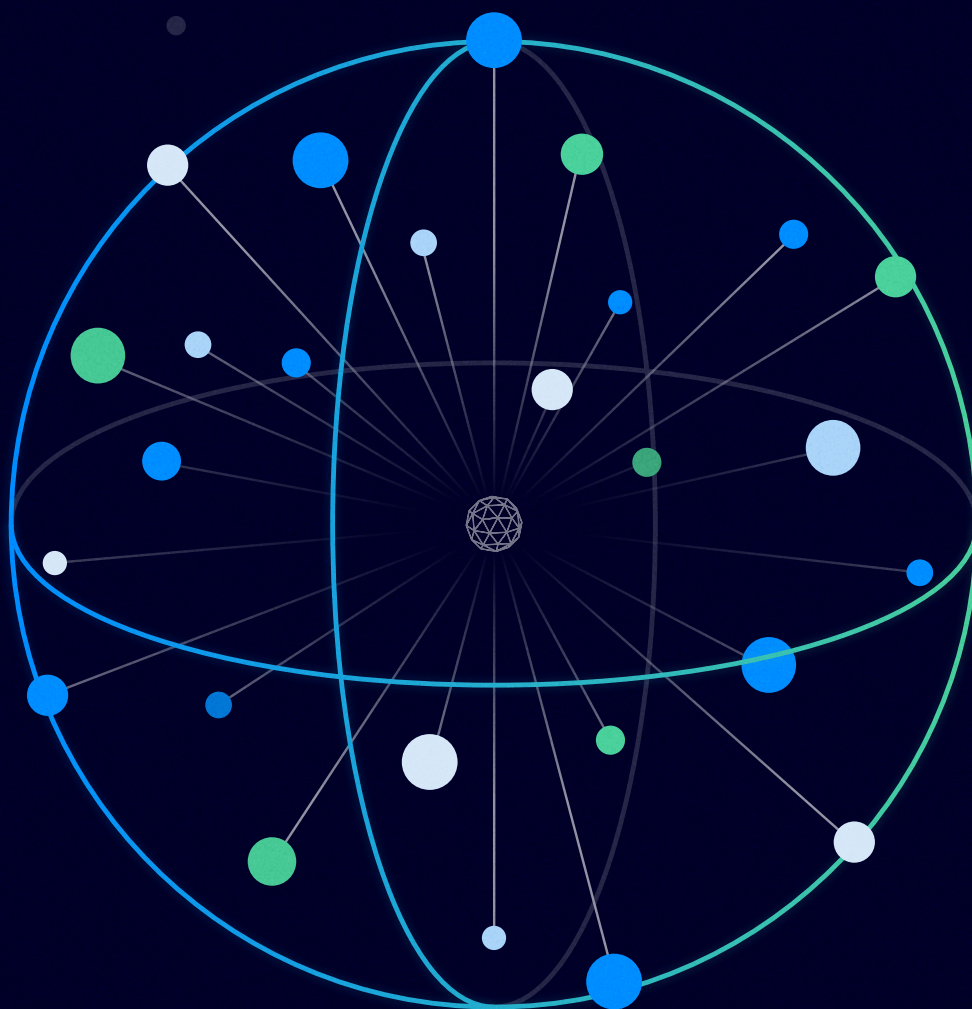

Markets To Mars

How Quantum Will Change the Fabric of Finance Forever

Brad Levy

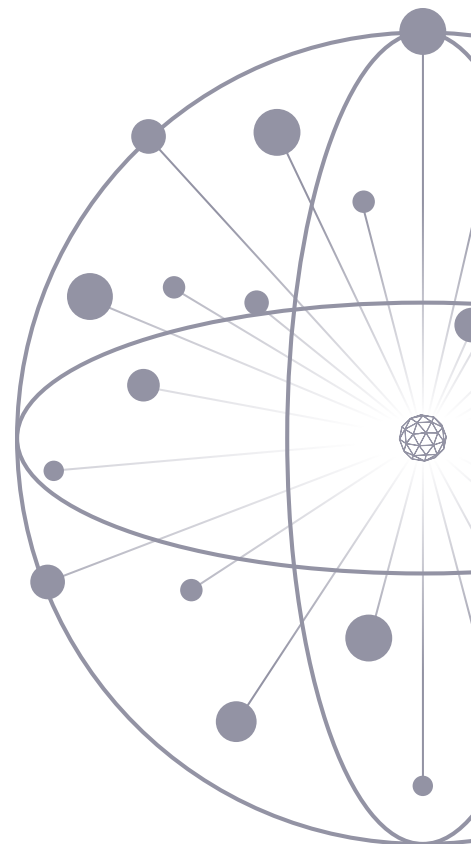
Dietmar Fauser



Innovation usually happens incrementally, through advancements like faster data or more intelligent trading algorithms. But every so often, there's a shift so profound that it renders our entire business paradigm obsolete. Quantum computing may be that shift... and its arrival will supercharge the AI revolution.

At Symphony, we are actively preparing for the quantum era - not as a theoretical exercise but as a necessity. Quantum computing will destabilize and may invalidate many foundations of business, including current encryption methods. It will also accelerate AI to unimaginable speeds. As a result, all professional fields are going to be forced to evolve, at scale.

This will be a challenging time for the Financial Services industry. Yet those who position for the coming shift now will become the trusted platforms of tomorrow.



From Silicon to Qubits

Traditional computing has been built on silicon semiconductors and binary units called “bits.” Quantum computing introduces the “qubit” (the quantum bit), which can exist in multiple states of matter simultaneously. Thus, qubits can actually represent 0, 1 or any combination of both.

What does this mean?

It enables greater data storage and exponentially more complex computations. Finance will need to adopt an entirely new approach to solving complex problems. From how we build technology to how we secure our data, everything needs to be redesigned.

Many firms are viewing quantum as a future concept - something to worry about tomorrow. Yet the breakthroughs are happening today.

Microsoft’s “Majorana 1” processor shows scalable quantum computing is within reach. Google’s “Willow” chip is capable of tasks that would take a normal computer 10 septillion years to calculate. And JP Morgan is involved in joint research that’s turning theory into real-world uses for quantum computers. So the question is not if quantum will change finance... but when, and by how much. And the answer may be, “sooner than you think,” and “by a lot.”

The Technology Battleground

In a larger sense, there is a very real technology arms race going on today.

Things like nation-state hack-attempts on the US electrical grid and currency friction with crypto seem unrelated. But put this against the backdrop of a European land war and a cold war in space. Suddenly, the interconnection of global friction

becomes obvious. In all of this, technology is the battleground on which everything is playing out.

Symphony is aware of this. Which is why we are focused on developing deeply secure, quantum-ready financial communication platforms - before they are needed.

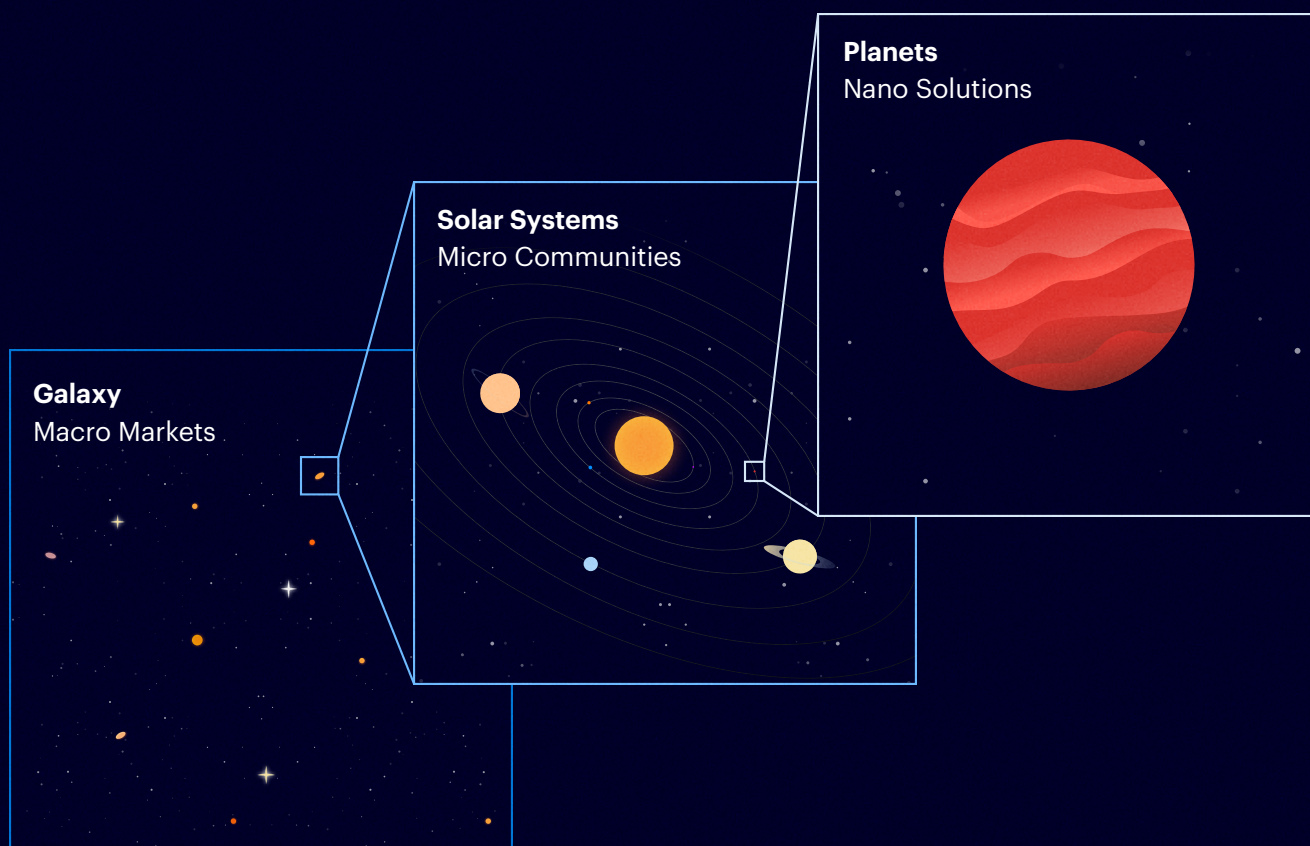
The Three-fold Impact of Quantum

In the coming years, quantum will affect financial markets across three distinct dynamics:

- 1 Macro markets
- 2 Micro communities
- 3 Nano solutions.

These are all separate but interdependent layers that will each be transformed by quantum computing. And each level will require its own technology solution.

As a simple metaphor, these layers function much like the cosmos itself: the Galaxy, Solar Systems and Planets:



1 Macro Markets (The Galaxy)

The entirety of interconnected global markets is the galaxy.

This global whole will undergo a revolutionary transformation with the advent of quantum computing. This shift will reshape communication

infrastructure, cybersecurity, and it will scale the speed of AI. This massive change will require all new security architecture across this entire global system. Worse, the macro-changes we are about to see will happen exponentially faster than anything we've previously experienced.

2 Micro Communities (Solar Systems)

Individual companies comprise the solar systems, within the global galaxy.

Each of these organizations will need to adapt all their financial workflows. Every component of their daily operations and internal processes will require quantum-proof security. This is why Symphony is building quantum-safe computing spaces with end-to-end encryption. These will now demand post-quantum cryptography.

Such protections must also extend to public infrastructure and cross-organizational workflows. In this way, Symphony will continue fostering a more resilient financial ecosystem via strong micro-communities. Symphony is uniquely qualified to execute this because our architecture avoids vendor lock-ins. This provides the crucial flexibility needed for the rapid industry changes ahead. Technology safe spaces and adaptability are about to become bedrock requirements for every market participant.

3 Nano Solutions (Planets)

Quantum changes will also impact individuals - the "planets" in our analogy.

Person-to-person interaction requires quantum-resistant solutions. That means things like secure key management, and encrypted messaging. To achieve this, Financial Services must move beyond encryption as we've always known it. We must begin to embed enhanced security within workflows themselves. Such security must be wired directly into assets, liabilities and transactions themselves. This is an entirely new way of thinking about encryption.

Symphony is leading this by developing the tools needed to make financial communications

quantum-ready. You've heard that data is the new oil. But refining and using your oil now demands a new form of protection.

Symphony's real strength lies in our detailed understanding of nitty-gritty market dynamics. We have a full grasp of things like how collateral is structured, how repo/stock loan works, or how margin is actually facilitated at the clearing house level. Such minute details are what makes markets function - and thus, what defines Finance. Symphony's technology addresses the extremely granular details at a nano-market level, thus ensuring market liquidity and security.

History Comes to a Head

The challenges we all face extend beyond finance. They are impacting all industries. But in this regard, Finance, Energy and Technology remain crucial.

Here is why:

Technology is vital due to the accelerating speed of business and technology.

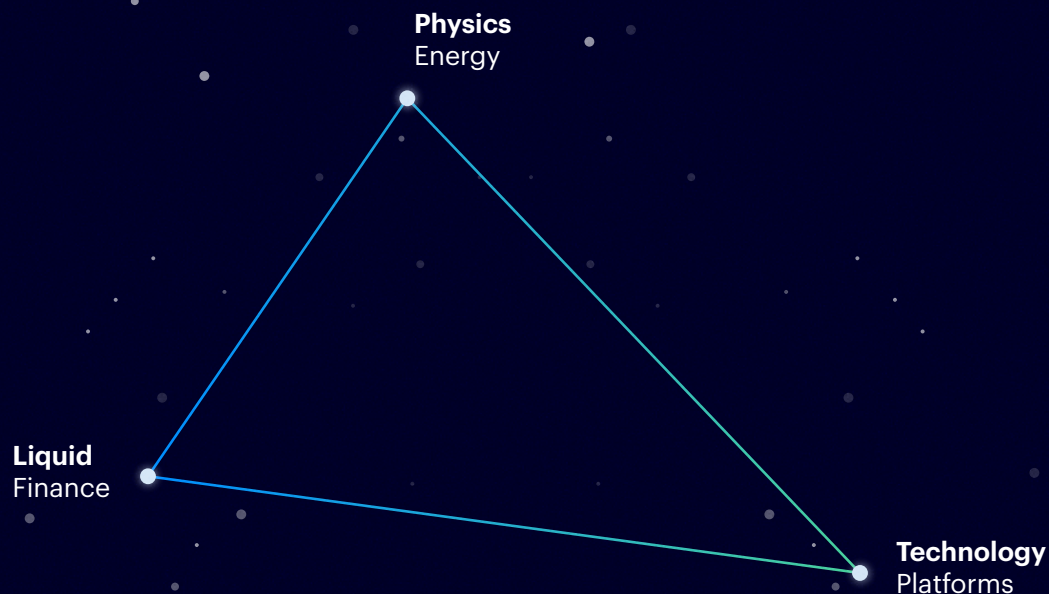
Energy is essential for the Finance and Tech sectors' capital viability.

And if Finance doesn't work... then everything is broken.

As epic as these challenges may sound, Symphony has been working on these issues for years. We have written extensively about the [historical evolution of Financial Services](#) and outlined the [generational drivers](#) of the change we are collectively living through.

In that regard, this quantum conundrum becomes a corollary to our earlier writings around [disruption, business cycles and risk](#).

In fact, the imminent arrival of quantum computing will force many of these issues to a head. A very simple way to envision this is in the picture of a pyramid, with 3 critical connected nodes:



The Quantum Model of Finance

In short, quantum computing will impact financial technology through three critical developments:

- 1 Quantum Cryptography → Encryption
- 2 Quantum Optics → Key Generation and Distribution
- 3 Quantum Chips → Speed and New Capabilities

Each area presents its own challenges. But together, these three macro-forces will demand a complete overhaul of Financial Services.

1 Quantum Cryptography → Encryption

Quantum computers pose an imminent threat to traditional encryption methods, which they will quickly render obsolete. Therefore, the financial industry urgently needs robust, post-quantum cryptographic (PQC) solutions. These new solutions must be capable of protecting financial data, transactions, and identity verification systems before quantum decryption becomes widespread. Because then it is too late.

Currently, the US National Institute of Standards & Technology (NIST) is running a competition to select PQC algorithms for exactly this purpose.

As such, Symphony is preparing ways to support the NIST recommendations. Addressing these quantum threats begins with a fundamental redesign of digital identity authentication and authorization. This will require quantum-resilient frameworks or possibly even blockchain.

Collaboration across sectors is crucial for developing these post-quantum protocols. Because ultimately, global financial stability depends on a uniform and integrated approach. This is why Symphony is focused on new solutions to secure identity and protect global markets.

2 Quantum Optics → Key Generation and Distribution

Quantum optics facilitates new methods of key generation and distribution around encryption. Right now, quantum optics is still in an experimental research state and is not currently reaching beyond metropolitan network distances. But it is only a matter of time before we will begin to see this in broader use.

New optical networks and laser technologies enable the replication of entangled quantum states. In turn, these can be used for building quantum-safe workflows and optical encryption. This type of technology enables quantum networks to generate “one-time-use” cryptographic keys.

By definition, these keys can never be intercepted because any attempt to observe them leads to their immediate destruction. This is simply how quantum state observation works.

Quantum optics will also be crucial in safeguarding financial workflows. This will be accomplished by embedding security directly over end-to-end interfirm workflows. Symphony is working towards quantum-secure workflows that encrypt inside daily financial operations at the base level. This approach results in a much higher security standard than we see with the macro-approach of today’s cybersecurity practices.

3 Quantum Chips → Speed and New Capabilities

As mentioned earlier, quantum chips operate with qubits. While today this is a fragile technology and not yet fit for industrial use, the latest developments indeed prove this technology. As an industry, we can absolutely scale quantum’s massive compute power.

Simply put, qubits enable computing exponentially faster than the classical systems based on binary logic. Which means AI-driven financial modeling, fraud detection, and predictive analytics will also become exponentially faster.

In a practical sense, here is what you can expect to happen: trading strategies will evolve in real time, fraud detection will become predictive rather than reactive, and risk modeling will operate at a level of complexity previously thought impossible.

Financial firms that embrace quantum-powered AI will gain an unprecedented advantage. Symphony is preparing for this era by engineering deeply secure, scalable financial architectures that leverage and protect against the full potential of quantum capability.

Quantum Risk vs. Quantum Opportunity

The big, urgent risk is that quantum computing will render today's encryption obsolete.

This development will overturn a variety of mainstream encryption protocols, ones that are in massive use today. This includes the asymmetrical key exchanges, which form the bedrock of current Internet protections (RSA, TLS, etc.). People, companies and governments are all rightfully concerned about this. For our industry, this rise of quantum will create direct risk exposure for any financial transaction, every identity verification, and all proprietary data.

But any market player knows that with risk, comes opportunity. The solution lies in quantum-secure optical encryption.

Symphony is actively working on quantum encryption protocols and AI-powered security. Right now, the AI question everyone is asking is this: "Just how fast can AI become with quantum compute?"

It is too early to definitively answer this. But we know one thing for sure about quantum computing: predictive analytics, real-time trading models, and fraud detection will be exponentially more powerful than anything our industry has ever seen before.

Symphony's Role in Quantum Finance

The age of quantum finance isn't coming - it's here. The Financial Services industry must prepare now, not after quantum computers become available. Symphony stands at the forefront of this shift. We are actively developing post-quantum encryption solutions across multiple levels. We are engineering deeply secure workflows to protect financial stability.

And we are designing scalable, quantum-ready architectures for global financial firms worldwide.

Markets are going to Mars...and Symphony is ensuring our industry is ready for the journey and the destination.

Further Reading

Articles we've published

- [A Decade of Symphony](#), 2024
- [Fortifying Your Financial Cybersecurity](#), 2024
- [Disruptions, Disruptors...and the Disrupted](#), 2024
- [Business Cycles & Opportunity](#), 2023
- [Risk, Transformation & Trust](#), 2022
- [An Open Approach to Desktop Interoperability](#), 2021
- [TrIdent...a weapon of mass solution](#), 2018
- [It's the Community, Stupid](#), 2015

Works that inspire our thinking

- [Age of Revolutions](#), Fareed Zakaria, 2024
- [Stratospheric CEOs](#), Georgie Dickins, 2024
- [Nexus](#), Yuval Noah Harari, 2024
- [NIST's Post-Quantum Cryptography Overview](#), 2024
- [The Coming Wave](#), Mustafa Suleyman and Michael Bhaskar, 2023
- [Atlas of AI](#), Kate Crawford, 2021
- [The Changing World Order](#), Ray Dalio, 2021
- [Novacene](#), James Lovelock, 2019
- [Accelerate](#), Nicole Forsgren PhD, Jez Humble and Gene Kim, 2018
- [The Three Body Problem](#), Liu Cixin, 2008
- [The Innovator's Dilemma](#), Clayton M Christensen, 1997

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