

The Business of Quantum

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Quantum technologies represent a transformative leap in science but also in business. In recent years, quantum computing has evolved from a niche research area to a highly competitive technological frontier, with exponential growth described by Dowling's and Neven's Law (Moore's Law of Quantum) illustrating rapid advancements in processing power.

Significant global investments and efforts are driving this evolution. Major companies like IBM, which has a vast quantum network with over 410,000 users and numerous industrial collaborations, and start-ups are leading the development of scalable quantum solutions. Countries such as China and the USA are vying for leadership, with China building robust quantum infrastructure and making strategic advancements in an attempt to dominate the field. But European Centers of Excellence are also developing.

The quantum market is now seen as a strategic sector, with billions of dollars in global investments. This burgeoning ecosystem is supported by established corporations, innovative start-ups, and academic partnerships. The applications of quantum technologies are vast, spanning areas like quantum-enhanced machine learning, cybersecurity, optimization, communication and sensing. However, it also introduces risks, particularly to current encryption systems, including blockchain security, necessitating a shift toward quantum-safe encryption methods.

The rise of quantum technologies highlights the urgent need for a specialized workforce. Interdisciplinary education and training programs are essential to prepare talent capable of combining expertise in physics, computer science, and industry-specific applications. Academia and industry must collaborate to design new training programs and curricula to support this rapidly expanding field.

Efforts to standardize quantum technologies are also crucial for market development. The intellectual property landscape in quantum technologies is expanding, with growing interest in patenting aimed at commercialization. This presentation underscores the transformative potential of quantum technologies across industries while stressing the need for global collaboration to address its opportunities and challenges effectively.

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