QUANTUM ADVANTAGE IN FINANCE

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Many finance professionals are curious about quantum computing—but few know where to start.

Are you one of them?

Here's the business reality:

If you're waiting until quantum computing is "ready" before exploring its potential, you're already behind.

Today, leading financial institutions are already testing quantum techniques in:

• Portfolio optimization

• Quantum-enhanced Monte Carlo simulations

• Quantum machine learning

They're not chasing hype—they're positioning for long-term strategic advantage.

My role is to help you cut through the noise and pinpoint where quantum computing can make a difference now—and what's realistically coming in the next 2–3 years.

If you've been asking yourself:

What exactly is quantum computing, and how is it reshaping finance?

What can QC actually do for us today?

Is it time to build internal capacity—or wait?

What practical steps can we take right now?

Then this book is for you.

Do not hesitate to reach out if you need additional help:

https://www.linkedin.com/in/oswaldo-zapata-phd-quantum-finance/

Oswaldo, May 2025.

QUANTUM FUNDAMENTALS

PLEASE STOP IT: QUBITS ARE NOT "0 AND 1 AT THE SAME TIME"!

In this post, I will explain why interpreting a qubit as a quantum system that is both 0 and 1 at the same time *is incorrect*.

I understand that this is an attempt to convey a difficult concept (quantum superposition) in simple terms.

However, this description is misleading and perpetuates a misconception about the quantum world: that it is a superposition of classical worlds.

This misunderstanding leads to inaccurate statements in quantum computing, such as "a quantum computer tries all possible solutions at once and chooses the correct one."

On a grander scale, some people claim "there are infinite universes at the same time."

Superposition of Motion in Classical Mechanics

Consider a projectile launched at an angle between zero and ninety degrees with respect to the ground.

In his "Dialogue Concerning Two New Sciences," Galileo explained that the motion of the projectile can be described as two independent motions: horizontal and vertical.

Using a Cartesian coordinate system with the x-axis along the ground level and the y-axis vertical, the position of the projectile over time can be expressed as functions of these coordinates.

The projectile's position is given in terms of time, so the horizontal and vertical motions are also functions of time.

It is natural to say that the particle moves "at the same time," or "simultaneously," in the x and y directions.

In modern vector notation, the position vector at any time t is given by:

V(t) = [v_x(t) v_y(t)]^T

This isn’t how things work in the quantum world.

Two Quantum States at Once

Richard Feynman believed that the double-slit experiment "has in it the heart of quantum mechanics."

This experiment, also discussed by David Bohm and John Bell to explore the core ideas of quantum mechanics, was popularized by Feynman in his Lectures on Physics.

It has become a foundational thought experiment for introducing quantum concepts to the general public.

It is used by everyone attempting to explain quantum superposition, from enthusiasts to experts.

I suppose that you are familiar with it.

Pay close attention, as the following argument is fundamentally flawed.

It is claimed that, since photons behave according to quantum mechanics and produce an interference pattern on the screen, the only possible logical conclusion is that they pass through both slits simultaneously.

It is thus natural to mathematically describe their state as a superposition of both possibilities, $|u\rangle$ and $|l\rangle$:

$|\psi\rangle = ½\, |u\rangle + ½\, |l\rangle$.

If the probabilities of passing through the slits are not equal, maybe because one slit is slightly bigger than the other, this is generalized to

$|\psi\rangle = \alpha_u\, |u\rangle + \alpha_l\, |l\rangle$,

where $|\alpha_u|^2$ and $|\alpha_l|^2$ represent the probabilities of passing through the upper and lower slits, respectively.

Photons are, thus, described as being in a superposition of states, namely, passing through both slits simultaneously.

This mathematical framework also applies to other quantum two-level systems, such as qubits.

If a classical bit represents a state of information with values b=0 or b=1, a qubit is a quantum system that exists in a superposition of both states simultaneously, $|0\rangle$ and $|1\rangle$,

$|q\rangle=\alpha_0|0\rangle+\alpha_1|1\rangle$.

More complex systems, such as Schrödinger's cat, can also be described using this principle.

Before opening the box, Schrödinger's cat exists in the state:

$|cat\rangle=\alpha_a |a\rangle+\alpha_d |d\rangle$,

where $|a\rangle$ and $|d\rangle$ represent the "alive" and "dead" states, respectively.

Similar to the motion of a projectile, the states of photons, qubits and cats are described as simultaneously occupying two incompatible states.

The only thing that is correct in this argument is the math.

The physical interpretation is incorrect—at least from the point of view of quantum mechanics!

What Quantum Mechanics Really Tells Us

There is almost no physicist or quantum computing expert who, when talking to non-experts, does not introduce a qubit by saying that it is a quantum system in two classical states, 0 and 1, at the same time.

Previously, I have explained the classical origin of this misinterpretation.

Let me now explain how physicists are introduced to two-level quantum systems.

The approach is historical and within the context of quantum physics.

We learn that two German physicists, Otto Stern and Walther Gerlach, studied the behavior of narrow beams of silver atoms passing through non-uniform magnetic fields.

They discovered that, regardless of the magnet's orientation, the spots on the screen indicated that the beam split into two distinct parts (instead of a continuous beam ranging from maximum to no deflection).

They concluded that this was due to the intrinsic magnetic moment (the spin) of the single electron in the silver atoms, which had two opposite discrete values, say + and -.

Associated with these values are two vectors, denoted $|+\rangle$ and $|-\rangle$, respectively.

Mathematically, the state of the electron before measurement is described by the vector:

$|e\rangle = a\,|+\rangle + b\,|-\rangle$,

where a and b, the so-called probability amplitudes, are complex numbers.

These quantum numbers are not arbitrary; they must satisfy the experimental results.

The fact that a and b are complex numbers is the crucial difference between quantum and classical two-level systems.

As quantum numbers, they can be written as complex exponentials, and the phase difference between them plays a crucial role in the system's "coherence".

Something that does not occur in classical physics.

For example, this explains the interference pattern of electrons and photons in the double-slit experiment.

Notice that there is no mention of time, let alone "in two states at the same time" or "simultaneously."

The description is purely mathematical!

Just like in linear algebra, when we say that a vector A is the sum of vectors B and C, we do not say that A is simultaneously B and C.

The same holds for quantum mechanics.

The description is purely mathematical!

We are taught that quantum mechanics only tells us about the measurement probabilities, not about what happens between the preparation of the quantum system and the measurement.

There are some things in the quantum mechanical way of describing the world that are simply "unspeakable", as John Bell put it.

This is what is amazing about quantum mechanics, not that the qubit is 0 and 1 at the same time or that the electron passes through both slits in the double-slit experiment.

If you do not accept this, you will not be able to understand the true nature of paradoxes like Schrödinger's cat and Einstein's "spooky action at a distance".

Read the original posts and comments for extra details: Part 1, Part 2, Part 3.

IS THE WORLD QUANTUM MECHANICAL?

It is common to hear quantum computing experts stating that quantum mechanics is a fundamental theory of nature.

If you are familiar with popularizations of quantum computing, you may have certainly heard that Feynman said, "Nature isn't classical, dammit, and if you want to make a simulation of nature, you'd better make it quantum mechanical."

This phrase is often used as an ontological justification for the development of quantum computers.

In fact, if the world is quantum, we would rather build a computing machine based on the principles of quantum mechanics.

Well, you might be surprised to know that quantum mechanics (regardless of who says it!) is not a fundamental theory of nature.

Feynman knew this very well, and any high-energy physics student knows it as well.

The quantum mechanics at the foundations of quantum computation and quantum communication is the result of almost three decades of constant struggle by the physicists of the time, including notable figures like Planck, Einstein, and Bohr, to explain nuclear phenomena such as the radiation of black bodies, the photoelectric effect, and the emission spectra of atoms.

The theory was finally formulated by Erwin Schrödinger and Werner Heisenberg in 1925-1926.

However, this theory is not relativistic.

The special theory of relativity was discovered more than two decades before, and physicists knew that the non-relativistic quantum mechanics of Heisenberg and Schrödinger could not be a fundamental theory of nature.

A few years after the formulation of Heisenberg and Schrödinger’s non-relativistic quantum mechanics, Dirac wrote a relativistic equation that generalized Schrödinger's equation for the electron.

The theory predicted the existence of particles with identical mass to the electron but with a positive charge.

This particle, the positron, was soon discovered in 1931 by Carl Anderson.

Despite this experimental success, Dirac's theory of the relativistic electron presented some mathematical inconsistencies that were only resolved many years later by Schwinger, Tomonaga, and Feynman himself.

This theory is called quantum electrodynamics.

Two other theories explain the nuclear forces at a fundamental level, the so-called weak and strong nuclear forces.

The general framework for these theories is known as quantum field theory.

According to Steven Weinberg, one of the greatest theoretical physicists of the second half of the 20th century, "quantum field theory is the way it is because this is the only way to reconcile quantum mechanics with special relativity."

In conclusion, non-relativistic quantum mechanics, the one used in quantum computing, is not a fundamental theory of nature.

It is simply a low-energy limit (velocities much smaller than the speed of light) of more fundamental theories.

Read the original post and comments for extra details.

CLASSICAL VS QUANTUM COMPUTERS

In this post, I want to propose a novel way of introducing quantum computers to non-experts.

Do not panic, though; I hate crackpot theories too!

It's just basic quantum mechanics.

Suppose you want to know the result of performing the double-slit experiment with electrons, but for some reason, you cannot use them.

Perhaps you lack the necessary equipment to produce and control electrons.

Since you have already studied quantum mechanics, you know that in this case, photons behave similarly to electrons.

Thus, you perform the experiment with photons and get the expected result: an interference pattern.

Now, suppose another lab does not have photons, but only classical particles.

The result of the experiment does not show the interference pattern typical of quantum particles.

Knowing that electrons do not behave classically, the director of the second laboratory decides to add additional walls with slits between the classical source and the screen.

After studying the situation carefully, they finally succeed in replicating the interference pattern.

If the problem is to simulate the behavior of electrons passing through a wall with slits, it is clear that you have an advantage over the other lab.

Whenever there is a need to simulate the passage of electrons through two or more slits, you just have to insert walls with the appropriate number of slits, launch the photons, and the electron-like pattern will appear on the screen.

The other lab with only classical particles, however, must carefully analyze the situation and insert many walls to reproduce the electron's behavior.

The conclusion is obvious: you have the advantage because your device can simulate a quantum problem using a quantum system that behaves exactly the same way.

The other lab, on the other hand, only has classical systems, and solving the problem with classical particles is extremely difficult.

This is the essential difference between a classical and a quantum computer: the quantum computer can simulate a quantum system "easily", while it is difficult (or perhaps impossible) for classical systems to do so.

Finally, suppose you want to simulate the behavior of classical particles passing through an n-slit experiment.

Would you use the classical or the quantum system/computer described above?

Of course, you would use the classical computer.

In this case, the classical computer is faster and more precise!

Since we will always be interested in classical problems, classical computers will always be needed.

In some cases, we may be interested in hybrid computers—systems that combine classical and quantum parts to work in tandem to solve problems.

Classical and quantum parts will be devoted to solving the parts of the problem where they are most efficient.

Read the [original post]() and comments for extra details.

A QUBIT IN TIMES OF UNCERTAINTY

Suppose you toss a coin in the air. There are two possible outcomes: Heads (H) or Tails (T).

Assume the coin is fair.

Using ket notation, the state of the coin while in the air is given by:

$|C\rangle = ½ |H\rangle + ½ |T\rangle$.

The coefficients in front of $|H\rangle$ and $|T\rangle$ indicate the probabilities of the coin landing on head or tail once it reaches the table.

If the coin is biased, its state in the air is:

$|C\rangle = p_H |H\rangle + p_T |T\rangle$,

where p_H and p_T represent the probabilities of getting head or tail, respectively.

Since these are the only two possible outcomes, we have:

$p_H+p+T=1$.

Now, let's take this analogy a step further to bring it even closer to quantum mechanics.

We define the state of the coin in the air as:

$|C\rangle = \sqrt{p_H} |H\rangle + \sqrt{p_T} |T\rangle$.

This expression looks very similar to the mathematical description of a single qubit.

It seems that the only difference between the two models is that the coefficients are real in one case and complex in the other.

The similarities are so striking that some computer scientists introduce the mathematics of quantum mechanics using the probabilistic model.

However, despite the resemblance, there is a fundamental—philosophical, if you will—difference between the two:

• In the probabilistic model, uncertainty arises due to our limited knowledge of the system.

• In the quantum model, uncertainty is intrinsic to nature.

In principle, we could build a probabilistic model of computation using complex coefficients—there's nothing wrong with that.

But as long as it's based on a classical physical system, superposition will not carry the same meaning as it does in quantum mechanics.

In a classical system, whether deterministic or probabilistic, a measurement "reveals" the preexisting state of the system.

In contrast, in quantum mechanics, a measurement "fixes" the state of the system.

Once again, just like in the case of "Qubits are not 0 and 1 at the same time," it is not that we do not know the state of the quantum coin while it is in the air.

According to quantum mechanics, asking this question simply does not make sense!

You cannot ask about it—because there is no way for us to know!

Quantum mechanics is rather blunt about this!

Certain classical concepts, like preexisting states before measurement, do not apply in the quantum world.

Read the [original post] and comments for extra details.

QUANTUM COMPUTING AND FINANCE

HOW FINANCE BECAME A FERTILE GROUND FOR QUANTUM COMPUTING

The integration of quantum computing into finance is an intriguing story.

Let’s summarize its key developments.

Quantitative finance as a formal field of study began around the mid-20th century.

Prior to that, investors and financial institutions relied heavily on experience and pragmatism.

There were no quantitative models to anticipate market behavior or predict future prices.

By the 1950s, things began to change.

Finance became more mathematical, and significant advances emerged, such as Markowitz's Mean-Variance Model (1952) for portfolio optimization and the Black-Scholes equation (1973) for option pricing.

An option is a financial instrument where the holder has the right, but not the obligation, to exercise it at a specified time in the future.

From the 1950s to the early 1980s, the role of financial mathematicians was to model the market and refine existing equations.

For example, Itô’s calculus, developed in the 1940s, became widely used in financial mathematics.

In the 1980s, the advent of powerful and accessible computers shifted the focus in the financial sector.

Rather than creating new models, financial institutions began concentrating on solving the equations they already had.

On the hardware side, programming languages like C and Fortran enabled financial professionals to perform heavy computational tasks on computers from companies like IBM and HP.

At the same time, the increasing availability and volume of financial data, with platforms like Bloomberg Terminal (introduced in 1982), prompted a shift towards a more data-driven approach to finance.

Personally, I remember that in the 1990s, when I was studying physics at university, the field of Econophysics was gaining popularity.

The concept behind this field was that physicists, with their mathematical and computational expertise in solving differential equations and understanding stochastic processes, could tackle some of the most demanding problems in finance, particularly with the aid of computers and the vast amounts of financial data available.

The 21st century, largely due to the internet, has been characterized by the ever-growing availability of real-time financial data (e.g., from Bloomberg and Reuters), as well as increasingly powerful computers and advanced software.

One of the major consequences of these technological advancements is the rise of high-frequency trading (HFT), where professionals exploit sub-millisecond market discrepancies to make favorable transactions.

In recent years, we've witnessed the latest computational revolution in quantitative finance with the advent of artificial intelligence (AI), particularly machine learning.

These technologies have enabled more sophisticated analysis, prediction, and optimization in financial modeling.

Read the original post and comments for extra details.

BIG BANKS ARE GOING QUANTUM — WHAT ABOUT THE REST?

JPMorgan, HSBC, Goldman Sachs etc etc.

The usual suspects!

But what about the rest of the banking world?

Are smaller banks being left behind??!?!

Lately, I have seen the image below pop up in my LinkedIn feed.

Click to see the image.

It highlights how major financial institutions have been investing in quantum computing technologies.

This is interpreted as an indication of these institutions’ "readiness" for quantum computing once the technology reaches maturity.

Of course, we all know that leading firms such as JPMorgan Chase and HSBC are investing in quantum computing.

Their efforts are commendable, and we should applaud them for leading this progress.

However, the rationale for adoption is vastly different for small and mid-sized financial institutions.

Unlike JPMorgan or HSBC, these firms don’t have millions to allocate to experimental technologies—nor do they have the same urgency.

Large incumbents, as they are referred to in financial jargon, often face pressure to stay ahead of emerging technologies in order to maintain their competitive edge.

But smaller institutions, paradoxical as it may seem, have the luxury of waiting.

History has shown that, in many cases, it is actually advantageous for smaller players to let industry giants take on the initial risk—absorbing the high costs of early adoption, validating the technology, and refining use cases.

Only when the technology is tested and prices drop do these smaller firms step in, adapting their services and products accordingly.

Read the original post and comments for extra details.

THE AEI PATH TO QUANTUM ADOPTION

Machine learning is often called "the science of acronyms."

That, I'm sure you know!

SL, UL, RL, NN, RNN, SVM, KNN, PCA, NLP, ...

But acronyms not only populate machine learning, they are also common in other areas such as marketing and management.

Every time someone wants to remember the main characteristics of a concept or a process, they come up with an acronym. That's exactly what I have done!

In order to remember the phases of the quantum adoption process, for example, in a bank, I have introduced the AEI acronym:

A. The A stands for **Awareness**.

This is the phase where the bank's innovation team has most probably heard about quantum computing but has not yet delved deeply into it.

The knowledge at this level is rather elementary, and their main concern is to know if quantum computing may affect their operation and when.

This phase is often filled with questions such as "What exactly is quantum computing?", "How will it change our business?", "Is it relevant for us right now?"

E. Exploration is the next, more in-depth phase.

The bank has already surpassed basic awareness and seeks deeper understanding.

Perhaps the innovation team has consumed enough content or even hired a professional in the field.

Now, the focus is on educating technical employees, like quants and IT teams, about quantum technologies.

This may include quantum portfolio optimization, quantum machine learning and quantum cryptography.

I. Implementation is the third phase.

By now, the organization is ready to implement the technical solutions provided by experts from academia, startups, or large companies.

This phase may involve deploying early-stage quantum algorithms or even collaborating with partners in the quantum ecosystem.

Implementation requires a solid foundation of technical knowledge and careful project management to ensure successful integration.

Be aware that the elements A, E, and I do not commute! AEI ≠ AIE.

Moreover, the phases must follow in order and you cannot skip any of them.

For example, if a bank attempts to implement a quantum solution without educating its staff on the fundamentals of quantum technology, the implementation will almost certainly fail in the long run.

I have called this the AEI path and not the AEI cycle.

However, as the bank progresses and adopts new quantum solutions, the AEI phases will repeat.

As with any innovation cycle, new developments will lead to revisiting awareness, exploration, and implementation, which evolve over time.

The AEI path helps me use a structured framework for adoption, starting with raising awareness, progressing to deeper exploration, and culminating in thoughtful implementation

I have introduced the AEI acronym for myself, but feel free to use it if you find it helpful!

Read the original post and comments for extra details.

SELL ME THIS QUANTUM PEN

Everybody is trying to sell you something quantum.

Quantum this, quantum that!

Quantum finance is no exception.

But as I explained in another post: MOST QUANTS DON'T CARE ABOUT QUANTUM.

That's why quantum computer experts interested in its applications to finance must go the extra mile to understand why people aren't buying.

Every salesperson knows that it's not about what you want to sell, it's about what people want to buy.

I remember that in the mid 2000s, Steve Blank, an entrepreneur and educator known for his work on customer development and the lean startup methodology, introduced the slogan "Get out of the building!"

In other words: stop obsessing over what you want to sell and start asking people what they actually need.

This idea was later popularized by the Lean Startup movement.

Of course, this principle applies not just to quantum computing in finance but to any sector where quantum computing and quantum communication have the potential to be transformative.

Only by listening to the market can we understand its needs and accelerate quantum adoption.

Until we do that, quantum computing will remain the domain of BIG BANKS—many of whom are disconnected from reality (sorry from being honest!).

Hardware companies have a huge responsibility: delivering real, tangible results that will propel quantum computing toward practical applications.

Until that happens, quantum computing evangelists/consultants must take responsibility for learning from practitioners in every sector—including finance—and proposing viable ways to enhance the field without making unsustainable claims.

Is it that easy?

Of course not!

But you can't sell a pen to someone who neither needs nor wants it!

Read the original post and comments for extra details.

QUANTUM ADOPTION—DOES SIZE MATTER?

Not all banks are the same, and, of course, we shouldn't expect them to adopt quantum computing in the same way or at the same time.

AEI is an acronym that stands for Awareness, Exploration, and Implementation.

See the post THE AEI PATH TO QUANTUM ADOPTION.

Let's explore how these three phases relate to the size of a bank or financial institution.

1. For small banks, which primarily serve local businesses and individual customers, quantum computing remains mostly an area of curiosity.

Their innovation teams are likely aware of the potential impact of quantum technologies and may have even explored some theoretical applications.

However, due to limited resources and different business priorities, quantum computing adoption typically does not move beyond this Awareness phase.

Could they or should they advance to the Exploration phase?

While each bank's situation is unique, the high costs and current hardware limitations make this unlikely, in my opinion—at least for now.

2. The situation is slightly different for mid-sized banks.

With greater resources and a broader strategic scope, they may choose to take a more proactive approach.

If their innovation team has already a basic understanding of quantum computing's potential applications, they might consider advancing to the Exploration phase.

This phase involves educating their technical teams on the theoretical and practical aspects of quantum computing, keeping up with industry developments by reading research papers or attending conferences, and identifying potential use cases relevant to their business.

Some mid-sized banks may even begin early-stage implementation by collaborating with quantum startups or research institutions, experimenting with cloud-based quantum processors, and running quantum algorithms for finance, such as portfolio optimization or quantum machine learning.

3. As you may know, larger banks, with dedicated R&D budgets and long-term innovation strategies, are already investing in quantum computing.

But what exactly are they doing?

In conclusion, when it comes to quantum adoption, size definitely matters.

While small banks remain in the Awareness phase, mid-sized banks are likely ready to Explore, and big banks can move toward Implementation.

The journey to quantum adoption is not one-size-fits-all, and each institution must assess its needs, risks, and potential benefits.

Read the original post and comments for extra details.

6 REASONS WHY YOUR QUANTUM ADOPTION PLAN SUX!

I'm here on LinkedIn because I love learning from people like you — people with different backgrounds, different industries, and fresh perspectives.

That's exactly what makes this space so valuable!

The other day, while scrolling through my feed, I came across an article by Wasim Mushtaq.

Wasim has worked in the innovation departments of several financial institutions — exactly the kind of experience I'm trying to learn more about right now.

No, he doesn't talk about quantum computing.

But I think many of the lessons he shares apply perfectly to those of us working on quantum adoption strategies.

Here are 6 common innovation mistakes and why I think they totally apply to quantum:

1. Innovation cannot thrive in an isolated team.

That's why quantum adoption must start with company-wide education.

It's a cultural shift — not a pet project.

2. Quantum is not the end goal.

The goal is customer value and quantum is just a (powerful) tool to get there.

3. Adoption must grow gradually.

Start with education and then move toward practical implementation.

Don't try to quantum-transform overnight.

4. It must align with long-term strategy.

If it's not part of the company's long game, it'll never stick.

5. Find the why, then find the partners.

Don't start with the tech vendor and try to make it fit.

First ask: Why does quantum matter to us?

6. It takes the whole organization.

Not just leadership.

Not just R&D.

Middle management and operations need to understand quantum's potential or they'll block progress without meaning to.

What do you think?

Have you seen other mistakes companies make when trying to adopt cutting-edge tech?

Are you afraid of making these mistakes?

Read the original post and comments for extra details.

TRUE: MOST QUANTS DON'T CARE ABOUT QUANTUM!

In other posts we have already discussed some of the reasons why small and mid-sized financial institutions are hesitant to adopt quantum computing.

In this post, I want to bring a more personal perspective to this discussion and share my experiences interacting with quants.

Most of the quants I have met are either skeptical or simply indifferent to quantum computing.

That's a fact!

They are not actively seeking to learn about the "so-called quantum speedups", nor do they see an immediate reason to do so.

Some find the topic interesting, yes, but they do not see an urgent need to invest time in it.

I understand them.

Their workloads are already demanding, and they see quantum as a risky investment of time (especially when they keep hearing that practical applications are still decades away!).

In many cases, it is not because they find the subject too difficult.

Some quants are physicists with PhDs in quantum topics, meaning they could pick up the basics of quantum computing in a few months, if not less.

Yet, as a physicist friend of mine who has spent two decades in quantitative finance put it:

"Honestly, I don't care about that quantum computing stuff."

(My free translation from Italian.)

As we know, it is normal for new scientific paradigms to face skepticism before gaining traction.

And quants have a range of reasons for resisting the quantum paradigm, from valid technical concerns to personal biases.

For instance, many of them are focused on well-established classical techniques that already deliver strong results.

They rely on stochastic calculus, machine learning, and optimization methods that work today, whereas quantum computing is still largely experimental.

Some other reasons are purely subjective.

One quant told me bluntly that many of these new “quantum professionals” don’t even know quantum mechanics properly or how to program in C!

I recall an interview with Román Orús, a well-known expert in quantum computing for finance, where he shares a story about visiting a bank executive to discuss quantum computing investment opportunities (or something like that).

After greeting him, the executive immediately dismissed the topic, opened his tablet, and started playing video games.

That was several years ago, but honestly, I don't think much has changed.

Read the original post and comments for extra details.

NISQ ADVANTAGE (IN FINANCE)

I am all in for theoretical results!

But, is it completely useless to pursue practical quantum computing research (such as applications in finance) until a solid demonstration has been found for most algorithms with expected practical impact?

The quantum advantage of several quantum algorithms has been formally proven.

For example, we all know that Shor's algorithm provides an exponential speedup over the best-known classical algorithms for factoring large numbers.

We also know that Grover's algorithm offers a polynomial speedup for unstructured search problems.

However, many (if not all) of the quantum algorithms with near-term practical applications, such as portfolio optimization and quantum machine learning, have not yet been rigorously proven to outperform classical counterparts.

Does that mean, then, that research should stop until we have formal proof of their advantage?

Should we prioritize proving mathematical advantage first, or is there value in exploring applications despite the uncertainty?

There are several compelling arguments in favor of continuing research:

1. Many breakthrough technologies were developed before their theoretical foundations were fully understood.

For instance, the transistor revolutionized electronics long before the full understanding of semiconductor physics was established.

Similarly, quantum computing could benefit from exploratory research and experimental validation

2. Insights from machine learning: In classical AI and machine learning, empirical results often precede theoretical guarantees.

Deep learning, for example, achieved remarkable success before we had a solid theoretical framework explaining why it works so well.

The same approach could apply to quantum algorithms—practical experimentation might guide theoretical breakthroughs rather than the other way around.

3. Perspectives from the quantum computing for finance community: Industries like finance are already exploring quantum algorithms for portfolio optimization, Monte Carlo simulations, and machine learning.

Financial institutions are not particularly interested in whether a practical problem can be solved faster by a classical computer.

This information is irrelevant if the computer cannot be practically built or if competitors cannot access it.

What matters is having a quantum computer that outperforms the classical or quantum systems of the competition.

In some cases, it's sufficient to have a faster solution, even if it isn't the most precise one.

This could be especially valuable in high-frequency trading, where speed often outweighs precision.

These are some of the arguments in favor of NISQ algorithms, in particular, in finance.

Read the original post and comments for extra details.

ADOPT QUANTUM NOW BEFORE IT'S TOO LATE

Look at the picture below and tell me: how many of these objects do you recognize?

For the older among you, how many did you use?

All of them have something in common: they disappeared from the market!

As you may know by now, I am not an alarmist, and I am not claiming that "in a matter of years, quantum computers will allow us to travel in multiple dimensions at speeds faster than light!"

But quantum computing is a reality, and it must be taken seriously.

I believe that financial institutions need to start adopting quantum technologies sooner rather than later.

It is not an exaggeration to say that, in this case, the old proverb fits:

"Yesterday was the best time, today is the second best, and tomorrow may be too late."

In marketing, they always teach that you should focus on the pain your potential customers are feeling.

Your goal is to stress that pain and then convince them that your product or service alleviates or eliminates it.

But what if there is no pain?

This is the problem with emerging technologies: at the moment, there is no pain.

But what about later?

When will practical quantum computers be a reality?

3, 5, 10, 20 years? Nobody knows for certain.

Honestly, this is extremely difficult to evaluate.

Look, here's the thing: Are financial institutions, from small to large ones, ready to suffer the fate of the products in the picture below?

Not that long ago, these were top products from leading companies.

Because they failed to adapt to new technologies, they disappeared!

And in some cases, their companies disappeared with them.

I still remember that in the late nineties, every Friday evening after college, we used to stop by Blockbuster to pick up movies for the weekend.

And traveler's checks?

Even more obsolete!

Just 25 years ago, I remember traveling to a "high-risk country."

To avoid losing my money in case I got robbed, I took a couple of traveler's checks with me. Ah, the good old days!

I have plenty of these stories, and I'm not that old!

When was the last time you signed a check, visited a physical bank branch to transfer money or opened a new account in person?

Some friends outside the quantum computing field tell me that quantum computing advocates use a kind of light "campaign of fear" to promote quantum adoption (similar to how mass media companies have made millions with such strategies).

Even though I hate to use overused phrases, in this case, it is fair to say that when it comes to quantum computing:

"The question is not if, but when.”

Read the original post and comments for extra details.

MISCELLANEOUS QUANTUM TOPICS

ABOUT THE QUANTUM COMPUTING HYPE

I know a thing or two about hype in physics: I have a PhD in string theory!

Over thirty years ago, I read two recently published books by Michio Kaku, "Hyperspace" and "Beyond Einstein", where he discussed string theory.

These books gave me the final push to embark on a long journey that culminated in earning my PhD in string theory and several postdocs.

However, Michio Kaku has a tendency to be overly enthusiastic and, at times, misleading.

This was true with string theory and seems to be happening again with quantum computing.

Kaku tends to oversimplify both the subject matter and the role of science in society.

A critique also noted by Scott Aaronson.

Search for his blog post: “Book Review: ‘Quantum Supremacy’ by Michio Kaku (DO NOT BUY).”

Quantum computing is still an emerging technology (don't forget it!) and I believe governments and businesses are doing their best to promote it without veering too far into hype.

As long as theoretical and experimental progress continues, the interest of governments, research institutions, and businesses will naturally grow.

Will useful quantum computers be ready in the next 15–30 years?

Nobody knows.

Fortunately, we are in an excellent moment for quantum computing, and we should do as much as we can to promote it.

However, we must always keep in mind that, as evidence suggests, we are still far from truly "crossing the chasm".

Read the original post and comments for extra details.

IS QUANTUM COMPUTING HYPE EVERYWHERE?

I don't know about you, but I have become increasingly paranoid about quantum computing hype!

Last week, a review paper on Quantum Machine Learning was brought to my attention.

At first glance, it seemed well-written—so much so that I think it can become one of my go-to references on the subject.

But then I decided to read it more carefully, starting from page one, and that's when my "HYPE DETECTOR ALARM" was triggered!

This is how it starts:

"The advancement of computational power has always been a driving force behind every major industrial revolution."

This immediately reminded me of the time when I used to be fascinated by the unification program.

Of course, I am talking about string theory.

Back then, I had learned to repeat the most unsupported claims about unification.

For example, I remember Steven Weinberg saying that just as Newton unified celestial and terrestrial physics, and Maxwell unified electricity and magnetism, contemporary physicists were in search of the unification of all the forces of nature.

For Weinberg and other supporters of a "final theory," this was seen as the natural continuation of a long and respectable tradition. It was a sort of duty to do it!

These kinds of historical reconstructions are very common in science (let alone in politics).

They are particularly prevalent in scientific programs that are still in an immature stage of development, where they must rely on dubious arguments to gain support—both within the scientific community and among the general public, including young talent.

That's exactly how I felt when I read the sentence about the "advancement of computational power" driving "every major industrial revolution."

From what I know, the Industrial Revolution began in the mid-18th century in Britain, characterized by the mechanization of the textile industry and the development of steam power.

This was followed in the second half of the 19th century by the expansion of the steel industry and the electrification of industries and society.

That’s what I remember from what I have read!

Of course, this is a classic economic-driven approach, but I think most people would agree with it.

Now, I understand that all these technological advances require scientific progress, and to some extent, they may also depend on increases in computational power.

But is it really true that "the advancement of computational power has always been a driving force behind every major industrial revolution"?

I'm not so sure.

In fact, I highly doubt it!

Maybe you know better and have a couple of references to support this claim.

If so, please share them below.

From what I know, the Industrial Revolution lasted for almost two centuries before computational power had any real impact on the way modern industries and societies functioned—with the advent of modern computers in the mid-20th century.

Read the original post and comments for extra details.

WHO IS THE GREATEST QUANTUM COMPUTING SCIENTIST EVER?

Ranking scientists has always been a common topic of debate: Einstein, Newton, Boltzmann, Euler, Darwin, Curie, Freud, ...

This fascination with ranking individuals clearly arises from the way history has always been written—emphasizing the actions of key figures: Pericles, Alexander the Great, Constantine, ...

We see similar questions everywhere:

Who is the greatest philosopher of all time?

Who is the greatest chess player of all time?

Who is the greatest athlete of all time?

Personally, I find ranking scientists in this way rather pointless.

However, such rankings reveal something interesting: the values and sentiments of the scientific community.

For example, if you tell me that Dirac is the greatest physicist of the 20th century,

I understand that you prioritize quantum mechanical transformations—from particle physics to quantum computing—over singularities in spacetime or the large-scale structure of the universe.

That's exactly what I want to explore with this poll: a small experiment in quantum computing sentiment analysis.

In these rankings, having a Nobel Prize often places scientists at the top.

More recently, the Breakthrough Prize in Fundamental Physics has also gained credibility in the scientific community.

In 2022, Peter Shor, and David Deutsch were awarded the Breakthrough Prize for their contributions to quantum computing.

They are undoubtedly among the most important scientists in the field.

See the original post for the poll results.

WTH! A STRING THEORIST DOING QUANTUM COMPUTING?

It's fascinating to see how people from vastly different backgrounds end up working in quantum computing.

You name the field!

There's someone out there now doing quantum computing.

In my case, about six years ago, I was deep into string theory and black hole radiation when I started thinking seriously about quantum computing.

For those unfamiliar, string theory is a theoretical model for the quantization of gravity and the unification of all the fundamental forces of nature.

What surprised me the most was the way most theoretical physicists in string theory and black hole research casually used the word "information."

For example, they could just start by saying, "a qubit is the most basic unit of quantum information."

They spoke as if everyone in physics should know exactly what information meant in that context.

Honestly, I felt a bit stupid.

Despite years of studying physics, I felt dumb for not knowing what quantum information was.

In fact, most physics curricula don't teach you about information (unless you're doing something like computational or quantum information theory).

Only recently have standard textbooks on quantum mechanics begun to include discussions on quantum information and related topics.

So, I started reading online reviews, bought a few books, and dove in.

Now here I am: writing about quantum computing!

Read the original post and comments for extra details.

I DON'T CARE ABOUT QUANTUM EDUCATION!

That's what an investor from a developing country told me.

At first, I thought he was completely off.

But the more I thought about it, the more I started to understand where he was coming from.

Here's what I realized:

1. Education takes time.

High school and college-level training in quantum tech might take years before producing any real results.

Investors usually want returns on a much shorter timeline.

2. It's not just up to the private sector.

Building a strong education system for something like quantum computing needs serious government involvement.

And let's be honest: private and public interests don't always align.

Sometimes they even clash.

That's a risk many investors would rather avoid.

3. No jobs = brain drain.

If there's no local industry or research ecosystem for quantum technologies, even the brightest students might end up leaving or switching fields.

The talent goes elsewhere, and the country loses out.

To me, it feels like a chicken-and-egg problem:

Should developing countries start by building up education in quantum tech?

Or should they first create industry demand and then train people to fill those roles?

Or maybe both at the same time?

This isn't just about quantum computing, by the way.

I've seen the same dilemma play out in other tech areas across different developing regions.

Some made it work.

Others didn't!!

One thing I do believe strongly: there's no one-size-fits-all approach.

What works in the U.S. or Europe won't necessarily work elsewhere.

So I'm curious — what do you think?

How should developing countries approach quantum adoption?

What role should education play?

How can private investors help move the needle?

Read the original post and comments for extra details.

IF I HAD TO START ALL OVER AGAIN!

Have you ever come across a YouTube video where someone (probably someone you've never heard of) shares what they would have done differently if they had to start over, given the knowledge they have today?

Well, this post is along those lines.

Honestly, giving advice is one of the most uncomfortable situations I can find myself in, but young students have asked me, and I hope I can help.

In my case, before transitioning to quantum computing, I studied string theory and devoted a significant part of my life to teaching theoretical physics.

Would I then recommend that someone follow the same path if they want to work in quantum computing?

Maybe not.

But does this mean that, given the chance to go back in time, I would be glad to throw away everything I know about general relativity, particle physics, and differential geometry? Hell no! Never!

Recently, I've noticed that there's a growing trend of launching master's and PhD programs specifically tailored for those who want to become "experts" in quantum computing.

These programs aim to meet the market's demand for the most efficient way to learn quantum computing and start doing research.

This is a reality, but the market push is not always the best guide for making career decisions.

In fact, from what I've seen, much of this teaching remains quite superficial, spread thinly across many topics.

If I had to give advice, I'd say: choose a solid foundation based on your interests.

Some obvious choices are:

• Physics if you're drawn to hardware development.

• Computer Science if you want to focus on coding and algorithms.

• Mathematics if you're passionate about complexity theory.

Learn the nitty-gritty of one of these subjects first, then transition fully into quantum computing.

This way, you'll be able to make meaningful contributions in the long run, without solely relying on the true expertise of your peers who have studied one of the traditional fields mentioned above.

What if you want to study particle physics, astrophysics, or any other research field that's not directly connected to quantum computing?

Absolutely, why not?!

But I'd only recommend them if you're truly passionate about the subject, to the point that you don't mind how long it will take to master it.

I may sound cliché, but the most important thing is to enjoy every day of your life, so much so that your passion becomes your work.

Read the original post and comments for extra details.

arXiv—TO POST OR NOT TO POST?

Many people have asked me why my notes on quantum computing are not published or even available on arXiv.

Before I explain the reason, let me share a story.

Last week, while searching for references for a survey paper on "Quantum Computing for Finance" that I am writing, I came across a paper on arXiv.

The authors heavily use ChatGPT and the paper is full of mistakes.

However, what stood out most was something I had never seen before (if you're aware of this practice, please, let me know in the comments): there are references that don’t exist!

For instance, the paper cites works by "John Smith", "Sarah Johnson," and "Michael Brown," with titles and journal names full of keywords such as "Quantum Computing," "Quantum Information Science," "Quantum Computing and Information," "Machine Learning," and "Quantum Machine Learning."

I tried to find these references to take a look, but I couldn’t find them anywhere—other than in the paper itself.

After digging deeper, I realized that these "papers" were never actually published.

They were certainly fabricated for SEO (Search Engine Optimization) purposes!

Now, why aren’t my quantum computing notes on arXiv?

Here’s the story:

I submitted the second part, but arXiv claimed it was too similar to the first part (which appeared already on arXiv) and advised me to update the first part instead.

When I explained that the two parts (each with almost 70 pages) didn’t even share a single line, they threatened to revoke my right to submit papers in the future if I tried again.

I don't know how arXiv operates and, honestly, I don’t even care anymore.

If I want to publish something, I will post it here on LinkedIn to share with you or submit it to a proper peer-reviewed journal.

Read the original post and comments for extra details.

DON'T USE CHATGPT TO WRITE YOUR QUANTUM COMPUTING PAPERS!

I was recently reading a paper on quantum computing, and I couldn't resist commenting on this.

Here's an extract from the paper:

"Leveraging non-classical properties such as entanglement, superposition, and interference, quantum algorithms offer the potential for substantial speedups, sometimes exponential, over classical computing counterparts."

This is 100% AI-generated, no doubt about it.

It’s dull and flavorless.

I have been writing about many things, not just theoretical physics or quantum computing, for a very long time.

Long before ChatGPT was even a dream.

And yes, I still "enjoy" the painful process of writing, revising, and editing the same lines dozens of times.

Before ChatGPT (just last year!), I used to send my final drafts to a professional copy editor. A process that took both time and money.

Today, ChatGPT has only changed one thing for me: I no longer need to hire a copyeditor for that final polish.

But that’s where it ends.

If you use ChatGPT to assist with your writing, be smart about it.

If it generates sentences like the one quoted above, just DELETE THEM!

I mean, only if you care about your reputation!

Read the original post and comments for extra details.

QISKIT VS CIRQ

Maybe some of you can help me with this question:

Why is Qiskit more popular than Cirq?

To me, their main features and advantages look rather similar:

1. Cirq by Google, like Qiskit by IBM, is backed by one of the largest tech companies in the world, with a proven track record of breakthroughs in quantum computing, including the proof of quantum supremacy with Sycamore and Willow.

2. Cirq offers a Python-based interface that integrates seamlessly with Google's quantum hardware (like Qiskit with IBM hardware), making it, at least in principle, appealing to students and professionals from diverse fields.

3. Cirq, like Qiskit, is open-source, allowing users to contribute to its development and use it for creating and running quantum circuits, whether on quantum computers or simulators.

4. Finally, like Qiskit, Cirq also integrates with other quantum computing platforms and tools.

Despite these similarities, Cirq lacks a large, established, and collaborative community of researchers and developers compared to Qiskit.

But why?

While it's difficult to pinpoint the exact reasons for Qiskit's broader popularity, I think that it's likely its strong educational resources and greater community support have made it a more widely adopted choice in the quantum computing developer community.

Read the original post and comments for extra details.

IS QUANTUM COMPUTING CROSSING THE CHASM?

Every time a new technology is developed and introduced to the market, there are always groups ready to adopt it, even at the early stages when the product is incomplete and the future uncertain.

On the other hand, there are those who, for various reasons, vehemently reject the idea.

These are two extreme cases: the early adopters (13.5%) and the laggards (16%). Most people, however, fall somewhere in between these extremes.

In fact, the majority of people will adopt the technology at an intermediate stage of its development.

Some will adopt it earlier—referred to as the early majority (34%)—and others later, known as the late majority (34%).

Before these large groups, there is a minority: the innovators (2.5%), who create and initially use the new technology.

Regarding quantum computing, it has already moved past the innovators stage, with more people beginning to believe in its potential and adopting it.

Among the innovators, we can include companies like IBM, Quantinuum, D-Wave, and IonQ, which are developing quantum hardware.

In the early adopters group, we can mention financial institutions such as JPMorgan and HSBC and startups like Quantum Signals and Multiverse.

Despite this, evidence shows that the vast majority of businesses are still reluctant to take action and start investing.

This reluctance explains why many leaders in the field—both individuals and small and large companies—devote significant time, energy, and budgets to promoting the potential benefits of quantum computing for businesses.

Read the original post and comments for extra details.

QUANTUM FUTUROLOGY: SCIENCE OR SCI-FI?

Let's be honest: one thing is what we wish for, and another is what will actually happen.

Today, I want to discuss an interesting article I recently read about the benefits that AI investments have had on private organizations across various sectors.

This is based on serious research—not wishful thinking.

Pay close attention to the points below, and try to extrapolate them to the future of quantum computing.

It's important to remember that AI, compared to quantum computing, is a much more mature field.

What I will be discussing regarding AI could be the reality for quantum computing in 5 or 10 years.

The study I am referring to found several key insights:

✓ Larger Firms See Higher ROI from AI Investments

The larger the firm, the higher the proportional return on investment.

This means that for the same amount of money invested, bigger firms tend to see a larger return.

"AI contributes to the increase in industry concentration and the rise of 'superstar' firms."

The origin of this advantage lies in the ownership of large datasets, extensive research teams, and advanced infrastructure.

Smaller firms are at a competitive disadvantage, and I would even argue that smaller companies may be wasting money investing in AI at this point!

This mirrors the disparity we have seen between large and small banks in quantum computing investments.

✓ AI Drives Product Innovation

Firms that invest in AI are creating new business opportunities, particularly through product innovation, as evidenced by the increase in patents and trademarks related to new products.

This is a direct result of AI's ability to accelerate R&D processes and generate new products.

Quantum computing could similarly unlock new forms of innovation in the future, especially as it matures.

✓ AI Increases Market Share

AI helps firms to capture a larger market share.

What AI does not do:

✘ AI Does Not Directly Increase Productivity

Unlike technologies such as electricity or robotics, AI has not led to a clear and direct increase in productivity.

Firms may not see immediate improvements in efficiency just from investing in AI.

✘ AI Does Not Lower Operational Costs

In fact, the opposite tends to be true!

As firms invest more in AI, operational costs often increase, including labor costs.

So, while AI can bring new capabilities, it doesn’t necessarily mean a reduction in the cost of running a business.

I found these conclusions particularly interesting, especially for those within the quantum ecosystem who predict the transformative potential of quantum computing without fully exploring what it truly means for quantum computing to be 'transformative'—particularly in the context of private organizations.

Read the original post and comments for extra details. The link to the paper is in the comments.

HOW TO KEEP UP WITH QUANTUM COMPUTING PROGRESS?

Yesterday Microsoft unveiled its new topological quantum chip.

Great news!

A couple of weeks ago, Huang from Nvidia and Zuckerberg from Meta shared their expectations for quantum computing applications in solving practical problems and everybody was talking about it!

A few weeks before that, Google made waves with its Willow quantum supremacy experiment. Wow!

And so on and so forth.

You get the point.

Now, if you add all the news from nearby fields, such as AI, there’s more than enough material to spend our whole day reading stuff here on LinkedIn or searching the web.

The question, then, is relevant:

How can we keep up to date and stay well-informed with so much information?

I’m sorry to disappoint you, but you can't!

You can't fully understand how Willow works and proves quantum supremacy while also grasping the physics behind Microsoft’s new topological chip at the same time.

If by chance you’re an expert in both areas, you’ll certainly know about both.

But I’m sure that in a couple of weeks, there will be a new breakthrough in another area of quantum computing that you won’t be able to fully understand either.

We just have to accept it!

So, what can we do?

Here’s what I do:

I accept that I can’t know everything in the field and, this is important, I put that into practice.

For example, if someone asks me about a topic I don’t know enough about, or if I find myself in a conversation (offline or online) about something unfamiliar, I simply shut up or say that I don’t know.

There’s nothing worse than pretending to know about something when you barely know anything about it.

Here’s how I stay informed: I follow a few reliable people here on LinkedIn and read carefully what they share (of course, when appropriate).

That's it. I read them, and then I move on to my own things.

Another excellent way to stay informed is to participate in events such as the Quantum Innovation Summit in Dubai.

To sum up, this is what I do: I read reliable sources, attend quantum computing events (mostly online) and accept that I can't know everything.

Honestly, I could write a long list of topics concerning quantum computing that I know little about.

But the same goes for you!

Read the original post and comments for extra details.

ONLY THOSE WITH FEW IDEAS ARE AFRAID OF PLAGIARISM!

Plagiarism is not the same as piracy.

Plagiarism is when someone takes part (or sometimes all!) of your work and presents it as their own.

It's despicable, sure. But honestly, there's not much you can do about it.

Many years ago my father was a consulting engineer and he had a proposal he used to present to potential clients.

One day, a client called him and said:

"Hey, someone else just presented your exact program to us!"

It was the same, they only changed the name of the company!!!

But, don't be too surprised:

That's like watching your favorite politician's program being copied by their opponent.

Or vice versa!

Now, back to the point.

A few months ago, when I shared my notes on quantum computing, https://lnkd.in/dyRPBS7s, many people warned me:

"Be careful! Someone might plagiarize or pirate your content."

As I said, you can't stop plagiarism.

No one wants to waste time and money chasing down copycats—unless you've written a New York Times bestseller (which, for the record, I haven't!).

Now, suppose my notes are published by a well-known publisher.

Would that stop people from copying and sharing them without permission?

I doubt it!

So, I've made a decision.

Today, I'm giving away my personal notes on Quantum Computing for Finance — for FREE.

You can download them.

Share them.

Send them to your friends.

I don't care!

I've got more ideas.

I can always make more!

In fact, if you do download them, please share them with your network.

Read the original post and comments for extra details.

ARE WE WRONG ABOUT QUANTUM COMPUTING BENEFITS?

The other day, just before my flight, I picked up a special issue of Harvard Business Review (HBR) titled "The Year in Tech, 2025."

Like many of you, I was excited about the possibility of finding something about quantum computing (QC) and its potential "to transform nearly every industry in today's world."

Well... do you know how many articles were about quantum computing?

None!

And, do you know how many times they mentioned quantum computing?

Not even once!

For those of us who spend our days thinking about QC, this is disappointing.

It raises a tough question:

Is quantum computing truly important, or are we just delusional?

Is it just useful for Michio Kaku to make more money selling books, rather than for practical applications?

What Are We Getting Wrong?

As I have emphasized in previous posts, I think that one major issue is the lack of honest interaction with end users.

Not to try to sell them something, but to really listen to them!

For example, in finance, most quants don’t care about QC—and it seems not much has been done to change that (see my post TRUE: MOST QUANTS DON'T CARE ABOUT QUANTUM!).

The HBR edition I bought had an article titled "What is Responsible Computing?" that struck me as particularly relevant to this discussion.

Let me quote part of their conclusion:

"Firms can use the responsible computing framework to make their IT more green, ethical, trustworthy, and sustainable.

The following pillars can help you become a responsible computing provider: ..."

Here are two of those pillars:

1. "Assess and track energy sources, energy use related to cooling, and water usage."

If quantum computers are expected to consume significantly less energy than classical computers for certain computations, why isn’t this being promoted as a key selling point?

With AI’s energy consumption continuing to rise, shouldn’t we be presenting QC as a more sustainable alternative to classical computing?

Even if not yet practical, it could at least serve as a compelling investment narrative.

2. "Understand the ethical, legal, and social responsibility of processing and storing data."

Since quantum communication has been shown to be more secure than classical communication, why isn’t this part of the selling proposition for quantum technologies?

These are two clear areas where QC could outperform classical computing, yet we rarely hear them emphasized in public discussions (particularly the first one).

Maybe we should stop talking about quantum speedups over classical computers and start positioning QC from a more practical perspective:

✘ Computational acceleration.

✓ Energy efficiency.

✓ Stronger security.

Would shifting the conversation in this direction make QC adoption more appealing to investors and industries?

Read the original post and comments for extra details.

CHINA'S QUANTUM LEAP: A 15-YEAR JOURNEY

From 2009 to 2012, I lived in China.

While doing research, I was contacted by a private school to help prepare high school students who wanted to study at U.S. universities.

Most of them were Taiwanese, Hong Kong, and Singaporean students of Chinese origin living in Beijing.

I was genuinely surprised by how advanced these students were—bright, motivated, and already thinking deeply about science and technology.

After I left Beijing, I continued teaching online.

Over the years, more and more students from mainland China began reaching out.

Almost all of them went on to attend some of the most prestigious universities in the U.S., studying physics, electrical engineering, and computer science.

Some are still there today, and I'm very proud to have played a small part in their journey.

Since then, I've returned to China several times—a country I continue to hold close to my heart.

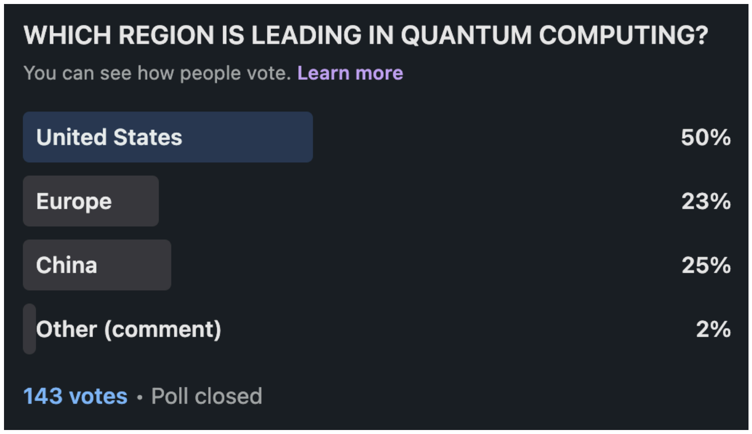
I share this story because 15 years ago, when I first moved to China, the country had almost no visible development in quantum computing.

Fast forward to today, and there's global concern that China might be leading the quantum race!

It shows what focused government support and national determination can achieve—even in the most advanced areas of science and technology.

Read the original post and comments for extra details.

WHICH REGION IS LEADING IN QUANTUM COMPUTING?



Read the original post and comments for extra details.

LISTEN TO THE PODCASTS

PODCAST 1: QUANTUM COMPUTING & FINANCE

PODCAST 2: WALL STREET VS BIG TECH: THE QC BATTLE

PODCAST 3: THE COST OF NOT ADOPTING QC

PODCAST 4: THE TRIPLE HELIX OF QUANTUM COMPUTING

PODCAST 5: FROM CLAY TABLETS TO QC. THE EVOLUTION OF BANKING

PODCAST 6: FROM GUT FEELING TO QUANTUM FINANCE

PODCAST 7: ARE BANKS PREPARED FOR THE QUANTUM APOCALYPSE?