QUANTUM INVESTMENT ROADMAP

QUANTUM DOMAIN	DESCRIPTION	USE CASES	INVESTMENT CONSIDERATIONS	CURRENT MARKET SIZE	FORECAST MARKET SIZE
Hardware	Companies building physical quantum computing systems, including superconducting qubits and photonics.	Quantum computation, cooling systems, light manipulation.	The most speculative with no clear market leader. Developing physical quantum systems using superconducting qubits, trapped ions, and photonics. Supply chain includes cryogenic cooling, lasers and optical systems, and high-end electronics for controlling qubits. Investors can adopt a "pickaxe and shovel" strategy by focusing on enabling technologies and supply chain components that support the broader ecosystem.	**~$650m–$750m (combined quantum revenue)** [1]	**~$50B BY 2035 (29% CAGR) [Quantum insider]**
Software & Algorithms	Firms developing quantum software and algorithms optimized for real-world applications.	Algorithm development, quantum simulation, real-world problem solving.	Likely to dominate the quantum market long-term, as it did with classical computing. Sustained investment is needed to align features with market demands. Algorithms with high-value applications (e.g., drug discovery), are expected to perform strongly. Key opportunities include unsolved challenges like quantum error correction, crucial for scalability. Companies developing proprietary algorithms or middleware that connect quantum hardware to enterprise use cases will likely become major value drivers.		
Post-Quantum Cryptography	Encryption technologies resistant to quantum attacks, including QKD (Quantum Key Distribution) and quantum-resistant chips.	Secure communication, cryptographic resilience, networking.	PQC is widely seen as the scalable solution for global quantum-safe communication, while QKD targets niche, ultra-secure point-to-point links. Consistent investment is needed to support the development of interoperable systems that combine PQC and QKD. A tiered architecture will require foundational technologies and cross-system compatibility. Key opportunities are foundational technologies like quantum repeaters and error correction protocols are essential for building scalable quantum networks. A major concern in QKD is the reliance on "trusted nodes" to extend communication range. These physical relays introduce potential vulnerabilities and must be addressed before large-scale investment in QKD-based infrastructure.	**~$302.5M**[2]	**~$1.9B BY 2029 (44.2% CAGR)** [3]
Sensing	Quantum sensors leveraging superposition and entanglement for high-precision measurements.	Metrology, atomic clocks, gravitational sensors, medical imaging.	Quantum sensing is one of the most mature and commercially viable segments of the quantum technology landscape, offering precision far beyond classical sensors through phenomena like superposition and entanglement. Growth will be steady but selective, driven by niche, high-value use cases. Cost and necessity limit broader adoption, as classical sensors (e.g., GPS) remain sufficient for many industries. Applications include atomic clocks, gravitational sensors, medical imaging, and defense systems capable of detecting stealth objects. Targeted investment is promising in sectors like aerospace, defense, and healthcare, where performance gains can justify the premium.	**$380M** [4]	**~$1.8B BY 2035 (14% CAGR**[5]
Quantum Services	Validation and certification of cryptographic systems and cybersecurity modules.	FIPS 140-3 validation, CAVP testing, product gap analysis, cybersecurity audits.	Professional services that translate quantum concepts into business strategy are emerging as high-margin, mission-critical offerings. Demand will surge as NIST standards finalize, making quantum-safe migration essential for organizations with sensitive data. Targeted investment in companies offering user-friendly SDKs and frameworks supports a "picks and shovels" strategy, enabling broad ecosystem adoption.	**$400M**	**$6.6B**
Supporting Infrastructure	Foundational systems including specialist materials, cloud platforms, and manufacturing foundries.	Cryogenic cooling, photonics for communication, cloud-based quantum access.	Foundational technologies, such as cryogenic cooling systems, photonics for quantum communication, and cloud-based quantum access, form the backbone of scalable quantum deployment. Due to high capital and technical barriers, hyperscalers like Azure and AWS are well-positioned to lead, leveraging existing strengths in high performance computing, datacenter cooling, and global cloud infrastructure. Investing in these players offers a relatively low-risk entry into the quantum ecosystem.	**Unknown**	**Not separately forecasted; enabling layer for quantum stack**

Source: 1. MarketsandMarkets; 2. MarketsandMarkets; 3. MarketsandMarkets; 4. Fortune Business Insights; 5. Roots Analysis