcome current technological barriers	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE"	**ICT**	*2024*
Random Power srl	Yes	Yes	Como	Lombardia	Italia	Manufacturing of industrial machines and equipment / Design and development of an innovative system enabling data encryption and development of related services.	28FABBRICAZIONE DI MACCHINARI ED APPARECCHIATURE N.C.A.	**ICT**	*2022*
RDLAB137 S.R.L.	No	Yes	Assago	Lombardia	Italia	Research and development in advanced technologies	72RICERCA SCIENTIFICA E SVILUPPO	**Enabling Technologies**	*2024*

Reply - Quantum Computing Practics	No	Yes	Torino	Piemonte	Italia	Programming and IT consulting.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1996*
RESI INFORMATICA SPA	No	Yes	Roma	Lazio	Italia	IT solutions for enterprise resource management and security systems	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1987*
RINA CONSULTING - CENTRO SVILUPPO MATERIALI SPA	No	Yes	Roma	Lazio	Italia	Metamaterials and Advanced Materials	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Enabling Technologies**	*1993*
RIVOIRA GIOVANNI & FIGLI S.P.A.	No	No	Verzuolo	Piemonte	Italia	Production and distribution of industrial and technical gases	19FABBRICAZIONE DI COKE E PRODOTTI DERIVANTI DALLA RAFFINAZIONE DEL PETROLIO	**Others**	*1920*
RO TECHNOLOGY SRL	No	Yes	Roma	Lazio	Italia	Industrial Automation	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2011*
Rotonium srl	No	Yes	Gemona (UD)	Friuli Venezia Giulia	Italia	Photonic Quantum Computers	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**ICT**	*2022*
RULEX INNOVATION LABS SRL	Yes	Yes	Genova	Liguria	Italia	Development of explainable AI for understanding and interpreting processed data / Enabling people and organizations to take smart decisions and automate processes by harnessing their own business data and domain knowledge	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2014*

Saes Rial Vacuum	No	Yes	Parma	Emilia Romagna	Italia	Production of vacuum pumps and vacuum control systems	28FABBRICAZIONE DI MACCHINARI ED APPARECCHIATURE N.C.A.	**Enabling Technologies**	*2015*
SCM GROUP SPA	No	No	Rimini	Emilia Romagna	Italia	Manufacturing of machines and industrial components for processing wood, plastic, glass, metal, and composite materials	28FABBRICAZIONE DI MACCHINARI ED APPARECCHIATURE N.C.A.	**Enabling Technologies**	*1952*
SECURITY PATTERN SRL	No	Yes	Mazzano	Lombardia	Italia	IT Consultancy	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2017*
SeeQC-EU srl	No	Yes	Roma	Lazio	Italia	Commercially scalable and cost-effective quantum computing solution	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**ICT**	*2017*
SIGMA INGEGNERIA SRL	No	Yes	LUCCA	Toscana	Italia	Design and development of engineering solutions for civil and industrial infrastructure	71ATTIVITÀ DEGLI STUDI DI ARCHITETTURA E D'INGEGNERIA; COLLAUDI ED ANALISI TECNICHE	**ICT**	*2004*
SLEEP ADVICE TECHNOLOGIES SRL	No	Yes	Torino	Piemonte	Italia	Sleep Technology	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Others**	*2015*

SMART FACTORY SRL	No	No	Milano	Lombardia	Italia	ndustrial production and software development.	71ATTIVITÀ DEGLI STUDI DI ARCHITETTURA E D'INGEGNERIA; COLLAUDI ED ANALISI TECNICHE	**ICT**	*2016*
SMARTEX SRL SOCIETA' DI PRODOTTI E SERVIZI GIURIDICI INTERDISCIPLINARI	Yes	Yes	S.Giuliano Terme	Toscana	Italia	Interaction between law, technology, and human capital	69ATTIVITÀ LEGALI E CONTABILITÀ	**Consulting**	*2015*
SOFTJAM SPA	No	Yes	Genova	Liguria	Italia	IT consulting in custom software development and digital transformation	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*1996*
SOMACIS	No	Yes	Castelfidardo	Marche	Italia	High-performance Electronic eMbedded Systems	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1972*
SPINDOX	No	Yes	Milano	Lombardia	Italia	Development and production of software and technological solutions	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2008*
ST Microelectronics	No	Yes	Catania	Sicilia	Italia	Manufacturing of semiconductors and electronic components.	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**Enabling Technologies**	*1987*
STELLAR PROJECT SRL	Yes	Yes	Padova	Veneto	Italia	Satellite Communication and Space Sustainability / Starting to expand our activities on data analytics both for terrestrial applications and the space environment	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**sensing**	*2016*

						providing tools for Space Debris Analysis and monitoring			
Sybilla Biotech	Yes	Yes	Bresso	Lombardia	Italia	Development of small-molecule degraders with a novel mechanism of action to discover new drugs for medical needs / Focusing on developing small molecule degraders with a novel Mechanism of Action to find new therapeutics for unmet medical needs	72RICERCA SCIENTIFICA E SVILUPPO	**Others**	*2017*
TEKNE SRL	No	Yes	Ortona	Abruzzo	Italia	Aerospace Engineering	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Aerospace**	*1990*
TELEA BIOTECH SRL	No	Yes	Sandrigo	Abruzzo	Italia	Quantum Resonance Medical Devices	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Sensing**	*2011*
TELECOM ITALIA SPA	No	No	Milano	Lombardia	Italia	Provision of telecommunications services, including fixed-line, mobile, internet, and digital TV	61TELECOMUNICAZIONI	**TLC**	*1994*
TELESPAZIO	No	Yes	Roma	Lazio	Italia	Design and production of equipment for the aerospace sector.	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*1961*
TELSY S.P.A.	No	No	Milano	Lombardia	Italia	Cybersecurity and encryption services, communication security solutions.	61TELECOMUNICAZIONI	**TLC**	*1971*

Test and Manufacturing Engineering SRL	No	Yes	Napoli	Campania	Italia	Production of electronic boards and testing systems electronic and electromechanical devices	72RICERCA SCIENTIFICA E SVILUPPO	**Enabling Technologies**	*2009*
THALES ALENIA SPACE ITALY	No	No	Roma	Lazio	Italia	Design and manufacturing of aerospace equipment	30FABBRICAZIONE DI ALTRI MEZZI DI TRASPORTO	**Aerospace**	*2000*
THE CIRCLE SOCIETA AGRICOLA A RESPONSABILITA LIMITATA	No	Yes	Roma	Lazio	Italia	Agricultural Company	01COLTIVAZIONI AGRICOLE E PRODUZIONE DI PRODOTTI ANIMALI, CACCIA E SERVIZI CONNESSI	**Others**	*2015*
ThinkQuantum	Yes	Yes	Sarcedo (VI)	Veneto	Italia	Quantum-based technology solutions for cyber security and communication systems (QKD and QRNG) / Offering quantum-based technology solutions for cyber security and communication systems	26FABBRICAZIONE DI COMPUTER E PRODOTTI DI ELETTRONICA E OTTICA; APPARECCHI ELETTROMEDICALI, APPARECCHI DI MISURAZIONE E DI OROLOGI	**TLC**	*2021*
TIM	No	Yes	Milano	Lombardia	Italia	Products and services for mobile and landline telecommunications	61TELECOMUNICAZIONI	**TLC**	*1994*

Titan4	No	Yes	Roma	Lazio	Italia	Development of technological solutions for optimizing energy infrastructure management.	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Energy**	*2017*
TRUST-IT SERVICES SRL	No	Yes	Pisa	Toscana	Italia	Digital Communication and IT Services	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Consulting**	*2002*
TS-Way	No	Yes	Orvieto	Umbria	Italia	Research and development in advanced technologies	72RICERCA SCIENTIFICA E SVILUPPO	**TLC**	*2010*
UniCredit SpA	No	Yes	Milano	Lombardia	Italia	Banking and financial services	64ATTIVITÀ DI SERVIZI FINANZIARI (ESCLUSE LE ASSICURAZIONI E I FONDI PENSIONE)	**Others**	*1999*
VST srl	Yes	Yes	Modena	Emilia Romagna	Italia	Telemedicine Equipment	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**ICT**	*2003*
WARRANT HUB SPA	No	Yes	Correggio Re	Emilia Romagna	Italia	Business Consultancy	62PRODUZIONE DI SOFTWARE, CONSULENZA INFORMATICA E ATTIVITÀ CONNESSE	**Consulting**	*1995*
Xanadu	No	Yes	Pavia	Lombardia	canada	Development of photonic quantum computers and cloud services	72RICERCA SCIENTIFICA E SVILUPPO	**ICT**	*2016*

REFERENCES

Abbasi, Q.H, Weides, M., Li, C., & Imran, A. (2024). Dive into the Quantum Realm: Promise of Quantum Communication and What's Next!.
https://www.comsoc.org/publications/ctn/dive-quantum-realm-promise-quantum-communication-and-whats-next

AI4Business (2023), "Tecnologie quantistiche in Italia: oltre 140 milioni di euro dal PNRR", November 23rd 2023.
https://www.ai4business.it/quantum-computing/tecnologie-quantistiche-in-italia-oltre-140-milioni-di-euro-dal-pnrr/

Airbus. (2024). Quantum technologies. A potential game-changer in aerospace.
https://www.airbus.com/en/innovation/digital-transformation/quantum-technologies#:~:text=The%20Airbus%20Quantum%20Computing%20Challenge,Bristol's%20Quantum%20Technology%20Innovation%20Centre.

Alpine Quantum Technologies. (n.d.). AQT Overview.
https://www.aqt.eu/.

Altman, E., Brown, K. R., Carleo, G., Carr, L. D., Demler, E., Chin, C., ... & Zwierlein, M. (2021). Quantum simulators: Architectures and opportunities. PRX quantum, 2(1), 017003.
https://journals.aps.org/prxquantum/abstract/10.1103/PRXQuantum.2.017003

Arqit. (n.d.). Who We Are.
https://arqit.uk/who-we-are.

Arraut, I., Au, A., Tse, A. C. B., & Segovia, C. (2019). The connection between multiple prices of an Option at a given time with single prices defined at different times: The concept of weak-value in quantum finance. Physica A: Statistical Mechanics and its Applications, 526, 121028.
https://arxiv.org/abs/1905.05813

Aslam, N., Zhou, H., Urbach, E. K., Turner, M. J., Walsworth, R. L., Lukin, M. D., & Park, H. (2023). Quantum sensors for biomedical applications. Nature Reviews Physics, 5(3), 157-169.
https://pubmed.ncbi.nlm.nih.gov/36776813/

AWS. (n.d.). Rigetti Quantum Computers on AWS.
https://aws.amazon.com/it/braket/quantum-computers/rigetti/.

Banque de France. (2022). The Banque de France has successfully experimented with Cryptonext Security post-quantum security technologies.
https://www.banque-france.fr/en/espace-presse/communiques-bdf/la-banque-de-france-realise-avec-cryptonext-security-une-experimentation-de-securite-post-quantique

Berke C, Varvelis E, Trebst S, Altland A, DiVincenzo DP. Transmon platform for quantum computing challenged by chaotic fluctuations. Nat Commun. 2022 May 6;13(1):2495. doi: 10.1038/s41467-022-29940-y.
https://www.nature.com/articles/s41467-022-29940-y

Bayerstadler, A., Becquin, G., Binder, J., Botter, T., Ehm, H., Ehmer, T., ... & Winter, F. (2021). Industry quantum computing applications. EPJ Quantum Technology, 8(1), 25.
https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt/s40507-021-00114-x

BCG. (2023). Quantum Computing Is Becoming Business Ready.
https://www.bcg.com/publications/2023/enterprise-grade-quantum-computing-almost-ready

BlueQubit. (2024). Quantum Computing Hardware: Discover The New Era of Computing.
https://www.bluequbit.io/quantum-computing-hardware.

BOE. (2021). Real Decreto 936/2021, de 26 de octubre.
https://www.boe.es/diario_boe/txt.php?id=BOE-A-2021-17505#:~:text=A%2D2021%2D17505-,Real%20Decreto%20936%2F2021%2C%20de%2026%20de%20octubre%2C%20por,de%20Recuperaci%C3%B3n%2C%20Transformaci%C3%B3n%20y%20Resiliencia

Borowski, M., Gora, P., Karnas, K., Błajda, M., Król, K., Matyjasik, A., ... & Kutwin, M. (2020). New hybrid quantum annealing algorithms for solving vehicle routing problem. In International Conference on Computational Science (pp. 546-561). Cham: Springer International Publishing.
https://pmc.ncbi.nlm.nih.gov/articles/PMC7304725/

Bosch. (2023). Quantum technologies: Bosch aims to use sensors to take a leading position.
https://www.bosch-presse.de/pressportal/de/en/quantum-technologies-bosch-aims-to-use-sensors-to-take-a-leading-position-258816.html.

Bova, F., Goldfarb, A., & Melko, R. G. (2021). Commercial applications of quantum computing. EPJ Quantum Technology, 8(1), 2.
https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt/s40507-021-00091-1

Bürgler, B., Sjolander, T. F., Brinza, O., Tallaire, A., Achard, J., & Maletinsky, P. (2023). All-optical nuclear quantum sensing using nitrogen-vacancy centers in diamond. npj Quantum Information, 9(1), 56.
https://www.nature.com/articles/s41534-023-00724-6

Cao, Y., Zhao, Y., Wang, Q., Zhang, J., Ng, S. X., & Hanzo, L. (2022). The evolution of quantum key distribution networks: On the road to the qinternet. IEEE Communications Surveys & Tutorials, 24(2), 839-894.
https://eprints.soton.ac.uk/454194/1/COMST_00444_2021_final_manuscript.pdf

CDP. (2024). Quantum Finance. Una panoramica delle possibilità attuali e prospettive future.
https://www.cdp.it/resources/cms/documents/CDP_Studio_Quantum_Finance.pdf.

CEN-CENELEC. (2023a). Standardization Roadmap on Quantum Technologies.
https://www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt_q04_standardizationroadmapquantumtechnologies_release1.pdf

CEN-CENELEC. (2023b). Quantum Technologies Use Cases.
https://www.cencenelec.eu/media/CEN-CENELEC/AreasOfWork/CEN-CENELEC_Topics/Quantum%20technologies/Documentation%20and%20Materials/fgqt_q05_quantumtechnologiesusecases_release1.pdf

Cohen W. M., Levinthal D. (1989), Innovation and learning: the two faces of R&D, *Economic Journal*, n. 99, 569-596.
https://www-jstor-org.libezproxy.open.ac.uk/stable/2233763

Cordier, B. A., Sawaya, N. P., Guerreschi, G. G., & McWeeney, S. K. (2022). Biology and medicine in the landscape of quantum advantages. Journal of the Royal Society Interface, 19(196), 20220541.
https://royalsocietypublishing.org/doi/10.1098/rsif.2022.054

Crunchbase News. (2023). Global Funding Data Analysis: AI EOY 2023.
https://news.crunchbase.com/venture/global-funding-data-analysis-ai-eoy-2023/

Daley, A. J., Bloch, I., Kokail, C., Flannigan, S., Pearson, N., Troyer, M., & Zoller, P. (2022). Practical quantum advantage in quantum simulation. *Nature*, 607(7920), 667-676.
https://doi.org/10.1038/s41586-022-04940-6

Debackere K., Veugelers R. (2005), The role of academic technology transfer organizations in improving industry science links, *Research Policy*, n. 34, 321-342.
https://doi.org/10.1016/j.respol.2004.12.003

Dijkstra, E. (2024). Quantum and Military Communication Security: An Analysis of the Opportunities, Risks, Implementation Challenges, and Prospects of Quantum Computing in Military Communication (Bachelor's thesis, University of Twente).
https://essay.utwente.nl/103094/

D-Wave Systems. (n.d.). D-Wave Announces General Availability of First Quantum Computer Built for Business.
https://www.dwavesys.com/company/newsroom/press-release/d-wave-announces-general-availability-of-first-quantum-computer-built-for-business/.

Danish Quantum Community (2024). 16 Danish Quantum Use Cases: Practical Insights into Applications of Quantum Technologies Across Industries.
https://www.danskindustri.dk/brancher/di-digital/analysearkiv/brancheanalyser/2024/11/16-danish-quantum-use-cases/

DCG Academy. (2024). OVH launches quantum computer at data center in France.
https://www.datacenterdynamics.com/en/news/ovh-launches-quantum-computer-at-data-center-in-france/.

Degen, C. L., Reinhard, F., & Cappellaro, P. (2017). Quantum sensing. Reviews of modern physics, 89(3), 035002.
https://journals.aps.org/rmp/abstract/10.1103/RevModPhys.89.035002

Dhankhar, R., Singh, N., & Nair, R. V. (2024). Probing the electronic ground state of the nitrogen-vacancy center in nanodiamonds at room temperature. Optik, 172038.
https://inspirehep.net/literature/2831411

Distriq. (2022). Quantum Sherbrooke Innovation Zone Officially Launches with Investments over $435M.
https://distriq.com/en/news/quantum-sherbrooke-innovation-zone-officially-launches-with-investments-over-435m.

EE Times. (2020). France Has a Quantum Plan.
https://www.eetimes.eu/france-has-a-quantum-plan/.

Eindhoven University of Technology (TU/e). (n.d.). Center for Quantum Materials and Technology Eindhoven.
https://www.tue.nl/en/research/research-groups/center-for-quantum-materials-and-technology-eindhoven?utm_source=google&utm_medium=cpc&campaignid=21332749115&adgroupid=&gad_source=1&gclid=CjwKCAjwvIWzBhAlEiwAHHWgvXCc4uNmx4pQlEBECgqAtSPlJaREZYrqZEyUY1rzs7EMWJFhvUwz5xoCCdMQAvD_BwE

ENI (2024). Nasce Eniquantic: la nuova società di Eni per lo sviluppo tecnologico del quantum computing.
https://www.eni.com/it-IT/media/comunicati-stampa/2024/07/cs-eniquantic.html.

Ephos. (2023). Ephos joins NATO’s DIANA to build the essential infrastructure for Allied innovation in quantum technologies.
https://ephos.io/newsroom/ephos-joins-natos-diana-to-build-the-essential-infrastructurefor-allied-innovation-in-quantum-technologies/

EPO (2023a), European Patent Office (2023). Quantum computing: Insight report. Epo.org.
https://www.epo.org/en/searching-for-patents/business/patent-insight-reports

EPO (2023b), European Patent Office (2023). Quantum simulation: Insight report. Epo.org.
https://www.epo.org/en/searching-for-patents/business/patent-insight-reports

Euractiv. (2024). Europe's Quantum Tech Sees Rosy Outlook for 2024. https://www.euractiv.com/section/industrial-strategy/news/europes-quantum-tech-sees-rosy-outlook-for-2024-report-says/

European Commission, Draghi M. Report (2024), “The future of European competitiveness - Part B | In-depth analysis and recommendations”, pp. 1-328.

https://commission.europa.eu/document/download/ec1409c1-d4b4-4882-8bdd-3519f86bbb92_en?filename=The%20future%20of%20European%20competitiveness_%20In-depth%20analysis%20and%20recommendations_0.pdf

European Commission. (2014): Directorate-General for Research and Innovation, Wellen, D., Vermeulen, E., Andersen, B., Dvorak, I. et al., *Boosting open innovation and knowledge transfer in the European Union – Independent expert group report on open innovation and knowledge transfer*, Publications Office, 2014, https://data.europa.eu/doi/10.2777/72620

European Commission (2016). Quantum Manifesto.
http://qurope.eu/system/files/u7/93056_Quantum%20Manifesto_WEB.pdf

European Commission. (2024). European Quantum Communication Infrastructure (EuroQCI). https://digital-strategy.ec.europa.eu/en/policies/european-quantum-communication-infrastructure-euroqci.

European Policy Centre (2023), "Quantum technologies and value chains: Why and how Europe must act now", G. E. Riekeles, Discussion Paper.
https://www.epc.eu/content/PDF/2023/Quantum_Technologies_DP.pdf

European Research Council. (2021). ERC frontier research contribution to e Europe fit for the digital age.
https://erc.europa.eu/sites/default/files/2022-08/H2020_factsheet_FitforDigitalAge.pdf

Ezratty O. (2024). Understanding Quantum Technologies. arXiv:2111.15352 Quant-Ph [Internet. 7th Edition].
[2111.15352] Understanding Quantum Technologies 2024

Faccia, A. (2020). Quantum Finance. Opportunities and threats.". *Information Technology innovations in Economics, Finance, Accounting, and Law*, *1*(8).
https://www.sciencedirect.com/science/article/pii/S2199853122007880

Feld, S., Roch, C., Gabor, T., Seidel, C., Neukart, F., Galter, I., ... & Linnhoff-Popien, C. (2019). A hybrid solution method for the capacitated vehicle routing problem using a quantum annealer. Frontiers in ICT, 6, 13.
FFG. (n.d.). Quantum Austria.
https://www.ffg.at/en/quantum-austria

Flöther, F., Christopher Moose, C, Tavernelli, I., Fraser, H., Pureswaran, V., (2020). Exploring quantum computing use cases for life sciences.
https://www.ibm.com/downloads/cas/EVBKAZGJ.

Forbes (2024). Eni investe nel quantum computing: nasce Eniquantic.
https://forbes.it/2024/07/16/eni-investe-quantum-computing-nasce-eniquantic/.

Garcell, E. (2024). The promise of quantum computing in manufacturing. https://www.smartindustry.com/benefits-of-transformation/advanced-control/article/55093883/the-promise-of-quantum-computing-in-manufacturing.

Gibney. E., (2024). This billion-dollar firm plans to build giant quantum computers from light. Can it succeed?. Nature.
https://pubmed.ncbi.nlm.nih.gov/39592790/

Gill, S.; Cetinkaya, O.; Marrone, S.; Claudino, D.; Haunschild, D.; Schlote, L.; Wu, H.; Ottaviani, C.; Liu, X.; Machupalli, S. P.; Kaur, K.; Arora, P.; Liu, J.; Farouk, A.; Song, H. H.; Uhlig, S.; Ramamohanarao, K. (2024). Quantum Computing: Vision and Challenges. Cornell University. ArXiv.
https://arxiv.org/abs/2403.02240

GlobeNewswire. (2023). Rigetti Computing Awarded Innovate UK Grant to Enhance Quantum Machine Learning Methods for Anti-Money Laundering Detection.
https://www.globenewswire.com/news-release/2023/11/01/2771203/0/en/Rigetti-Computing-Awarded-Innovate-UK-Grant-to-Enhance-Quantum-Machine-Learning-Methods-for-Anti-Money-Laundering-Detection.html

GlobeNewswire. (2024). Rigetti Computing Awarded Innovate UK Grant to Develop Quantum Machine Learning Techniques for Financial Data Streams.
https://www.globenewswire.com/news-release/2024/01/11/2807928/0/en/Rigetti-Computing-Awarded-Innovate-UK-Grant-to-Develop-Quantum-Machine-Learning-Techniques-for-Financial-Data-Streams.html.

Government of Canada. (2023). National Quantum Strategy.
https://ised-isde.canada.ca/site/national-quantum-strategy/en.

Government of Israel. (2022). IIA to Establish Israeli Quantum Computing Center. https://www.gov.il/en/pages/iia-to-establish-israeli-quantum-computing-center-17-jul-2022.

HPCwire. (2023). Poznan Supercomputing and Networking Center Partners with ORCA Computing for Quantum Photonic Systems Installation.
https://www.hpcwire.com/off-the-wire/poznan-supercomputing-and-networking-center-partners-with-orca-computing-for-quantum-photonic-systems-installation/.

Micro Photon Devices. (n.d.). Products.
http://www.micro-photon-devices.com/Products

Astrid. (n.d.). Quantum Technologies and Cybersecurity.
https://www.astrid-online.it/static/upload/yneo/yneojkda-tfr-quantum-technologies-and-cybersecurity.pdf

Politecnico di Milano. (n.d.). *Spinoff Details: Politecnico di Milano*
https://www.deib.polimi.it/ita/spinoff/dettagli/5

D-Wave Systems. (n.d.). *D-Wave Quantum Computing eBook*.
https://www.dwavesys.com/media/qlgj4hla/dwave_qc_ebook_v18c_0.pdf .

EuroQIC. (n.d.). *European Quantum Internet Alliance.*
https://www.euroquic.org/

IBM. (2022). Bosch Partnering with IBM on Strategic Quantum Computing Materials Science Engagement.
https://newsroom.ibm.com/2022-11-09-Bosch-Partnering-with-IBM-on-Strategic-Quantum-Computing-Materials-Science-Engagement

IBM. (2023). IBM Quantum DC Europe.
https://it.newsroom.ibm.com/Quantum-DC-Europe

IBM. (2024). Supply chain planning and analytics.
https://www.ibm.com/products/planning-analytics/supply-chain-planning?utm_content=SRCWW&p1=Search&p4=43700068108624254&p5=p&p9=587000075586.56354&gad_source=1&gclid=CjwKCAjwxY-3BhAuEiwAu7Y6s7HV8jeMLQq5LUlBJqcu3e4RqVgbCWk1_gxcEqHnOqNmMpnENp2esxoCE9MQAvD_BwE&gclsrc=aw.ds

Intelligence Online. (2024). France. Encryption startup CyferAll plans capital increase, banks on military networks.
https://www.intelligenceonline.com/surveillance--interception/2024/03/25/encryption-startup-cyferall-plans-capital-increase-banks-on-military-networks,110195468-art

IoT World Today. (2024). French Government Gives Nation Quantum Strategy Update.
https://www.iotworldtoday.com/quantum/french-government-gives-nation-quantum-strategy-update

IQM, Ocean & Likestar. (2024). State of Quantum 2024: Understanding the 2023 Trends and Outlook for 2024.
https://www.meetiqm.com/newsroom/press-releases/state-of-quantum-report-2024.

Ireland Quantum Strategy
https://www.gov.ie/ga/foilsiuchan/126b4-quantum-2030-a-national-quantum-technologies-strategy-for-ireland/

Jain, S. (2021). Solving the traveling salesman problem on the d-wave quantum computer. Frontiers in Physics, 9, 760783.
https://www.frontiersin.org/journals/physics/articles/10.3389/fphy.2021.760783/full

Jaksch, D., Givi, P., Daley, A. J., & Rung, T. (2023). Variational quantum algorithms for computational fluid dynamics. AIAA journal, 61(5), 1885-1894.
https://arxiv.org/abs/2209.04915

Ji, W., Liu, Z., Guo, Y., Hu, Z., Zhou, J., Dai, S., ... & Du, J. (2024). Correlated sensing with a solid-state quantum multisensor system for atomic-scale structural analysis. Nature Photonics, 1-6.
https://www.nature.com/articles/s41566-023-01352-4

Johnson, T. H., Clark, S. R., & Jaksch, D. (2014). What is a quantum simulator?. EPJ Quantum Technology, 1, 1-12.
https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt10

Kastuar, S. M., & Ekuma, C. E. (2024). Chemically tuned intermediate band states in atomically thin Cu x GeSe/SnS quantum material for photovoltaic applications. *Science Advances*, *10*(15), eadl6752.
https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt10

Kaur, M., & Venegas-Gomez, A. (2022). Defining the quantum workforce landscape: a review of global quantum education initiatives. Optical Engineering, 61(8), 081806-081806.
https://arxiv.org/abs/2202.08940

Kim, S. (2023). South Korea to Inject More than $2.3 Billion in Quantum Science, Tech by 2035. The Korea Economic Daily.
https://www.kedglobal.com/tech,-media-telecom/newsView/ked202306270025#:~:text=South%20Korea%20will%20pour%20more,country%20between%202019%20and%202023.

Krishnan, P. (2023). Integrating Quantum Model Computing With Machine Learning: Quantum Algorithms For Accelerating Ai Model Training. Well Testing Journal, 32(2), 44-73.
https://welltestingjournal.com/index.php/WT/article/view/IntegratingQuantumModelComputingWithMachineLearningQuantumAlgori

Kung, H. & Fancy, S. (2021). A Quantum Revolution: Report on Global Policies for Quantum Technology. Cifar.
https://cifar.ca/wp-content/uploads/2021/05/QuantumReport-EN-May2021.pdf.

La Stampa. (2024). ENI accelera sul quantum computing: nasce Eniquantic.
https://finanza.lastampa.it/News/2024/07/15/eni-accelera-sul-quantum-computing-nasce-eniquantic/NzdfMjAyNC0wNy0xNV9UTEI.

Law, S. (2023). Why quantum materials are the answer to our energy transmission and data storage challenges.
https://iee.psu.edu/news/blog/why-quantum-materials-are-answer-our-energy-transmission-and-data-storage-challenges.

LevelQuantum. (n.d.). Technology.
https://www.levelquantum.eu/en/technology/.

LevelQuantum. (n.d). levelQuantum selected by NATO for DIANA program.
https://www.levelquantum.eu/en/levelquantum-selected-by-nato-for-diana-program/.

Li, X., Jones, A.C., Choi, J. et al. Proximity-induced chiral quantum light generation in strain-engineered WSe2/NiPS3 heterostructures. Nat. Mater. 22, 1311–1316 (2023).
https://doi.org/10.1038/s41563-023-01645-7

LuxQuanta.(2024). LuxQuanta presenta l'interoperabilità nella demo QKD multi-vendor alla fiera ECOC.
https://www.luxquanta.com/luxquanta-showcases-interoperability-in-multi-vendor-qkd-demo-at-ecoc-exhibition-n-70-en

Lv, Z., Cheng, C., & Song, H. (2022). Digital twins based on quantum networking. *Ieee Network, 36(5), 88-93.*
https://ieeexplore.ieee.org/document/9963997

Madje, U. P., & Pande, M. B. (2024, March). A Conceptual Model of Quantum Cryptography Techniques used to Provide Online Banking Transactions Security. In 2024 International Conference on Trends in Quantum Computing and Emerging Business Technologies (pp. 1-5). IEEE.
https://ieeexplore.ieee.org/document/10545237

Mandrà, S., Marshall, J., Rieffel, E. G., & Biswas, R. (2021, November). HybridQ: a hybrid simulator for quantum circuits. In 2021 IEEE/ACM Second International Workshop on Quantum Computing Software (QCS) (pp. 99-109). IEEE.
https://arxiv.org/abs/2111.06868

McKinsey. (2021). Quantum Computing: An emerging ecosystem and industry use cases.
https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/quantum%20computing%20use%20cases%20are%20getting%20real%20what%20you%20need%20to%20know/quantum-computing-an-emerging-ecosystem.pdf

McKinsey. (2023). Quantum Technology Monitor.
https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/quantum%20technology%20sees%20record%20investments%20progress%20on%20talent%20gap/quantum-technology-monitor-april-2023.pdf

McKinsey. (2024a). Quantum Sensing: Poised to Realize Immense Potential in Many Sectors.
https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/tech-forward/quantum-sensing-poised-to-realize-immense-potential-in-many-sectors

McKinsey. (2024b). Steady progress in approaching the quantum advantage.
https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/steady-progress-in-approaching-the-quantum-advantage

McKinsey, Digital, (2025). Quantum communication: Trends and outlook.
https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/quantum-communication-growth-drivers-cybersecurity-and-quantum-computing

McKinsey. (2025). Quantum Technology Monitor. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-year-of-quantum-from-concept-to-reality-in-2025

Meta, F. (2024). Open Fiber in campo con il progetto Rigoletto. Carpentieri: "Tecnologie in grado di garantire sicurezza ed efficienza". Ecco come funzionano.
https://www.corrierecomunicazioni.it/telco/banda-ultralarga/fibra-e-quantum-key-distribution-accoppiata-vincente-per-le-reti-del-futuro/

Mulligan, V. K., Melo, H., Merritt, H. I., Slocum, S., Weitzner, B. D., Watkins, A. M., ... & Bonneau, R. (2019). Designing Peptides on a Quantum Computer. BioRxiv, 752485.
https://www.biorxiv.org/content/10.1101/752485v1

MUR (2020). Programma Nazionale per la Ricerca 2021-2027 (PNR 2021-27).
https://www.mur.gov.it/it/aree-tematiche/ricerca/programmazione/programma-nazionale-la-ricerca

MUR, MIMIT, 2025. Strategia Italiana per le Tecnologie Quantistiche (WIP, Under Public Consultation).
https://www.mur.gov.it/it/strategia-italiana-le-tecnologie-quantistiche

MUR, MIMIT, Osservatorio Quantum Computing and Communication (2025). Ecosistema industriale italiano delle tecnologie quantistiche. Analisi dei risultati della consultazione pubblica condotta dal Ministero delle imprese e del Made in Italy.

https://www.mimit.gov.it/it/normativa/notifiche-e-avvisi/onsultazione-pubblica-in-materia-di-tecnologie-quantistiche

OECD (2011), *TTOs. Roles Performed*, OECD Innovation Platform.
http://www.oecd.org/innovation/policyplatform/48136121.pdf

OECD (2013), *Commercialising Public Research: New Trends and Strategies*, OECD Publishing.
http://dx.doi.org/10.1787/9789264193321-en

OECD (2019), *University-Industry Collaboration: new evidence and policy options*, OECD Publishing.
http://www.oecd.org/fr/innovation/university-industry-collaboration-e9c1e648-en.htm

National Quantum Computing Centre (NQCC). (n.d.). About NQCC.
https://www.nqcc.ac.uk/.

National Research Council Canada. (n.d.). Internet of Things: Quantum Sensors Challenge Program.
https://nrc.canada.ca/en/research-development/research-collaboration/programs/internet-things-quantum-sensors-challenge-program.

National Science Foundation. (n.d.). About NSF.
https://new.nsf.gov/about#:~:text=The%20U.S.%20National%20Science%20Foundation,national%20health%2C%20prosperity%20and%20welfare.

NATO. (2019). NATO's Quantum Technology Initiatives.
https://www.nato.int/cps/en/natohq/news_165733.htm?selectedLocale=en

Niosi, J. (2000). Science-based Industries: A New Schumpeterian Taxonomy, *Technology and Society,* 22, pp. 429-444.
https://doi.org/10.1016/S0160-791X(00)00028-2

Nuvvula, R. S., Devaraj, E., Elavarasan, R. M., Taheri, S. I., Irfan, M., & Teegala, K. S. (2022). Multi-objective mutation-enabled adaptive local attractor quantum behaved particle swarm optimisation based optimal sizing of hybrid renewable energy system for smart cities in India. Sustainable Energy Technologies and Assessments, 49, 101689.
https://www.sciencedirect.com/science/article/abs/pii/S2213138821007037

OpenFiber.(2024). Un'infrastruttura per la trasformazione digitale. https://openfiber.it/app/uploads/2023/06/B2B-Activities-portfolio.pdf.

OpenQKD. (2024). Who we are.
https://webmagazine.unitn.it/evento/dphys/14739/progetto-qtn-quantum-science-and-technology-in-trento.

Orrell, D. (2020). Quantum-tative Finance. Wilmott, 2020(106), 16-23.
https://onlinelibrary.wiley.com/doi/abs/10.1002/wilm.10829

Orús, R., Mugel, S., & Lizaso, E. (2019). Quantum computing for finance: Overview and prospects. Reviews in Physics, 4, 100028.
https://www.sciencedirect.com/science/article/pii/S2405428318300571

Paudel, H. P., Lander, G. R., Crawford, S. E., & Duan, Y. (2024). Sensing at the Nanoscale Using Nitrogen-Vacancy Centers in Diamond: A Model for a Quantum Pressure Sensor. Nanomaterials 2024, 14, 675.
https://www.mdpi.com/2079-4991/14/8/675

Perazzo, P., Di Matteo, S., Dini, G., & Saponara, S. (2024). On hardware acceleration of quantum-resistant FOTA systems in automotive. Computers and Electrical Engineering, 118, 109327.
https://www.sciencedirect.com/science/article/pii/S0045790624002556

Photonics. (2023). Photonic Raises $100M for Quantum Technology. https://photonic.com/news/photonic-raises-100m-for-quantum-technology/.

Photonics. (n.d.). Xanadu Brings Quantum Advantage to the People. https://www.photonics.com/Articles/Xanadu_Brings_Quantum_Advantage_to_the_People/a68070.

Planetek (2024). Azienda. https://www.planetek.it/azienda/chi_siamo/profilo.

Planetek (2024). Qu3d - Quantum 3D Imaging at high speed and high resolution. https://www.planetek.it/progetti/qu3d_quantum_3d_imaging_at_high_speed_and_high_resolution.

Pupillo, L., Ferreira, A., Lipiainien, V. and Polito, C. (2023), Quantum Technologies and Cybersecurity: Technology, governance and policy challenges, Task Force Report, Centre for European Policy Studies (CEPS), Brussels. ISBN 978-94-6138-793-6 https://cdn.ceps.eu/wp-content/uploads/2023/12/CEPS-TFR-Quantum-Technologies-and-Cybersecurity.pdf

Pyrkov, A., Aliper, A., Bezrukov, D., Podolskiy, D., Ren, F., & Zhavoronkov, A. (2024). Complexity of life sciences in quantum and AI era. *Wiley Interdisciplinary Reviews: Computational Molecular Science*, *14*(1), e1701. https://wires.onlinelibrary.wiley.com/doi/full/10.1002/wcms.1701

Q-*CTRL*. (2023). Q-CTRL Adds Morpheus Ventures to Record-Setting Series B Funding Round. https://q-ctrl.com/blog/q-ctrl-adds-morpheus-ventures-to-record-setting-series-b-funding-round-with-total-of-54-million-usd-raised.

QCI Hungary. (n.d.). Quantum Technology in Hungary. https://qcihungary.hu/en/home/

QED-C, Quantum Economic Development Consortium, (2025). State of the Global Quantum Industry. https://quantumconsortium.org/quantum-marketplace/

Qi, H., Wang, L., Gong, C., & Gani, A. (2024). A survey on quantum data mining algorithms: challenges, advances and future directions. Quantum Information Processing, 23(3), 74. https://link.springer.com/article/10.1007/s11128-024-04279-z

Qpic1550. (n.d). About. https://www.qpic1550-project.eu/about/.

Quandela. (n.d.). Quandela Applications in Pharmaceuticals. https://www.quandela.com/applications/4-pharmaceuticals/.

Quantera. (2023). Quantum Technologies. Public Policies in Europe. https://quantera.eu/quantum-technologies-public-policies-2023/

Quantum Computing Lab. (2023). Germany's Action Plan for Quantum Technologies. https://www.quantumcomputinglab.cineca.it/en/2023/05/09/germanys-action-plan-for-quantum-technologies/

Quantum Delta NL. (2024). Quantum Technologies and their Global Impact. Discussion Paper, Digital Transformation Dialogue, Pieter Vermaas and Ulrich Mans.

Quantum Delta NL. (2023). White Paper. Mapping Quantum Supply Chains. Towards European technology sovereignty in an emerging industry. https://quantumdelta.nl/news/white-paper-mapping-the-supply-chains-for-quantum-communication

Quantum Delta NL. (2023). White Paper. Mapping the Supply Chain for Quantum Communications. https://quantumdelta.nl/news/white-paper-mapping-the-supply-chains-for-quantum-communication

Quantum Delta NL. (n.d.). Delft Hub.
https://quantumdelta.nl/delft-hub

Quantum Flagship. (2020). Strategic Research Agenda.
https://qt.eu/publications

Quantum Flagship. (2022). Research and Industry Agenda.
https://qt.eu/publications

Quantum Flagship. (2024). Strategic Research and Industry Agenda 2030.
https://qt.eu/publications

Quantum Flagship. (n.d.). About Quantum Flagship.
https://qt.eu/about-quantum-flagship/

Quantum Flagship. (n.d.). QuCats Project.
https://qt.eu/projects/csa-projects/qucats

Quantum Life Science. (n.d.). About Quantum Life Science.
https://quantumlifescience.se/about/

Quantum Telecommunications Italy. (2024). I sistemi QKD di QTI per proteggere le comunicazioni al vertice del G7 2024.
https://www.qticompany.com/qtis-qkd-systems-to-secure-communications-at-the-g7-summit-2024/.

Quantum Telecommunications Italy. (2024). I sistemi QKD di QTI per proteggere le comunicazioni al vertice del G7 2024.
https://www.qticompany.com/qtis-qkd-systems-to-secure-communications-at-the-g7-summit-2024/.

Quantum Telecommunications Italy. (n.d). Products.
https://www.qticompany.com/products/.

Quantum Telecommunications Italy. (n.d). Who we are.
https://www.qticompany.com/who-we-are-qti/.

Quantum Telecommunications Italy. (n.d). Who we are.
https://www.qticompany.com/who-we-are-qti/.

Quantumnet. (2023). Home.
https://www.quantum-net.it/it/

Quantumnet. (2023). QuantumNet al Quantum Business Europe 2023.
https://www.quantum-net.it/it/quantumnet-al-quantum-business-europe-2023/

QUIC (European Quantum Industry Consortium) 2024, Report, "A Portrait of the Global Patent Landscape in Quantum Technologies"
:https://www.euroquic.org/new-white-paper-release-insights-from-quic-on-the-global-patent-landscape-in-quantum-technologies/

QURECA. (2023). Making European Industry Quantum Ready.
https://www.qureca.com/qtindu-making-european-industry-quantum-ready/

QuTech. (2015). Investment in Quantum Technology. https://qutech.nl/2015/06/01/investmentquantumtechnology

Rappert B., Webster A., Charles D. (1999), Making sense of diversity and reluctance: academic-industrial relations and intellectual property, *Research Policy*, n. 28, 873-890.
https://www.sciencedirect.com/science/article/abs/pii/S0048733399000281

Reuters. (2023). French Quantum Computer Startup PASQAL Raises 100 Million Euros.
https://www.reuters.com/technology/french-quantum-computer-startup-pasqal-raises-100-million-euros-2023-01-24/.

Rigetti Computing. (2024a). Quantum-Enhanced Machine Learning with Moody's Analytics.
https://medium.com/rigetti/quantum-enhanced-machine-learning-with-moodys-analytics-543d37df0549

Rigetti Computing. (2024b). Rigetti Expands QCS™ Availability on Microsoft's Azure Quantum.
https://investors.rigetti.com/news-releases/news-release-details/rigetti-expands-qcstm-availability-microsofts-azure-quantum

Safari, A., & Ghavifekr, A. A. (2022). Quantum technology & quantum neural networks in Smart Grids control: premier perspectives. In 2022 8th International Conference on Control, Instrumentation and Automation (ICCIA) (pp. 1-6). IEEE.
https://ieeexplore.ieee.org/document/9737203

Roland Berger. (2024). Quantum Technologies – Ready for take-off at last?.
https://www.rolandberger.com/en/Insights/Publications/Quantum-Technologies-Ready-for-take-off-at-last.html

Singh, J., & Bhangu, K. S. (2023). Contemporary quantum computing use cases: taxonomy, review and challenges. Archives of Computational Methods in Engineering, 30(1), 615-638.
https://link.springer.com/article/10.1007/s11831-022-09809-5

SIPRI (*Stockholm International Peace Research Institute,* 2025), "Military and Security Dimensions of Quantum Technologies: a Primer", M. Krelina.
https://www.sipri.org/publications/2025/other-publications/military-and-security-dimensions-quantum-technologies-primer

State Secretariat for Education, Research and Innovation (SERI). (n.d.). Swiss Quantum Initiative.
https://www.sbfi.admin.ch/sbfi/it/home/ricerca-e-innovazione/ricerca-e-innovazione-in-svizzera/sqi.html

Swiss Quantum Initiative (n.d.). The Swiss Quantum Initiative (SQI).
https://quantum.scnat.ch/en

Swissnex. (2024). Switzerland: A Hub for Quantum.
https://portal-cdn.scnat.ch/asset/d33dfe3b-49c9-5130-8f8a-029d6b4b36cd/Switzerland-A-Hub-for-Quantum.pdf?b=ac850fa6-0455-5469-9aa3-91293eb64c0a&v=e72fc8c7-e298-55e8-b5d0-28e4a670fbe4_0&s=fkgIXnriYG4yo-ch4Gzp0amwqdQZB_ZtPBjCAylehiQRpiJUZHFHTU6jgjiqQinSAMy0czVvoGqh2Zjy8rfamYA7xeC6CvMmEkG4S_8WNu8QzWfLkdDfAlZWjjqz9FjR3IyjyRFdCGoPqmF1pTjlweOr9eTs3jU1g0gqKMXCXwY

TechHQ. (2022). IBM Just Unveiled Its Most Powerful Quantum Computer Yet—A 433-Qubit Machine.
https://techhq.com/2022/11/ibm-just-unveiled-its-most-powerful-quantum-computer-yet-a-433-qubit-machine/#:~:text=IBM%20just%20unveiled%20its%20most%20powerful%20quantum%20computer%20yet%20%E2%80%94%20a,Eagle%20processor%20unveiled%20in%202021.&text=IBM%20intends%20to%20scale%20up,qubits%20by%202025%20and%20beyond.

Terra Quantum. (2023). Terra Quantum Breaks Records in Quantum Key Distribution.
https://terraquantum.swiss/news/terra-quantum-breaks-records-in-quantum-key-distribution-paving-way-to-offering-unprecedented-security-over-existing-fiber-optic-networks-globally#:~:text=Terra%20Quantum%20successfully%20sent%20quantum,second)%20(arXiv%20Paper.

The Quantum Insider. (2024). French National Quantum Update.
https://thequantuminsider.com/2024/03/29/french-national-quantum-update-march-2024/#:~:text=The%20French%20Quantum%20Strategy%20is,million%20comes%20from%20private%20investors

The Quantum Insider. (2024). PASQAL Announces New Roadmap Focused On Business Utility And Scaling Beyond 1,000 Qubits Towards Fault Tolerance Era.

https://thequantuminsider.com/2024/03/12/pasqal-announces-new-roadmap-focused-on-business-utility-and-scaling-beyond-1000-qubits-towards-fault-tolerance-era/

The Quantum Insider. (2024). South Korea Sets Stage for Technological Revolution with Quantum Computing Initiatives.
https://thequantuminsider.com/2024/02/19/south-korea-sets-stage-for-technological-revolution-with-quantum-computing-initiatives/.

Times of Israel. (2022). Defense Ministry Innovation Authority to Fund Israel's First Quantum Computer.
https://www.timesofisrael.com/defense-ministry-innovation-authority-to-fund-israels-first-quantum-computer/.

TU/e. (2021). Quantum Delta NL Awarded 615 Million Euro from Netherlands National Growth Fund to Accelerate Quantum Technology.
https://www.tue.nl/nieuws-en-evenementen/nieuwsoverzicht/09-04-2021-quantum-delta-nl-awarded-615-million-euro-from-netherlands-national-growth-fund-to-accelerate-quantum-technology

U.S Department of State. (2023). Joint Statement of the United States of America and France on Cooperation in Quantum Information Science and Technology.
https://www.state.gov/joint-statement-of-the-united-states-of-america-and-france-on-cooperation-in-quantum-information-science-and-technology/

UFM. (2023). Government's Billion Investment Strategy for Quantum Technology.
https://ufm.dk/aktuelt/pressemeddelelser/2023/regeringen-klar-til-milliardinvestering-som-led-i-ny-strategi-for-kvanteteknologi

UK National Quantum Technologies Programme. (n.d.). UK Quantum Technology Sensors.
https://uknqt.ukri.org/our-programme/#:~:text=The%20UK%20Quantum%20Technology%20Sensors,the%20UK%20quantum%20technology%20community.

UKRI, National Quantum Computing Centre, 2025. The convergence of healthcare and pharmaceuticals with quantum computing: A new frontier in medicine. Insights papers.
https://www.nqcc.ac.uk/quantum-computing-for-healthcare-and-pharmaceuticals/

United Nations (*UN*). (2024). The Pact for the Future, Global Digital Compact, and Declaration on Future Generations.
https://www.un.org/sites/un2.un.org/files/sotf-the-pact-for-the-future.pdf

United Nations Educational, Scientific and Cultural Organization (*UNESCO*). (2024). Quantum technologies and their global impact: A Discussion Paper.
https://unesdoc.unesco.org/ark:/48223/pf0000388955

United Nations Educational, Scientific and Cultural Organization (*UNESCO*). (2023). “Your opinion doesn’t matter, anyway: Exposing Technology-Facilitated Gender-Based Violence in an Era of Generative AI”.
https://unesdoc.unesco.org/ark:/48223/pf0000387483/PDF/387483eng.pdf.multi

United Nations Conference on Trade and Development (*UNCTAD*). (2021). Technology and Innovation Report 2021.
https://unctad.org/page/technology-and-innovation-report-2021

United Nations University (*UNU*) (2023). The High-Level Advisory Board on Effective Multilateralism (HLAB). A Breakthrough for People and Planet: Effective and Inclusive Global Governance for Today and the Future.
https://highleveladvisoryboard.org/breakthrough/pdf/highleveladvisoryboard_breakthrough_Shift1.pdf

University of Copenhagen. (2016). Massive Investment from Theoretical Quantum Physics to Usable Quantum Technology.
https://nbi.ku.dk/english/news/news16/massive-investment-from-theoretical-quantum-physics-to-usable-quantum-technology/.

University of Copenhagen. (2020). Tomorrow's Pharmaceuticals Could Be Discovered by Quantum Simulators. https://science.ku.dk/english/press/news/2020/tomorrows-pharmaceuticals-could-be-discovered-by-quantum-simulators/

University of Copenhagen. (n.d.). Field-Ready Single-Photon Quantum Technology. https://nbi.ku.dk/english/industrial-collaboration-at-nbi/cases/fire-q-field-ready-single-photon-quantum-technology/

van Daalen, O. (2024). Developing a human rights compatible governance framework for quantum computing. Research Directions: Quantum Technologies, 2, e1. doi:10.1017/qut.2024.2

van Deventer, O., Spethmann, N., Loeffler, M. *et al.* Towards European standards for quantum technologies. *EPJ Quantum Technol.* 9, 33 (2022).
https://doi.org/10.1140/epjqt/s40507-022-00150-1

Vermaas, P., & Mans, U.(2024). Quantum technologies and their global impact: discussion paper. UNESCO, Quantum Delta (Netherlands), & Centre for Quantum and Society. Digital transformation dialogue, Paris,https://unesdoc.unesco.org/ark:/48223/pf0000388955

Vinnova. (2023). The Swedish Quantum Agenda. https://www.vinnova.se/globalassets/bilder/publikationer/the-swedish-quantum-agenda.pdf?cb=20230328130156.

VTT Technical Research Centre of Finland. (2023). Finland Launches 20-Qubit Quantum Computer Development. https://www.vttresearch.com/en/news-and-ideas/finland-launches-20-qubit-quantum-computer-development-towards-more-powerful-quantum.

Warren, R. H. (2020). Solving the traveling salesman problem on a quantum annealer. SN Applied Sciences, 2(1), 75. *https://link.springer.com/article/10.1007/s42452-019-1829-x*

Webwire. (2024). Post-quantum cryptography: six French cyber players join forces to design the secure communication networks of tomorrow.
https://www.webwire.com/ViewPressRel.asp?aId=319363.

Wired. (2024). 10 startup italiane da seguire nel 2024.
https://www.wired.it/gallery/startup-italia-10-2024-intelligenza-artificiale/

Wu, Y., Wang, Y., Ye, X., Liu, W., Niu, Z., Duan, C. K., ... & Du, J. (2024). Third-order exceptional line in a nitrogen-vacancy spin system. Nature Nanotechnology, 19(2), 160-165.
https://www.nature.com/articles/s41565-023-01583-0

Yan, R., Wang, Y., Dai, J., Xu, Y., & Liu, A. Q. (2022). Quantum-key-distribution-based microgrid control for cybersecurity enhancement. IEEE Transactions on Industry Applications, 58(3), 3076-3086.
https://ieeexplore.ieee.org/document/9735409

Ye, J., & Zoller, P. (2024). Essay: Quantum Sensing with Atomic, Molecular, and Optical Platforms for Fundamental Physics. Physical Review Letters, 132(19), 190001.
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.132.190001

YoleGroup (2021). Industrial interest in quantum technologies continues, leading to major investments and a large market in 5-10 years.
https://medias.yolegroup.com/uploads/2021/06/YINTR21211-Quantum-Technologies-2021-Flyer.pdf

YoleGroup. (2024). Quantum winter? Not so sure. Each year continues to see newcomers emerging, but everyone hopes to see a commercial use case soon, leveraging the $2.3B opportunity by 2030.
https://www.yolegroup.com/product/report/quantum-technologies-2024/

World Economic Forum (WEF). (2022). Quantum Computing Governance Principles. https://www3.weforum.org/docs/WEF_Quantum_Computing_2022.pdfWEF (2024). Quantum Economy Blueprint 2024. https://www3.weforum.org/docs/WEF_Quantum_Economy_Blueprint_2024.pdf

World Economic Forum (2024), Report, “Quantum for Society: Meeting the Ambition of the SDGs”. https://www3.weforum.org/docs/WEF_Quantum_for_Society_2024.pdf

World Economic Forum (2025), Report, “Embracing the Quantum Economy: A Pathway for Business Leaders”. https://reports.weforum.org/docs/WEF_Embracing_the_Quantum_Economy_2024.pdf

Zhao, R. X., Shi, J., & Li, X. (2024). QKSAN: A quantum kernel self-attention network. IEEE Transactions on Pattern Analysis and Machine Intelligence.
https://ieeexplore.ieee.org/document/10613453

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