STRATEGIC INTELLIGENCE REPORT

SEEING THE FUTURE

How AI + Quantum Computing Is Revolutionizing Predictive Analytics

$250B
MARKET VALUE UNLOCK BY 2030

34%
PREDICTION IMPROVEMENT (HSBC)

13,000×
SPEEDUP VS SUPERCOMPUTERS

The convergence of artificial intelligence and quantum computing is creating unprecedented capabilities to model, predict, and optimize complex systems across every industry.

JJ Shay
AI Strategy & Business Development

February 2026 | bit.ly/jjshay

The Quantum-AI Inflection Point

We are witnessing a historic convergence: the fusion of artificial intelligence's pattern recognition with quantum computing's ability to explore vast possibility spaces simultaneously.

$16B
GLOBAL QUANTUM INVESTMENT 2025

60%
BUSINESS LEADERS INVESTING IN QUANTUM AI

32.7%
ANNUAL MARKET GROWTH RATE

Key Findings

THE CAPABILITY LEAP

- Quantum computers explore millions of possibilities simultaneously
- AI identifies patterns in quantum-generated data
- Hybrid systems achieve results neither could alone
- First commercial applications now in production

INDUSTRY TRANSFORMATION

- Finance: 34% better bond trading predictions
- Healthcare: 100% hit rate in drug discovery
- Weather: 30-50% improved forecast accuracy
- Logistics: 80% faster route optimization

> *"Quantum computing is not about incremental improvement—it's about transformative breakthroughs. Problems previously deemed impossible due to computational limits are now within reach."*
>
> **— McKinsey Technology Trends Outlook 2025**

THE STRATEGIC IMPERATIVE

Organizations that begin exploring quantum-AI systems today will be better positioned to capitalize when the technology matures. Early engagement surfaces new insights into operational inefficiencies and prepares teams for a quantum-augmented future.

Understanding the AI-Quantum Convergence

The Fourth Industrial Revolution is powered by the fusion of AI and quantum computing—a hybrid that promises to redefine every sector of industry and society.

CLASSICAL COMPUTING

How it works: Processes bits as binary switches (0 or 1), calculating one possibility at a time.

Limitation: Complex problems with many variables require exponentially more time.

QUANTUM COMPUTING

How it works: Uses qubits in superposition (0 AND 1 simultaneously), exploring multiple solutions in parallel.

Advantage: Entanglement allows coordinated evaluation of vast possibility spaces.

The Synergy: Why AI + Quantum Is Transformative

1. **Quantum Generates** — Explores solutions
2. **AI Analyzes** — Identifies patterns
3. **Hybrid Optimizes** — Classical refines
4. **Prediction** — Actionable foresight

QUANTUM MACHINE LEARNING

Quantum versions of neural networks that process high-dimensional data exponentially faster than classical ML.

QUANTUM FEATURE EXTRACTION

Identifies patterns classical methods overlook—critical in aerospace sensors and genomics.

QUANTUM OPTIMIZATION (QAOA)

Explores solution spaces more efficiently than gradient descent for combinatorial problems.

QUANTUM SIMULATION

Models molecular interactions at quantum level, enabling drug discovery breakthroughs.

Key Insight: Generative Quantum AI (Gen QAI)

Quantinuum's February 2025 breakthrough allows quantum-generated data to train AI systems, significantly enhancing model fidelity for challenges previously deemed unsolvable.

The Quantum Computing Market Explosion

2025 marks an inflection point: quantum computing has transitioned from theoretical promise to tangible commercial reality.

$1.8-3.5B	$20.2B	41.8%	$3.77B
MARKET SIZE 2025	PROJECTED 2030	CAGR GROWTH	2025 EQUITY FUNDING

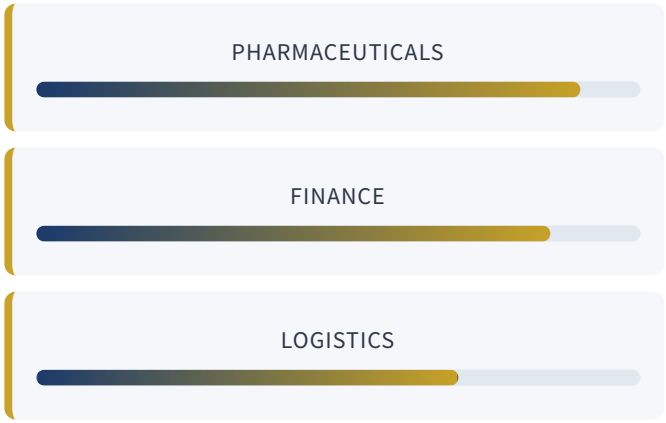
Investment Milestones 2025

Company	Milestone	Valuation/Funding
Quantinuum	Helios launch, DARPA selection	**$10B valuation**
PsiQuantum	World's most funded quantum startup	**$7B valuation**
Global Industry	Equity funding (9 months)	**$3.77B (3× 2024)**
AWS	Quantum-as-a-service investment	**$450M**

Key Hardware Advances

- **IBM Kookaburra:** 1,386 qubits modular
- **Google Willow:** 105 qubits, error correction
- **Quantinuum Helios:** Most accurate commercial
- **D-Wave Advantage2:** 5,000+ qubits

Market Value by Industry



Total: Up to $250B by 2030

TALENT CRISIS

Only 1 qualified candidate exists for every 3 quantum positions globally. McKinsey estimates 250,000+ new quantum professionals needed by 2030.

Landmark Breakthroughs of 2025

Despite predictions that quantum computing is "15-30 years away," the industry spent 2025 proving otherwise with production-ready applications.

February 2025

Quantinuum Gen QAI: First generative quantum AI framework—quantum-generated data trains AI for drug discovery and financial prediction.

March 2025

Ford Otosan + D-Wave: Production deployment reducing scheduling from 30 minutes to under 5 seconds.

September 2025

HSBC + IBM: 34% improvement in bond trading predictions using Heron quantum computer.

October 2025

Google: 13,000× speedup over Frontier supercomputer using just 65 qubits.

November 2025

Quantinuum Helios: Commercial launch of "most accurate commercial system."

Production-Ready Applications

FINANCIAL TRADING

HSBC bond prediction 34% better. Goldman Sachs 25× faster risk analysis.

MANUFACTURING

Ford Otosan scheduling in production. D-Wave warehouse optimization deployed.

DRUG DISCOVERY

100% hit rate in antiviral testing. AstraZeneca + IonQ accelerating synthesis.

34%	13,000×	100%	6×
BOND PREDICTION	SPEEDUP	DRUG HIT RATE	FASTER SCHEDULING

> *"The industry has transitioned from asking 'if' quantum computing will be practically useful to 'when' and 'which applications will benefit first.'"*
>
> — **SpinQ Quantum Computing Industry Trends 2025**

Healthcare: Predicting Molecular Futures

Quantum computing's unique ability to simulate molecular interactions at the quantum level is transforming drug discovery—reducing timelines from years to months.

$200-500B	100%	21.5%	12%
VALUE BY 2035	ANTIVIRAL HIT RATE	BETTER FILTERING	FASTER ANALYSIS

The Quantum Advantage in Pharma

First-Principles Drug Design

Quantum computers simulate molecular interactions from fundamental physics—without relying on experimental data.

McKinsey: QC creates "highly accurate simulations of molecular interactions from scratch"

Precision Targeting

Quantum algorithms predict how strongly drug molecules bind to target proteins with unprecedented accuracy.

Result: Identify promising candidates faster, predict side effects earlier

2025 Breakthrough: 100% Antiviral Hit Rate

MODEL MEDICINES' GALILEO ACHIEVEMENT

Using hybrid quantum-classical AI, GALILEO's generative tools produced 12 novel antiviral compounds—**every single one showed activity** against Hepatitis C and human Coronavirus 229E. The quantum-enhanced approach showed 21.5% improvement in filtering non-viable molecules.

Key Healthcare Applications

🔬

Protein Simulation

Model protein geometries

🔮

Electronic Structure

Drug metabolism

🧪

Docking Analysis

Binding prediction

⚠️

Off-Target Prediction

Early side effects

🩸

Liquid Biopsy

Cancer detection

💊

Personalized Medicine

Patient response

Healthcare Partnerships & Applications

Major Pharma-Quantum Collaborations

Partnership	Focus Area	Impact
AstraZeneca + IonQ + AWS	Quantum-accelerated chemistry	**Faster development**
Boehringer + PsiQuantum	Metalloenzyme structures	**Drug metabolism**
Insilico + U of Toronto	Quantum-classical hybrid	**Expanded discovery**
St. Jude Research	KRAS cancer target	**Novel ligands**
University of Chicago	Quantum liquid biopsy	**Better predictions**

Quantum Algorithms for Healthcare

VQE (VARIATIONAL QUANTUM EIGENSOLVER)

Achieves chemical accuracy for molecules like H2 and LiH. Foundation for ground-state energy prediction in drug design.

QPE (QUANTUM PHASE ESTIMATION)

Extracts eigenvalues of molecular Hamiltonians with high precision. Foundation for quantum chemistry pipelines.

QKDTI (QUANTUM KERNEL DTI)

Enhances predictive accuracy for drug-target interactions. Overcomes classical ML limitations in high-dimensional spaces.

QUANTUM WALK ALGORITHMS

Traverse protein-protein interaction networks faster than classical. Used for disease-gene prioritization.

The Precision Medicine Promise

MULTI-OMICS INTEGRATION

Quantum computing offers new paradigms for analyzing genomic, epigenetic, transcriptomic, proteomic data simultaneously—enabling truly personalized treatment.

PREDICTIVE DIAGNOSTICS

Quantum-enhanced ML improves disease prediction from high-dimensional biomarker data. Heart disease, cancer screening, and treatment response all benefit.

> *"Quantum computing is not just accelerating drug discovery—it's enabling us to predict molecular behaviors that were previously beyond computational reach."*

> — npj Genomic Medicine, December 2025

Finance: Predicting Markets at Quantum Speed

Financial services stands at the forefront of quantum adoption, with major institutions already demonstrating measurable advantages.

$6.3B	46.5%	75%	92%
MARKET BY 2032	CAGR GROWTH	HEDGE FUNDS USING QC	HFT PREDICTION

The HSBC Milestone

34% Improvement in Bond Trading Predictions

In September 2025, HSBC demonstrated quantum-enhanced models on **real production-scale bond trading data**. Using IBM's Heron quantum computer, the experiment showed 34% improvement in predicting whether bond trades would be filled.

Key Innovation: "Classical-to-quantum event matching" allows reusing quantum-generated features when similar market events recur.

Quantum Finance Applications

PORTFOLIO OPTIMIZATION

QAOA delivers ~40% better returns on diversification vs classical methods.

RISK ASSESSMENT

Quantum simulations process millions of scenarios in seconds—80% reduction in decision time.

FRAUD DETECTION

Quantum-enhanced ML cuts false alerts by ~65%. Pattern recognition across billions of transactions.

Market Adoption

Segment	Share
Corporate Banking	31%
Risk & Cybersecurity	26%
Retail Banking	14%
Asset Management	13%

Early Movers

- **Goldman Sachs:** 25× faster risk analysis
- **JPMorgan:** Quantum cryptography
- **BBVA + D-Wave:** 60-asset portfolio

Financial Prediction: Technical Deep Dive

Quantum Monte Carlo: The Finance Workhorse

CLASSICAL MONTE CARLO

Complexity: $n \approx 1/\varepsilon^2$

To achieve 0.1% error requires ~1,000,000 samples

Pricing complex derivatives can take hours or days

QUANTUM AMPLITUDE ESTIMATION

Complexity: $n \approx 1/\varepsilon$

Same accuracy with only ~1,000 samples

JPMorgan + IBM: 100× fewer shots for options

Quantum Algorithms for Finance

QUANTUM PCA

Exponentially faster for portfolio compression and risk decomposition. Enables real-time analysis of macroeconomic indicators.

QAOA

Explores solution spaces more efficiently for portfolio selection under real-world constraints—transaction costs, liquidity, regulatory limits.

QUANTUM SVM

Enhanced classification for credit scoring and fraud detection. Handles high-dimensional feature spaces.

VARIATIONAL ALGORITHMS

Hybrid quantum-classical approaches working on current NISQ hardware for portfolio optimization and risk modeling.

The Vanguard Study

BOND ETF PORTFOLIO CONSTRUCTION

IBM and Vanguard tested quantum-classical hybrid workflows on ETF construction with real-world constraints. Results showed:

- Optimization gap within industry standards after quantum sampling
- Consistently outperformed purely classical local search
- Robust performance even with hardware noise

92%	$7.2T	35%	55%
HFT PREDICTION	DAILY IMPACT	CREDIT DEFAULT	FASTER UNDERWRITING

> *"Finance is emerging as one of the first industries to show measurable benefits from quantum computing. The findings mark an early turning point."*
>
> **— IBM Quantum Industry Applications, December 2025**

Climate & Weather: Predicting the Unpredictable

Weather and climate systems represent some of the most computationally complex challenges on Earth. Quantum computing promises to revolutionize forecasting.

30-50%	1 Year	<0.05s
FORECAST IMPROVEMENT	EXTENDED HORIZON	DATA ASSIMILATION

The Challenge

CURRENT LIMITATIONS

- Extreme weather forecasts limited to ~10 days
- High-resolution models demand enormous power
- Subgrid processes approximated
- Processing delays can be fatal

QUANTUM SOLUTIONS

- Explore multiple atmospheric states simultaneously
- HHL algorithm for fluid dynamics
- Quantum ML captures nonlinear patterns
- Real-time extreme weather prediction

NASA's QubitCast

Quantum-Inspired Long-Range Prediction

NASA selected Planette to develop QubitCast—extending reliable forecasts from 10 days to **up to one year**. Using algorithms inspired by quantum physics to explore multiple possibilities in parallel.

Bridge Technology: Delivers quantum-inspired benefits on classical hardware while true quantum hardware matures

Research Breakthroughs

CHIBA + D-WAVE

Quantum annealing for 4DVAR data assimilation. Time dropped to <0.05 seconds.

QUANTUM NEURAL NETWORKS

QNNs outperform classical RNNs in wind speed prediction. Better adaptability to data shifts.

QLSTMS FOR SOLAR

Quantum LSTM models demonstrate superior accuracy in solar production forecasting.

Climate Modeling: The Quantum Opportunity

Four Core Quantum Contributions

1. **Solving Differential Equations Faster**
   Quantum linear solvers offer exponential speedups for ESM components.

2. **Better Subgrid Representation**
   Quantum ML learns cloud formation with improved expressivity.

3. **Parameter Tuning**
   QAOA assists time-consuming ESM calibration.

4. **Data Analysis**
   Pattern recognition for trends and extreme event precursors.

Quantum Algorithms for Climate

Algorithm	Application	Status
HHL	Navier-Stokes	Hybrid 2025
Quantum ML	Satellite data	**Active**
QAOA	ESM tuning	Research
Annealing	4DVAR	**Success**

HURRICANE PREDICTION

Quantum models forecast intensity to neighborhood levels.

INFRASTRUCTURE

Better forecasts reduce uncertainty in trillion-dollar decisions.

Reality Check

No quantum advantage for full climate modeling yet. Current work uses simplified systems.

Supply Chain: Predicting Perfect Routes

63%	6×	700K+	30%
EARLY ADOPTION	FASTER SCHEDULING	MACHINES OPTIMIZED	BETTER RESULTS

Production Deployments 2025

🚗 FORD OTOSAN

D-Wave: 30 min → 5 min. **Production.**

🥤 COCA-COLA JAPAN

700,000+ vending machines.

🚐 VOLKSWAGEN

First traffic routing pilot.

🚢 EXXONMOBIL

Maritime routing.

Key Use Cases

Route Optimization

Cargo Loading

Scheduling

Demand Forecast

Risk Modeling

Maintenance

Supply Chain: Technical Applications

Quantum Algorithms

Algorithm	Problem	Use
QAOA	Combinatorial	**TSP, routing**
Annealing	Global minima	**Networks**
Grover's	Search	Warehouse
Quantum PCA	Dimensionality	Facilities

D-Wave + Staque: Agriculture

First commercial quantum agriculture product. Optimizes autonomous vehicles where traditional computing takes days.

> **Impact:** Real-time route adjustment across vast operations

1. **Faster Decisions**
2. **Lower Costs**
3. **Sustainability**
4. **Resilience**

GOVERNMENT OPPORTUNITY

QED-C recommends USPS adopt quantum for fleet maintenance, scheduling, and route optimization.

Cybersecurity: Quantum Threat & Solution

17-34%	2035	50%+	10+ Yrs
CRQC BY 2034	U.S. DEADLINE	POST-QUANTUM TRAFFIC	MIGRATION TIME

⚠

"Harvest Now, Decrypt Later"

Adversaries collect encrypted data to decrypt once quantum computers are powerful enough. Sensitive data captured today could be exposed in a decade.

RAND: 17-34% chance of CRQC by 2034

Post-Quantum Cryptography

NIST STANDARDS

- **ML-DSA:** Signatures
- **SLH-DSA:** Hash-based
- **ML-KEM:** Keys
- **HQC:** Code-based

DEADLINES

- **U.S.:** 2035
- **DHS:** 2030
- **Australia:** 2030
- **UK/EU:** 2035

CLOUDFLARE OCTOBER 2025

Majority of human-initiated traffic now post-quantum encrypted.

Cybersecurity: Migration Strategy

VULNERABLE

- RSA encryption
- ECC
- Diffie-Hellman
- TLS/SSL (current)

QUANTUM-SAFE

- AES-256
- SHA-3
- NIST PQC
- Lattice-based

NIST Migration Roadmap

Now - 2030
Inventory & Plan: Identify vulnerable systems, begin hybrid.

2030
Deprecation: High-risk systems must migrate.

2035
Full Removal: All federal systems quantum-resistant.

Crypto Agility

1. **Inventory**
   Map all public-key systems. Prioritize by sensitivity.
2. **Hybrid**
   Combine classical with PQC during transition.
3. **Modular**
   Enable rapid algorithm updates.
4. **Monitor**
   Track quantum progress and vulnerabilities.

Materials Science: Designing the Future

$65.4M	24.5%	10-100×
QUANTUM BATTERY 2030	CAGR	ENERGY DENSITY

RIKEN Topological Quantum Battery

Near-perfect energy transfer with immunity to loss. Superposition and entanglement instead of chemistry.

Potential: 10-100× density, seconds charging, unlimited cycles

Materials Discovery

BATTERIES

High-entropy materials.

CATALYSTS

Green hydrogen, carbon capture.

SEMICONDUCTORS

Novel electronic properties.

SUPERCONDUCTORS

Room-temperature candidates.

Timeline

2025
Proof-of-concept quantum batteries. Market $18.5M.

2030s
Materials reach manufacturing readiness.

2040
ODNI: "previously unobtainable properties."

Aerospace & Autonomous Systems

Aircraft & Propulsion

ROLLS-ROYCE

Quantum-inspired CFD for jet engines.

BOEING

Double-digit fuel savings.

HYPERSONIC

Extreme environment modeling.

MATERIALS

Lighter, stronger composites.

Hyundai + IonQ: Quantum Vision

Quantum ML for autonomous sensor image classification. Parallel evaluation for split-second decisions.

Autonomous

- Path Planning
- Behavior Prediction
- Sensor Fusion
- Fleet Coordination

Defense & Space

- Satellite Constellation
- Mission Planning
- GPS-denied Navigation
- Secure Comms

10×	45%	13,000×
FASTER DESIGN	WEIGHT REDUCTION	PHYSICS SPEEDUP

Agriculture: Precision Farming

🚜

D-Wave + Staque: Autonomous Vehicles

First commercial quantum agriculture product. Optimizes movement where traditional computing takes days.

Quantum ML for Crops

CHALLENGES

- Late disease detection
- Expensive monitoring
- New climate patterns

SOLUTIONS

- Early, precise detection
- Process vast imagery
- Reduced pesticides

Applications

🌱 **Disease Monitoring**

💧 **Irrigation**

🚁 **UAV Coordination**

📊 **Yield Prediction**

🌡️ **Climate Adaptation**

🏭 **Supply Chain**

COLOMBIA CASE STUDY

30% cost reductions with AI and IoT. Quantum makes sustainability more scalable.

Food Security

Quantum ML for crop monitoring promises early disease detection for global food security.

D-Wave + Staque: Commercial Quantum Agriculture

Autonomous Agricultural Vehicle Optimization

Showcased at World Fira 2025, this commercial application optimizes movement of autonomous agricultural vehicles at scale—among the first real-world quantum products in agriculture.

The Problem: Traditional computing takes days to compute optimal routes for self-driving tractors—too slow for real-time decision-making

Quantum ML for Crop Disease

TRADITIONAL CHALLENGES

- Disease detection often too late
- Large-scale monitoring expensive
- Classical ML struggles with high-dimensional data
- Climate change introducing new patterns

QUANTUM ADVANTAGES

- Early, precise disease detection at scale
- Process vast UAV/satellite imagery
- Pattern recognition in complex data
- Reduced pesticide through targeting

Agricultural Applications

Disease Monitoring
QML detection

Irrigation
Resource optimization

UAV Coordination
Drone fleet routing

Yield Prediction
Quantum forecasting

Climate Adaptation
Local weather

Supply Chain
Farm-to-table logistics

CASE STUDY: COLOMBIA AI + IOT

Colombian farms achieved 30% cost reductions using AI and IoT for precision agriculture. Adding quantum optimization makes sustainability even more scalable.

Food Security Implications

Integration of quantum ML into crop monitoring holds significant promise for advancing agricultural practices and bolstering global food security through precise, early detection of plant diseases.

Government & Defense Applications

Governments worldwide are investing heavily in quantum computing for national security, scientific leadership, and public sector transformation.

Major Government Initiatives

Program	Focus	Timeline/Investment
DARPA QBI	Utility-scale quantum computers	**2033 target**
DOE Genesis	AI + quantum for American science	**National security**
NSM-10	Federal PQC migration	**Full by 2035**
EU Quantum Flagship	Trade and finance	**€120M committed**
Singapore NQO	National Quantum Hub	**Quantinuum partnership**

Defense & National Security Use Cases

CRYPTOGRAPHY

Post-quantum migration for classified systems. CNSA 2.0 requirements driving accelerated adoption. QKD for ultra-secure channels.

INTELLIGENCE

Quantum-enhanced pattern recognition in satellite imagery and signals intelligence. Processing vast data streams.

LOGISTICS

Military supply chain optimization. Real-time rerouting based on threat environments. Fleet maintenance prediction.

NAVIGATION

Quantum sensors for GPS-denied environments. Resilient navigation from magnetic, inertial, and optical sources.

Quantinuum + DARPA

Quantum Benchmarking Initiative Stage B

November 2025: Quantinuum selected for DARPA Stage B to evaluate technical likelihood of utility-scale quantum computer by 2033. Delivered "Lumos" concept design for utility-scale system.

Roadmap: Apollo universal fault-tolerant quantum computer scheduled for 2029 launch

U.S. POSTAL SERVICE

QED-C recommends USPS adopt quantum for fleet maintenance, staff scheduling, and route optimization—building institutional expertise.

WORKFORCE DEVELOPMENT

Only 1 qualified candidate per 3 positions. Government programs mobilizing to train 250,000+ quantum professionals by 2030.

Quantum Hardware: The Competitive Landscape

Multiple technology approaches are racing toward fault-tolerant quantum computing, with dramatic progress in 2025.

Major Quantum Computing Platforms

Company	Technology	Latest Milestone
IBM	Superconducting	**Kookaburra: 1,386 qubits**
Google	Superconducting	**Willow: 105 qubits, below-threshold**
Quantinuum	Trapped Ion	**Helios: Most accurate commercial**
IonQ	Trapped Ion	**HSBC, Hyundai, AstraZeneca**
PsiQuantum	Photonic	**$1B raised, $7B valuation**
D-Wave	Annealing	**Advantage2: 5,000+ qubits**

Technology Approaches

⚡ SUPERCONDUCTING

Leaders: IBM, Google
Pros: Fast gates, scalable
Cons: Extreme cooling (~15mK)

🔬 TRAPPED ION

Leaders: Quantinuum, IonQ
Pros: Highest fidelity, all-to-all
Cons: Slower, scaling hard

💡 PHOTONIC

Leaders: PsiQuantum, Xanadu
Pros: Room temperature, networked
Cons: Probabilistic, loss issues

🌀 TOPOLOGICAL

Leaders: Microsoft
Pros: Inherently error-resistant
Cons: Still experimental

The Error Correction Breakthrough

2025: THE YEAR ERROR CORRECTION WORKED

All major 2025 announcements were enabled by dramatic error correction improvement. Google's Willow demonstrated **below-threshold error correction**—the first time adding qubits actually reduced errors, proving the path to fault-tolerant quantum computing.

1,386	5,000+	10×	$10B
IBM QUBITS	D-WAVE QUBITS	ERROR IMPROVEMENT	QUANTINUUM

Quantum Cloud: Democratizing Access

Cloud platforms make quantum computing accessible without massive infrastructure investments.

Major Cloud Quantum Platforms

IBM QUANTUM

Industry leader with Qiskit SDK. Access to Heron, Eagle processors. Enterprise partnerships.

127+ qubits | Production-ready

AWS BRAKET

Multi-vendor access: IonQ, Rigetti, D-Wave. Integrated with AWS ecosystem. $450M investment.

Multi-hardware | Enterprise

AZURE QUANTUM

Microsoft's ecosystem. Access to IonQ, Quantinuum, Rigetti. Integration with Azure AI.

Hybrid-ready | Enterprise

Quantum-as-a-Service Market

$4B	$26B	60%
MARKET 2025	PROJECTED 2030	LEADERS EXPLORING

Hybrid Quantum-Classical Workflows

1. **Classical Pre-Process** — Data prep
2. **Quantum Execute** — QAE, QAOA, VQE
3. **Classical Refine** — Results processed
4. **Deploy** — Business integration

Key Tools

- **Qiskit:** IBM's open-source SDK
- **Cirq:** Google's Python framework
- **PennyLane:** Quantum ML library
- **Ocean:** D-Wave's tools

Enterprise Tips

- Treat quantum service like any microservice
- Feature-flag small % of workloads for A/B testing
- Wrap quantum jobs behind API gateway
- Cache quantum-generated features for reuse

PRACTITIONER ADVICE

"Organizations that begin exploring quantum early will be better positioned to capitalize when the technology matures. Even short-term engagement surfaces insights and prepares teams."

Quantum AI Algorithms Explained

Understanding the key algorithms driving quantum advantage in predictive analytics.

Core Quantum Algorithms for Prediction

1. **Quantum Amplitude Estimation (QAE)**
   Workhorse behind quantum Monte Carlo. Quadratic speedup in sampling—critical for financial risk modeling.

2. **QAOA (Quantum Approximate Optimization)**
   Transforms optimization into quantum Hamiltonians. Works on NISQ hardware for portfolio selection, routing, scheduling.

3. **VQE (Variational Quantum Eigensolver)**
   Finds ground-state energy of molecules for drug discovery. Achieves chemical accuracy for small molecules.

4. **Quantum Neural Networks (QNNs)**
   Parameterized quantum circuits mimicking neural networks. Better generalization in weather prediction.

5. **Quantum Support Vector Machines**
   Kernel methods in quantum feature spaces. Enhanced classification for fraud detection, disease diagnosis.

Algorithm Application Matrix

Algorithm	Finance	Healthcare	Logistics	Climate
QAE	**Monte Carlo**	Trials	Risk sim	Uncertainty
QAOA	Portfolio	Scheduling	**Routing**	ESM tuning
VQE	—	**Drug discovery**	—	Materials
QNN	Markets	Diagnosis	Demand	**Weather**
QSVM	**Fraud**	**Cancer**	Anomaly	Patterns

When Quantum Wins

✅ QUANTUM ADVANTAGE

- High-dimensional optimization
- Molecular simulation

❌ CLASSICAL STILL WINS

- Simple, linear calculations
- Well-structured data

- Probabilistic sampling
- Pattern recognition in complex data
- Combinatorial explosion problems

- Tasks requiring massive memory
- Real-time processing (current HW)
- Problems with good heuristics

Getting Started: Implementation Roadmap

A practical guide for organizations beginning their quantum journey.

Phase 1: Discovery (Months 1-3)

OBJECTIVES

- Identify optimization-heavy workloads
- Inventory predictive analytics use cases
- Assess data infrastructure readiness
- Build internal quantum awareness
- Select 1-2 pilot use cases

Phase 2: Pilot (Months 4-9)

OBJECTIVES

- Develop proof-of-concept on cloud platform
- Compare quantum vs classical baselines
- Build hybrid quantum-classical workflows
- Train core team on quantum tools
- Calculate potential ROI at scale

Phase 3: Expansion (Months 10-18)

OBJECTIVES

- Scale successful pilots to production
- Integrate quantum services into systems
- Expand to additional use cases
- Build quantum talent pipeline

- Establish vendor partnerships

High-Value Starting Points

Industry	First Use Case	Expected Value
Finance	Portfolio optimization	**40% better diversification**
Healthcare	Molecular simulation	**Faster candidate ID**
Logistics	Route optimization	**6× faster solutions**
Energy	Grid optimization	**Real-time balancing**
Manufacturing	Production scheduling	**Higher throughput**

KEY SUCCESS FACTORS

- **Start Small:** Single use case with clear metrics
- **Hybrid Approach:** Combine quantum with classical
- **Partner Early:** Leverage IBM, AWS, Azure expertise
- **Invest in Talent:** Quantum skills take time to develop

Challenges & Limitations

Despite remarkable progress, quantum computing faces significant hurdles. Understanding these is essential for realistic planning.

Technical Challenges

🔧 HARDWARE LIMITATIONS

Current NISQ devices are noisy with limited qubits. IBM's Starling (200 logical qubits by 2028) still far from simulating complex molecules.

❄️ COOLING REQUIREMENTS

Superconducting qubits require ~15 millikelvin. Specialized cryogenic systems are expensive and energy-intensive.

⏱️ COHERENCE TIME

Quantum states are fragile—even tiny vibrations cause errors. Qubits lose quantum properties quickly, limiting computation time.

🔗 CONNECTIVITY

Not all qubits interact directly. Limited connectivity constrains algorithm design. Two-qubit gates require costly "swap" operations.

Business Challenges

⚠️ High Costs

Development, maintenance, and deployment remain expensive. Quantum needs specialized infrastructure—cryogenics, shielding, expertise.

⚠️ Uncertain Timelines

Despite progress, fault-tolerant QC remains years away. Experts disagree: some say 2030s, others 2040s.

⚠️ Talent Shortage

Only 1 qualified candidate per 3 positions globally. Training takes years, not months.

⚠️ Integration Complexity

Quantum must work alongside classical infrastructure. "Black box" AI models complicate certification in safety-critical domains.

Reality Check: What Quantum Can't Do (Yet)

IMPORTANT LIMITATIONS

- **Full Climate Modeling:** No quantum advantage for complete ESM tasks
- **General-Purpose:** Not replacing classical computers for routine calculations
- **Real-Time:** Current hardware too slow for many time-critical applications

Break Encryption Today: Not yet powerful enough to crack current cryptography

The Road Ahead: 2026-2030

Expert predictions paint a picture of accelerating capability—with utility-scale quantum computing arriving sooner than expected.

Technology Roadmap

2026

Substantial fault-tolerant advances. Hybrid quantum-classical applications demonstrate measurable advantage. Physics-native computing emerges.

2028

IBM Starling: 200 logical qubits. Quantum advantage in targeted financial, chemical applications.

2029

Quantinuum Apollo: Universal fault-tolerant quantum computer launch. Major expansion of practical applications.

Early 2030s

Utility-scale quantum. DARPA targeting 2033. Drug discovery timelines compressed. Financial markets require quantum.

Expert Predictions for 2026

HARDWARE ADVANCES

First fully integrated logical operations. IBM quantum advantage target. Google scaling past milestones. Error correction in production.

HYBRID AI INTEGRATION

Quantum subroutines as modular components in classical AI stacks. Engineers "drop in" quantum optimization layers.

ENTERPRISE ADOPTION

Pilots live in finance, pharma, aerospace. Growth from <$1B to tens of billions by mid-2030s.

ECOSYSTEM MATURATION

Stronger partnerships. Standardization advancing. Workforce development scaling globally.

Market Projections

$5.3B	$20.2B	$250B	250K+
MARKET 2029	MARKET 2030	VALUE UNLOCK	PROFESSIONALS

THE CONVERGENCE ACCELERATES

By late 2020s, quantum-AI systems deliver "quantum advantage" in real-world applications. Industries that embrace early will set the pace for innovation and competitiveness.

The Long-Term Vision: 2030-2040

Looking beyond near-term milestones to the transformative potential of mature quantum-AI systems.

Transformative Scenarios

Drug Discovery Revolutionized

Quantum simulations accurately predict molecular behavior. Drug discovery timelines compress from decades to months. Personalized medicine becomes reality.

Post-Quantum Security Era

Post-quantum cryptography mandatory for all communications. Quantum computers routinely break classical encryption. QKD enables unbreakable secure channels.

Energy Transformation

Quantum batteries enable instant charging with 10-100× energy density. Room-temperature superconductors potentially discovered. Renewable energy becomes cheaper than any alternative.

Industry Transformation

Industry	Current State	2030+ Potential
Finance	Pilots, 34% gains	**Quantum required for competitive trading**
Pharma	100% hit rate demos	**Years → months drug development**
Automotive	Image classification pilots	**Quantum-enhanced full autonomy**
Energy	Quantum battery research	**10-100× battery density**
Climate	Algorithm development	**30-50% improved forecasts**

WINNERS

- Early quantum adopters gain decisive advantages
- New industries emerge around quantum
- Quantum-native companies disrupt incumbents
- Countries with infrastructure lead

DISRUPTIONS

- Legacy automakers without quantum-EVs at risk
- Traditional drug discovery processes obsolete
- Classical-only cybersecurity becomes vulnerable
- Workforce displacement in some domains

Building the Business Case

Quantifying the value of quantum-AI investments requires understanding direct returns and strategic positioning.

ROI Dimensions

FINANCIAL RETURNS

- Direct cost savings from optimization
- Revenue from faster time-to-market
- Reduced R&D costs via simulation
- Avoided losses from better prediction

OPERATIONAL EFFICIENCY

- Time savings (6× faster scheduling)
- Resource utilization improvement
- Decision quality enhancement
- Reduced computational costs long-term

STRATEGIC VALUE

- Competitive positioning
- First-mover advantages
- Talent attraction and retention
- Partnership and ecosystem access

RISK MITIGATION

- Quantum-safe security readiness
- Avoided disruption from competitors
- Regulatory compliance preparation
- Supply chain resilience

Demonstrated ROI Examples

Use Case	Organization	Measured Benefit
Bond trading	HSBC	**34% accuracy improvement**
Portfolio optimization	BBVA	**~40% better returns**
Schedule optimization	Ford Otosan	**6× faster**
Drug discovery	Model Medicines	**100% hit rate**
Fraud detection	Industry avg	**65% fewer false positives**

CFO SURVEY INSIGHT

In 2025, **55% of CFOs** said quantum technologies are critical for long-term financial strategy. Finance quantum market: $622M in 2025, growing to $6.3B by 2032.

Case Study Compilation

Real-world implementations demonstrating quantum-AI predictive analytics across industries.

HSBC Bond Trading

Challenge: Improve prediction accuracy for bond trade fill rates.

Solution: IBM Heron with classical-to-quantum event matching.

Result: 34% improvement. First production-scale quantum trading application.

Ford Otosan Scheduling

Challenge: Production scheduling taking 30 minutes—too slow.

Solution: D-Wave quantum annealing. Deployed in production.

Result: 30 minutes → under 5 minutes—6× improvement.

GALILEO Antiviral Discovery

Challenge: Traditional drug discovery has ~10-20% success rate.

Solution: Hybrid quantum-classical AI for compound design.

Result: 100% hit rate—all 12 compounds showed activity. 21.5% better filtering.

Coca-Cola Japan Vending

Challenge: Optimize logistics for 700,000+ vending machines.

Solution: Quantum computing for network-wide optimization.

Result: Successfully optimized logistics at previously unreachable scale.

Case Study Compilation (Continued)

St. Jude KRAS Cancer Research

Challenge: KRAS is an important but extremely difficult cancer drug target.

Solution: Quantum ML combined with classical models in concert.

Result: Identified novel ligands predicted to bind KRAS, experimentally validated.

Vanguard Portfolio Construction

Challenge: ETF portfolio construction with real-world constraints creates exponentially hard optimization.

Solution: IBM sampling-based variational quantum algorithm.

Result: Matched state-of-the-art classical solver; consistently outperformed purely classical local search.

Huaxia Bank ATM Optimization

Challenge: Optimize network of 2,243 ATMs across China.

Solution: SpinQ nuclear magnetic quantum computer with QNN model.

Result: 99% accuracy rate, outperforming classical algorithms. Implemented across all branches.

Key Learnings Across Cases

COMMON SUCCESS FACTORS

- **Hybrid approach:** All successful implementations combined quantum with classical
- **Clear metrics:** Defined measurable baselines before implementation
- **Right problem fit:** Optimization, simulation, ML problems with many variables

- **Expert partnership:** Collaborated with quantum hardware/software providers
- **Iterative development:** Started simplified, scaled complexity over time

Ethical Considerations & Governance

As quantum-AI systems become more powerful, addressing ethical implications becomes essential.

Key Ethical Challenges

👥 WORKFORCE DISRUPTION

Quantum-AI automation may displace traditional roles. While new positions emerge, transition requires significant reskilling investment.

🔍 ALGORITHMIC TRANSPARENCY

Many quantum-AI approaches operate as "black boxes," complicating certification in safety-critical aerospace, healthcare, and financial systems.

🌐 GLOBAL INEQUITY

Quantum infrastructure is expensive and concentrated. Low-income countries may access cloud-hosted quantum, but costs may prevent local capabilities.

🔐 SECURITY ARMS RACE

Quantum threatens current encryption while enabling new security paradigms. First to achieve supremacy gains significant advantage.

Governance Frameworks Emerging

Region	Framework	Focus
EU	EU AI Act + DORA + NIS2	**Encryption, key management**
U.S.	NSM-10 + NIST PQC	**PQC migration, standards**
Global	PKI Consortium PQCMM	**Maturity model**
Japan	Cyber Research Consortium	**PQC standardization**

Responsible Development Principles

FOR ORGANIZATIONS

- Invest in workforce reskilling alongside technology
- Prioritize explainability in safety-critical applications
- Conduct impact assessments before deployment
- Ensure diverse teams in quantum-AI

FOR POLICYMAKERS

- Support equitable access to quantum resources
- Fund quantum literacy and education programs
- Coordinate international standards
- Balance innovation with security safeguards

development

Key Players Directory

The quantum computing ecosystem includes hardware providers, cloud platforms, software companies, and enterprise adopters.

Hardware Providers

IBM

Superconducting. Kookaburra, Heron. IBM Quantum cloud.

Superconducting

GOOGLE

Willow processor. 13,000× speedup. Below-threshold error.

Superconducting

QUANTINUUM

$10B valuation. Helios "most accurate." DARPA Stage B.

Trapped Ion

IONQ

Partnerships with HSBC, Hyundai, AstraZeneca.

Trapped Ion

D-WAVE

Advantage2 (5,000+ qubits). Ford, Staque production.

Annealing

PSIQUANTUM

$7B valuation. $1B raised. Boehringer partnership.

Photonic

Cloud Platforms & Software

- **IBM Quantum:** Qiskit SDK, enterprise platform
- **AWS Braket:** Multi-vendor, $450M investment
- **Azure Quantum:** Microsoft ecosystem integration
- **Google Cloud:** Cirq framework
- **Rigetti:** Hybrid quantum-classical systems
- **Xanadu:** PennyLane quantum ML library
- **SpinQ:** Desktop quantum computers, education
- **QuEra:** Neutral atom quantum computing

Enterprise Adopters by Industry

Industry	Key Players
Finance	Goldman Sachs, JPMorgan, HSBC, Vanguard, BBVA
Pharma	AstraZeneca, Boehringer Ingelheim, Insilico Medicine
Automotive	Volkswagen, Ford, Hyundai, BMW, Toyota
Logistics	DHL, Maersk, FedEx, ExxonMobil
Aerospace	Rolls-Royce, Boeing, Airbus, Lockheed Martin

Glossary of Key Terms

A-M

Annealing: Quantum approach for optimization, finding lowest-energy states. D-Wave.

CRQC: Cryptographically Relevant Quantum Computer—powerful enough to break encryption.

Decoherence: Loss of quantum information due to environmental interference.

Entanglement: Particles become correlated; measuring one affects the other.

Error Correction: Techniques to detect and fix errors in quantum computations.

Fault-Tolerant: Systems that operate reliably despite errors through error correction.

Gate-Based: Universal QC using sequences of quantum gates. IBM, Google, IonQ.

Hybrid: Systems combining quantum and classical computing.

Logical Qubit: Error-corrected qubit from multiple physical qubits.

ML-KEM: Module-Lattice Key Encapsulation—NIST's post-quantum standard.

N-Z

NISQ: Noisy Intermediate-Scale Quantum—current era with limited, noisy qubits.

PQC: Post-Quantum Cryptography—algorithms resisting quantum attacks.

QAOA: Quantum Approximate Optimization Algorithm—hybrid for combinatorial problems.

QAE: Quantum Amplitude Estimation—quadratic speedup for Monte Carlo.

QKD: Quantum Key Distribution—provably secure encryption keys.

QML: Quantum Machine Learning—algorithms leveraging quantum for ML.

Qubit: Quantum bit—basic unit of quantum information in superposition.

Superposition: Qubit exists in multiple states simultaneously until measured.

Trapped Ion: QC using ions in electromagnetic traps. High fidelity.

VQE: Variational Quantum Eigensolver—finds ground-state energies for drug discovery.

Resources & Further Reading

Industry Reports

- **McKinsey Quantum Technology Monitor 2025** — Market analysis and value projections
- **McKinsey Technology Trends Outlook 2025** — Quantum's role in industry transformation
- **Deloitte Tech Trends 2026** — AI and quantum computing convergence
- **Bain Quantum Computing Value Report** — $250B market unlock analysis
- **SpinQ Industry Trends 2025** — Funding, milestones, commercial transition
- **QED-C Transportation & Logistics Report** — Use cases and recommendations

Technical Documentation

STANDARDS & GUIDELINES

- NIST Post-Quantum Cryptography Standards
- NIST IR 8547 PQC Migration Timeline
- NSM-10 Federal Quantum Requirements
- PKI Consortium PQCMM Framework

DEVELOPMENT RESOURCES

- Qiskit (IBM) — qiskit.org
- Cirq (Google) — quantumai.google
- PennyLane (Xanadu) — pennylane.ai
- Ocean (D-Wave) — docs.ocean.dwavesys.com

Organizations & Conferences

INDUSTRY BODIES

- Quantum Economic Development Consortium (QED-C)
- PKI Consortium PQC Working Group
- International Year of Quantum (IYQ) 2025
- Quantum Industry Coalition

KEY CONFERENCES

- Qubits (D-Wave annual conference)
- IBM Quantum Summit
- PQC Conference (PKI Consortium)
- Quantum for Good (UNICC/ITU)

Key Statistics at a Glance

Market & Investment

$1.8-3.5B
GLOBAL MARKET 2025

$20.2B
PROJECTED 2030

41.8%
CAGR

$16B
2025 INVESTMENT

Performance Breakthroughs

34%
HSBC PREDICTION GAIN

13,000×
GOOGLE SPEEDUP

100%
DRUG HIT RATE

6×
FORD SCHEDULING

Industry Value Potential

Industry	Key Metric	Value/Impact
Pharma	Value creation by 2035	**$200-500 billion**
Finance	Market size by 2032	**$6.3 billion**
Cross-Industry	Market unlock by 2030	**$250 billion**
QaaS	Market size by 2030	**$26 billion**

Hardware Progress

1,386
IBM KOOKABURRA

5,000+
D-WAVE ADVANTAGE2

$10B
QUANTINUUM

10×
ERROR IMPROVEMENT

Adoption & Workforce

60%
LEADERS INVESTING

75%
HEDGE FUNDS USING QC

250K+
PROFESSIONALS NEEDED

1:3
TALENT GAP

10 Critical Takeaways

1. **The Inflection Point Is Now**
   2025 marked quantum computing's transition from theory to commercial reality. Production deployments at HSBC, Ford, and Coca-Cola prove the technology works.

2. **Hybrid Is the Path Forward**
   Successful implementations combine quantum and classical computing. Neither replaces the other—synergy creates impossible capabilities.

3. **Start Now, Don't Wait for Perfection**
   Organizations exploring quantum early will be positioned to capitalize when technology matures. Pilot engagement builds expertise.

4. **Finance Leads, Others Follow**
   Financial services demonstrates strongest quantum adoption with measurable results. Healthcare, logistics, and materials science close behind.

5. **Optimization Is the Sweet Spot**
   Problems with many variables and combinatorial complexity—routing, scheduling, portfolio selection—show clearest quantum advantage.

6. **Cybersecurity Migration Is Urgent**
   "Harvest now, decrypt later" makes PQC migration time-sensitive. 2030-2035 deadlines require immediate planning.

7. **Talent Is the Bottleneck**
   With 250,000+ quantum professionals needed by 2030 and only 1 candidate per 3 positions, workforce development must parallel technology investment.

8. **Cloud Platforms Lower Barriers**
   IBM Quantum, AWS Braket, and Azure Quantum enable experimentation without massive infrastructure investment.

9. **Error Correction Unlocked 2025**
   Google's below-threshold error correction proves fault-tolerant quantum is achievable. This underpins confidence in roadmaps.

10. **$250B+ Value at Stake**
    The combined opportunity across pharma, finance, logistics, and materials science creates unprecedented incentive for investment.

Strategic Questions for Leadership

As quantum-AI capabilities mature, leadership teams should ask these questions to ensure strategic readiness.

Technology Assessment

- Which of our predictive analytics workloads involve optimization with many variables?
- Where do we accept "good enough" approximations because optimal solutions are too slow?
- What molecular or materials simulations could accelerate our R&D if quantum-enabled?
- How dependent are our systems on encryption algorithms vulnerable to quantum attack?

Competitive Positioning

- Are our competitors investing in quantum computing capabilities?
- What first-mover advantages exist in our industry for quantum adoption?
- Could quantum capabilities become table stakes in our sector within 5-10 years?
- Which emerging quantum-native companies could disrupt our business model?

Investment & Resources

- What budget should we allocate to quantum exploration vs other technology priorities?
- Do we have the talent to evaluate quantum opportunities, or do we need to hire/partner?
- Which cloud platform (IBM, AWS, Azure) aligns best with our existing infrastructure?
- What metrics would demonstrate quantum ROI for our specific use cases?

Risk Management

- What is our timeline for migrating to post-quantum cryptography?

- Are we storing sensitive data that could be vulnerable to "harvest now, decrypt later"?
- How will workforce automation from quantum-AI affect our talent strategy?
- What governance frameworks should we establish for quantum-AI decision-making?

ACTION ITEM

Form a cross-functional quantum readiness task force including technology, strategy, risk, and operations leaders to assess these questions and develop a phased adoption roadmap.

Quantum Readiness Checklist

A practical checklist for organizations beginning their quantum journey.

Phase 1: Awareness (Immediate)

- ☐ Brief executive leadership on quantum computing fundamentals
- ☐ Identify internal champions with interest/aptitude for quantum
- ☐ Subscribe to quantum industry reports and news sources
- ☐ Attend quantum computing webinars or conferences
- ☐ Review competitor quantum announcements

Phase 2: Assessment (Months 1-3)

- ☐ Inventory optimization-heavy workloads and predictive analytics use cases
- ☐ Audit cryptographic systems for quantum vulnerability (PQC readiness)
- ☐ Assess current data infrastructure compatibility with hybrid workflows
- ☐ Evaluate cloud quantum platform options
- ☐ Identify 2-3 candidate pilot use cases with clear metrics

Phase 3: Pilot (Months 4-9)

- ☐ Select single pilot use case with clearest value potential
- ☐ Engage cloud platform or vendor partner for support
- ☐ Develop proof-of-concept comparing quantum vs classical
- ☐ Train core team on Qiskit, Cirq, or platform tools
- ☐ Calculate potential ROI if scaled to production

Phase 4: Scale (Months 10-18)

- ☐ Move successful pilot to production environment
- ☐ Integrate quantum services into existing systems
- ☐ Build quantum talent pipeline
- ☐ Begin post-quantum cryptography migration

The Time to Act Is Now

The convergence of AI and quantum computing represents one of the most significant technological shifts of our lifetime.

🎯

The Window of Opportunity

We are in a unique moment where quantum computing has proven commercial viability but hasn't yet become table stakes. Organizations that build expertise now will capture disproportionate value as technology matures.

> **The Cost of Waiting:** As quantum capabilities accelerate, the gap between early movers and laggards will widen. First-mover advantages compound over time.

Three Immediate Actions

1. **Educate Your Leadership**
   Ensure C-suite and board understand quantum computing's potential impact on your industry. Strategic implications require executive attention.

2. **Identify Your Quantum Use Cases**
   Audit operations for optimization-heavy, simulation-dependent, or ML-enhanced workloads. These are your candidates for quantum advantage.

3. **Start a Pilot**
   Cloud platforms make experimentation accessible. A focused pilot teaches more than months of analysis.

FOR THOSE READY TO LEAD

Establish dedicated quantum teams. Form hardware partnerships. Invest in talent development. Position at the forefront of the quantum-AI revolution.

FOR THOSE JUST BEGINNING

Start with awareness and assessment. Identify a single promising use case. Partner with cloud providers for low-risk exploration. Build knowledge step by step.

> *"The fusion of quantum computing and AI isn't about incremental improvements—it's about transformative breakthroughs. Problems previously deemed impossible are now within reach. Organizations that recognize this moment will define the next era of innovation."*

$250B	2029	Now
VALUE AT STAKE	FAULT-TOLERANT TARGET	TIME TO BEGIN

About the Author

JJ Shay

AI Strategy & Business Development

M&A executive and AI strategist with 15+ years of experience at Google, Intuit, Fitbit, Philips Healthcare, and Thermo Fisher Scientific, having closed over $4 billion in transactions.

Strategic Expertise: AI strategy, corporate development, digital transformation, emerging technology integration

Background

- **$4B+ in M&A Transactions** across healthcare, life sciences, and technology
- **Google-Fitbit Integration** — Led $2.1B deal integration
- **MIT AI Executive Program** — Building hands-on AI expertise
- **10+ Production AI Systems** — From strategy to implementation
- **Harvard, MIT, Stanford** — Executive education

Approach

This presentation reflects a commitment to rigorous research combined with practical application. Drawing on experience at the intersection of corporate strategy and emerging technology, JJ Shay bridges the gap between technical possibility and business value.

STRATEGIC VISION

Connecting quantum capabilities to enterprise value creation through structured analysis.

TECHNICAL DEPTH

Hands-on AI building experience informs understanding of what's practical vs theoretical.

INDUSTRY CONTEXT

Cross-sector experience enables pattern recognition across healthcare, finance, and technology.

Connect

LinkedIn: bit.ly/jjshay

Consulting: Global Gauntlet AI

Focus: AI Strategy, Quantum Computing, M&A

Speaking: AI transformation, emerging technology

THANK YOU

SEEING THE FUTURE

AI + Quantum Computing | Predictive Analytics

$250B	2025	Now
MARKET OPPORTUNITY	COMMERCIAL REALITY	TIME TO BEGIN

Key Message

The convergence of AI and quantum computing is not a distant future—it's happening now. Organizations that engage today will capture disproportionate value tomorrow. The technology has proven commercial viability. The question is no longer "if" but "how quickly" to begin.

JJ Shay

AI Strategy & Business Development

bit.ly/jjshay | February 2026