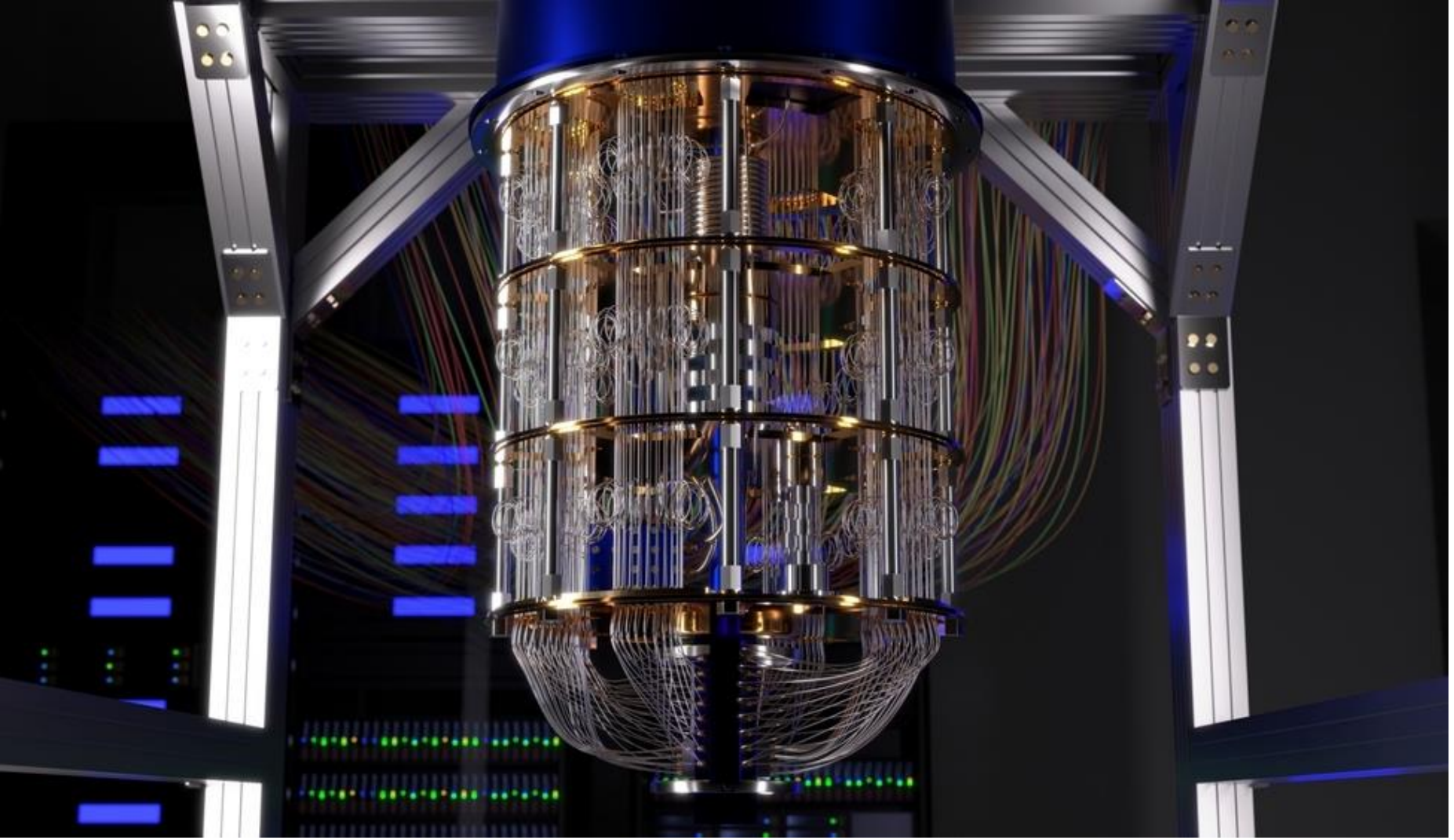

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QUANTUM COMPUTING

DANIEL BRÜHWILER / CEO

CONTENT

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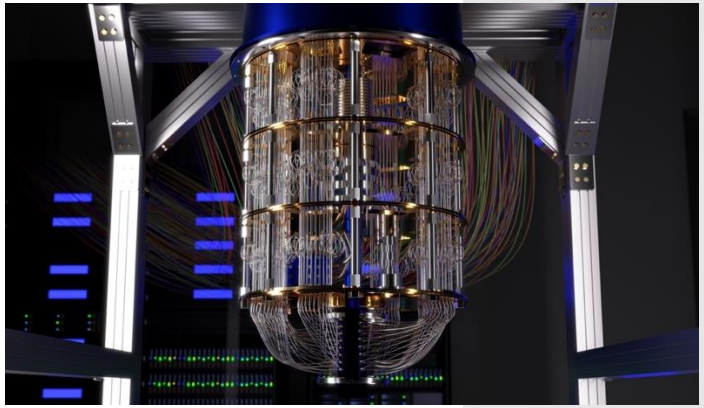

1. UNDERSTANDING QUANTUM PRINCIPLES

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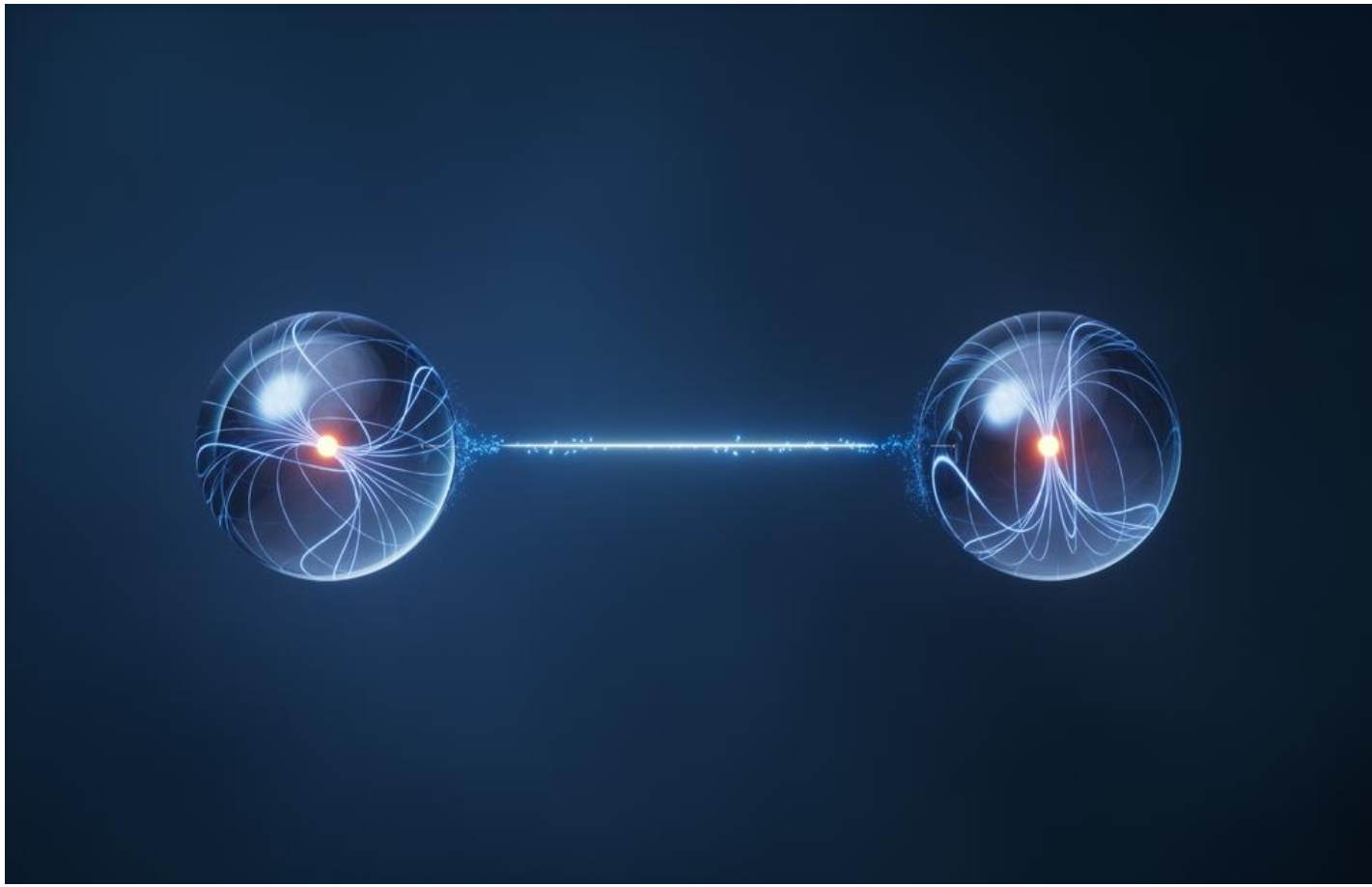
FUNDAMENTAL PRINCIPLES:

- **Superposition:** A quantum system can exist in multiple states simultaneously.
- **Entanglement:** Particles can become interconnected so that the state of one instantly influences the other, regardless of distance.



2. THE MECHANICS OF QUANTUM COMPUTING

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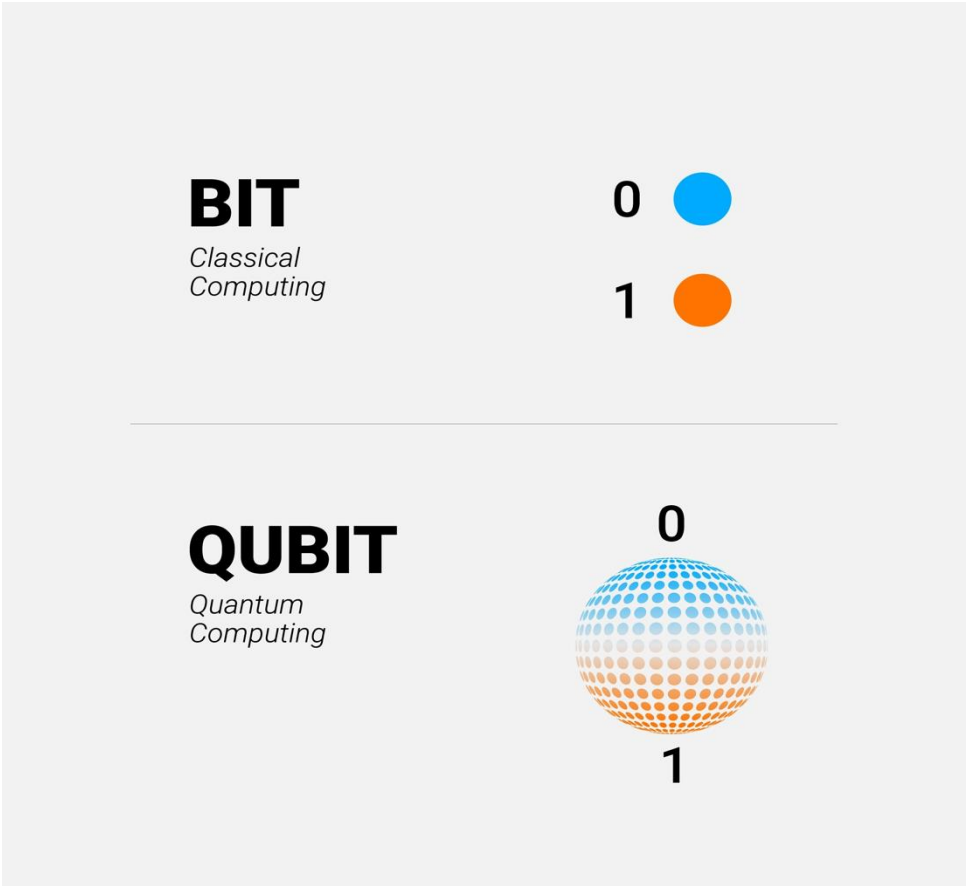
KEY POINTS:

- Unlike classical computers that use bits (0 or 1), quantum computers use qubits, which can represent 0,1 or both simultaneously due to superposition.
- Quantum gates manipulate qubits to perform calculations at exponential speeds.
- Entanglement allows qubits to be interconnected, enabling faster and more complex computations.



3. PIONEERING THE AGE OF TRANSFORMATION: QUANTUM TECHNOLOGIES

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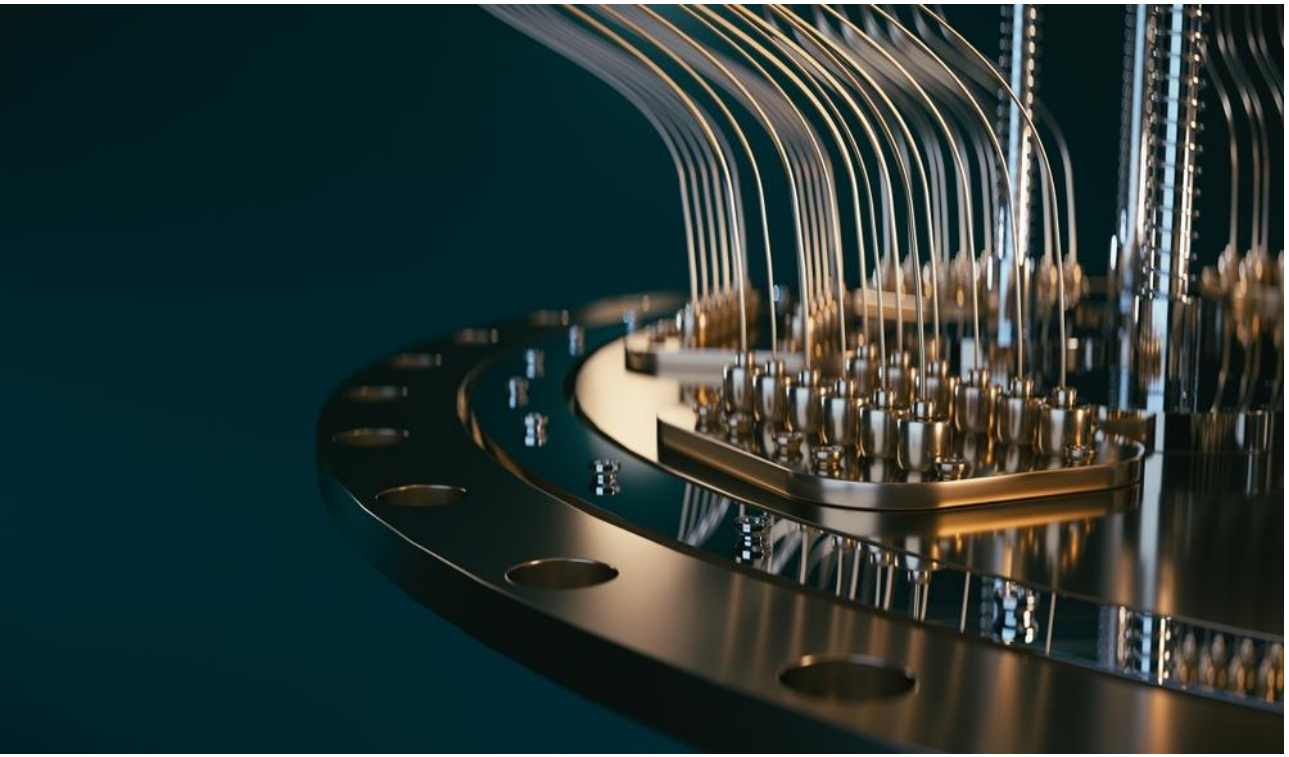

CORE TECHNOLOGIES DRIVING QUANTUM COMPUTING:

- Superconducting Qubits
- Trapped-Ion Qubits
- Quantum Annealing

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3. PIONEERING THE AGE OF TRANSFORMATION: TECHNOLGIES

SUPERCONDUCTING QUBITS:

Technology: Based on superconductivity, operated at temperatures near absolute zero (-273.15 degrees Celsius), qubits encode information through flow of electrons, often arranged in ring circuits (Absolute zero is the lowest possible temperature, where the motion of particles theoretically comes to a complete stop).

Advantages: Relatively high scalability, fast quantum operations compared to other technologies.

Disadvantages: Shorter coherence times compared to other technologies, making error correction a challenge, require extremely low temperatures.

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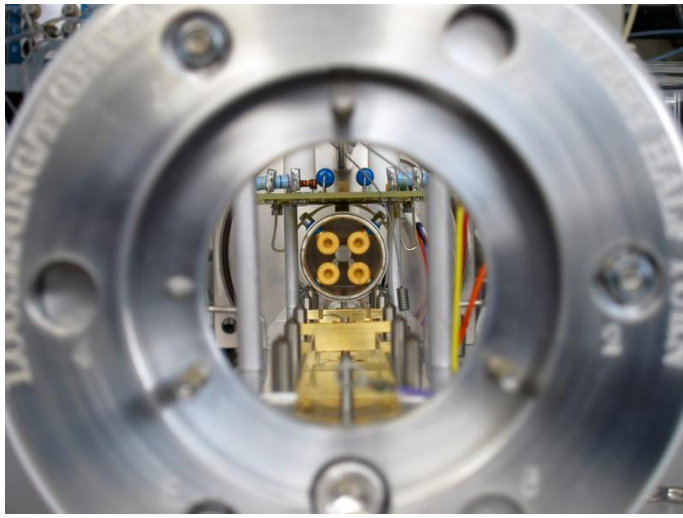
3. PIONEERING THE AGE OF TRANSFORMATION: TECHNOLGIES

TRAPPED-ION QUBITS:

Technology: Use charged atoms (ions) held in place by electromagnetic fields in a vacuum, ions serve as qubits, use charge and spin of ions to encode qubits.



Advantages: Very high fault tolerance, long coherence times (qubit state remains stable for a longer time), high precision, control and measurability, can be operated at room temperatures.

Disadvantages: Scalability is a challenge, systems are difficult to build and number of qubits is often limited.

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3. PIONEERING THE AGE OF TRANSFORMATION: TECHNOLGIES

QUANTUM ANNEALING:

Technology: Works by finding low-energy states, referred to as cooling (annealing), leverages quantum mechanics to find the global minimum or optimal solution to a problem.

Advantages: Require simpler hardware, resilience to noise, very suitable for optimization problems.

Disadvantages: Not universal and therefore not suited for general quantum computations, less precise than other quantum technologies.

3. PIONEERING THE AGE OF TRANSFORMATION: TECHNOLGIES

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QUANTUM TECHNOLOGIES:

	Alphabet	IBM	Honeywell	IonQ	Rigetti	D-Wave
Superconducting	X	X			X	
Trapped-Ion			X	X		
Annealing						X

4. TRANSFORMING INDUSTRIES WITH QUANTUM COMPUTING

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EXAMPLES:

- **Biotechnology:** Accelerate drug discovery
- **Finance:** Option pricing, optimizing portfolios
- **Artificial Intelligence:** Improving machine learning algorithms
- **Material Science:** Designing new substances
- **Logistics:** Revolutionizing supply chain management & shipping

5. WORLD APPLICATIONS TODAY

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EXAMPLES:

- **Alphabet:** Achieved quantum supremacy in solving a problem exponentially faster than a classical computer.
- **IBM:** Offering quantum computing as a service (QaaS) via Quantum Experience.
- **Honeywell:** Building high-performance quantum systems for commercial use.

6. QUANTUM COMPUTING SUPERIORITY

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GOOGLE'S SYCAMORE EXPERIMENT:

The Sycamore computer solved a problem in 200 seconds that would take the fastest supercomputer 10'000 years!

Sources:

https://www.nature.com/articles/s41586-019-1666-5

https://www.bbc.com/news/science-environment-50154993

7. OPPORTUNITIES IN QUANTUM COMPUTING

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PORTFOLIO COMPANIES:

- **Alphabet:** Pioneer in quantum supremacy
- **IBM:** Leader in quantum computing research and QaaS
- **Honeywell:** Innovator in commercial quantum systems
- **IONQ:** Specializing in trapped ion quantum computing
- **Rigetti:** Developing scaleable quantum processors
- **D-Wave:** Focused on quantum annealing for optimization problems
- **Palantir:** Specializing in quantum-enhanced data analytics

8. INVESTMENT PROCESS

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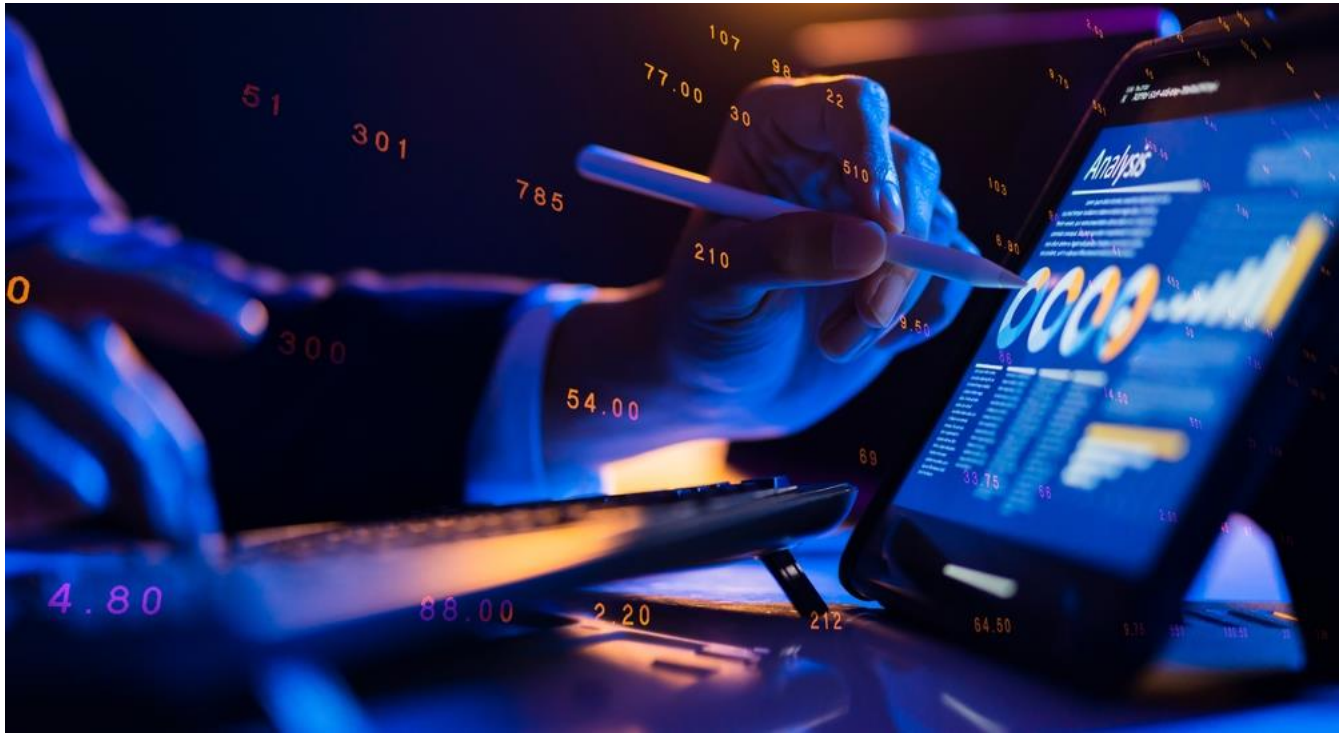
PORTFOLIO MANAGEMENT:

- Approach: bottom-up
- Style: momentum-driven
- Research: expanding universe
- Risk management: excluding companies from universe



9. PATENTS AS STRATEGIC ASSETS: THEIR CRITICAL ROLE IN THE VALUATION OF A COMPANY

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COMPETITIVE ADVANTAGE:

- Barriers to enter: For companies like Rigetti, IonQ, D-Wave, this ensures their innovations in quantum computing remain exclusive, safeguarding their market position.
- Innovation leadership: A large patent portfolio signals that a company is at the forefront of technological advancements, which can attract investors.

9. PATENTS AS STRATEGIC ASSETS: THEIR CRITICAL ROLE IN THE VALUATION OF A COMPANY

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MERGER, ACQUISITIONS, AND PARTNERSHIPS :

- A strong intellectual property (IP) portfolio can make a company more attractive for mergers and acquisitions. For example, IonQ's, Rigetti's, or D-Wave's patents make it a valuable acquisition target for tech giants seeking to enter the quantum computing space.

9. PATENTS AS STRATEGIC ASSETS: THEIR CRITICAL ROLE IN THE VALUATION OF A COMPANY

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REVENUE POTENTIAL:

- Licensing Opportunities: Patents can generate revenue through licensing deals, joint ventures, or royalties from other companies that wish to use the protected technologies.
- Monetizing of IP: A robust patent portfolio can lead to additional revenue streams such as selling patents.

9. PATENTS AS STRATEGIC ASSETS: THEIR CRITICAL ROLE IN THE VALUATION OF A COMPANY

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INVESTOR CONFIDENCE:

- A large and growing patent portfolio demonstrates a commitment to innovation and strategic foresight, which reassures investors that the company is well-positioned.
- In emerging fields like quantum computing, the potential applications of patented technologies can substantially increase a company's perceived value.

9. PATENTS AS STRATEGIC ASSETS: THEIR CRITICAL ROLE IN THE VALUATION OF A COMPANY

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RIGETTI COMPUTING:

Data from 2024 indicates that Rigetti Computing now holds a total of 110 patents.

IONQ:

As of November 2024, IonQ holds over 600 U.S. and international issued and pending patents. This includes the pending acquisition of Qubitekk's 118 patents.

https://convergedigest.com/ionq-expands-quantum-ip-portfolio-with-new-patents/

D-WAVE:

According to a 2024 report by Quantum Zeitgeist, D-Wave has a total of 501 patents, ranking it among the top quantum computing companies in terms of patent holdings.

10. QUANTUM COMPUTING: AN INVESTMENT IN THE FUTURE

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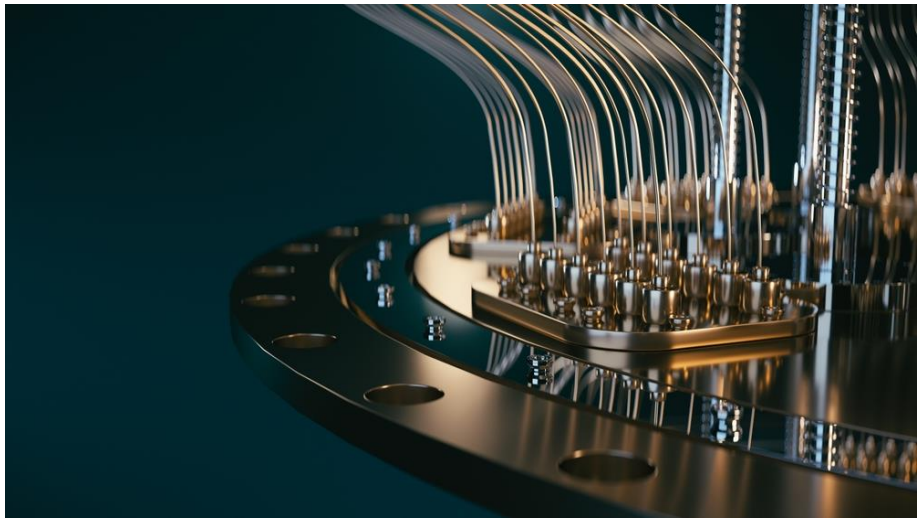
CONCLUSION:

- Quantum computing is a disruptive technology with transformative potential across industries.
- The portfolio includes industry leaders positioned to capitalize on this technological shift.
- Early investment in quantum computing provides a unique opportunity to benefit from exponential growth.



DANIEL BRÜHWILER / CEO

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GLOBAL STRATEGIC CAPITAL

GLOBAL STRATEGIC CAPITAL AG

Seefeldstrasse 287

CH-8008 Zürich

Telefon +41 44 201 31 33

db@globalstrategic.ch