A Practical Guide to Quantum Technologies for Finance Professionals

André Costa
John Galani
Frédéric Van Weyenbergh
Oswaldo Zapata

The Quantum Finance Boardroom

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André Costa,[2] John A. Galani,[3] Frédéric Van Weyenbergh,[4] and Oswaldo Zapata.[5]

1. Introduction

Quantum technologies are on the threshold of becoming relevant for the financial industry, opening the door to first-mover advantage and its related increasing returns and decreasing costs — from portfolio optimization to better derivative pricing, from stress testing to post-quantum cryptography (PQC) and cybersecurity, **from lucrative investments in quantum sensor to biotech**.

Most finance professionals don't need to become physicists, data scientists, or programmers to benefit from it. What they need is a clear, practical way to understand the technologies' implications and prepare for both the opportunities and risks they bring.

This paper provides a roadmap for finance professionals who want to engage confidently with quantum technologies (computing, sensing, and communication). It highlights common pitfalls to avoid, outlines the essential steps to take, and shows how to leverage financial expertise while building just enough quantum literacy to follow developments, evaluate opportunities, and engage with technical specialists.

2. What to Do and What Not to Do

From our experience working with finance professionals, the biggest challenge is rarely a lack of interest — it's uncertainty about where to start. Even more damaging than doing nothing is choosing the wrong path. Doing nothing may lead to procrastination, but pursuing the wrong approach often results in frustration and disappointment. And since frustration is much harder to recover from than procrastination, let's address that risk first.

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[1] All contributing authors are members of *The Quantum Finance Boardroom (TQFB).*
[2] Free Enterprise Advisor, Founder and Director. Co-founder of *TQFB*.
[3] City University MSc Shipping, Trade and Finance. CFO Hermanos Commodities DMCC (upstream transition fuels). Consultant for Quantum Exponential.
[4] quantonomiQs, Co-founder and Managing Partner.
[5] Quantum Finance Educator and Co-founder of *TQFB*.

What Not to Do

A common misstep comes from a very natural but misguided inference: “If quantum computing for finance is important, I should study quantum computing in depth to get ahead.” Unfortunately, that’s a serious mistake. Becoming fluent in quantum mechanics takes years of advanced study, is counterintuitive to most people, and much of that effort focuses on concepts physicists care about—not on the issues that matter to finance. The truth is, you don’t need to master the technical underpinnings of quantum theory to understand its impact on finance or to play a meaningful role in shaping its applications.

Another trap is information overload. Knowing that quantum computing is difficult, many professionals consume too much material—from solid online articles to questionable YouTube videos. It’s an easy rabbit hole to fall into: the content is accessible, fascinating, and often misleading. Worse still, misconceptions aren’t limited to dubious sources; even reputable outlets sometimes promote overhyped claims. Debates about interpretations of quantum physics or catchy phrases like “the electron is everywhere at the same time” may sound intriguing, but they add little to business or investment decisions. For finance professionals, it’s best to avoid this type of content altogether.

If misconceptions about quantum physics are one side of the coin, misconceptions about computing are the other. Media coverage often emphasizes big banks partnering with hardware companies or experimenting with algorithms for tasks like portfolio optimization or derivative pricing. From this, many conclude that the only way forward is to learn programming. And since Python dominates the conversation, the assumption becomes: “I must learn Python.”

That conclusion is also misguided. Not every finance professional needs to program quantum algorithms to benefit from the quantum ecosystem. In fact, focusing prematurely on coding can distract from what really matters.

A final wrong turn is deciding to purchase a generic book on quantum computing and trying to learn the subject from scratch. This is usually even less effective than teaching yourself quantum mechanics or programming in isolation. Without context, the effort is harder, less relevant, and more likely to end in discouragement.

The real opportunity lies not in mastering physics, coding, or generic textbooks, but in the intersection of technology and its applications: quantum computing for finance. Professionals can leverage their strongest asset—their financial expertise and business orientation—while building just enough quantum literacy to understand real applications, assess opportunities, and engage confidently with technical specialists.

With those pitfalls out of the way, let’s now turn to the more productive question: what to do next.

What To Do

Finance professionals should approach quantum computing step by step, focusing on practical knowledge rather than trying to master all the technical details at once. The goal is to stay flexible, learn what matters most for finance (what are the top priorities of C-suite executives?), and avoid getting lost in unnecessary complexity.

Quantum computing for finance is a vast and fast-moving field, and the worst strategy is to try to navigate it entirely on your own. Learning in isolation can be slow, confusing, and ultimately discouraging.

The smartest first step is to connect with a trusted community of people who are already on this journey. Engaging with peers allows you to exchange ideas, gain perspective, and learn directly from those who have faced similar challenges. For example, you can join ***The Quantum Finance Boardroom (TQFB)***, an online community where professionals share knowledge, resources, and practical guidance. Taking a broader perspective, thinking collectively about solutions, and acting as an interconnected ecosystem are essential to achieving lasting success—both individually and at the level of financial institutions. This is an organic reflection built around one key word: community.

Remember, success in this space depends not only on what you do but also on avoiding the wrong turns we discussed earlier. Surrounding yourself with a reliable network ensures that your learning stays focused, relevant, and aligned with the real opportunities in quantum computing for finance.

When it comes to the basics, it's important to remember that quantum technology goes beyond "faster" computing. The field also includes quantum communication and quantum sensing. Having a basic understanding of these three areas gives you the vocabulary to follow developments and the perspective to assess their financial implications.

Once you have this foundation, the next step is to understand which financial institutions are leading in quantum R&D and what types of projects they are pursuing. Equally important is keeping an eye on the startups and government labs already experimenting with applications relevant to finance. This provides context for where the industry is headed and the kinds of challenges being addressed.

To reach a conversational level of fluency, however, a few more activities are essential. This industry is still iterating between unstable technologies at all levels—from the type of qubit, to quantum gates, scalability, and hybrid computing, to name but a few. Not all quantum computers are created equal, so it's important to become familiar with the different technologies and hardware providers. Competing approaches to building quantum machines are still evolving, and understanding the landscape helps in evaluating long-term viability and investment opportunities.

Another priority is to gain familiarity with financial data security and the quantum threat. Quantum computers will eventually challenge today's encryption methods, so understanding the quantum-safe landscape—including governance, standards, and the migration to quantum-safe solutions—is critical to protecting sensitive financial information. Let's put the emphasis where it belongs: Post-Quantum Cryptography (PQC) stands as a critical, systemic top priority.

Finally, remember that this journey should not be undertaken alone. These activities are most effective when carried out with the guidance and support of professionals already experienced in both quantum computing and finance, who can help you focus on what matters most for your role and organization. And don't forget—finding like-minded people can make it fun!

3. Conclusion

Quantum computing is still an emerging field, but its impact on finance is already taking shape. For professionals, the key is not to master the physics or programming, but to approach the subject strategically—avoiding common missteps, staying connected with reliable communities, and focusing on the areas where quantum technology intersects with finance.

Finance professionals must develop sufficient quantum literacy to identify both risks and opportunities within the quantum ecosystem and its coming impact on the wider world. This is especially crucial when evaluating quantum computing startups or emerging technologies such as quantum sensing in pharmaceuticals. Those who can effectively bridge an understanding of quantum technology with financial analysis will be better positioned to spot breakthrough opportunities, manage quantum-related risks, and guide their organizations through the quantum transformation of the financial industry.

By combining financial expertise with targeted quantum awareness, professionals can stay ahead of the curve, contribute meaningfully to industry discussions, and make informed decisions as the quantum era unfolds.

Contact the authors:

André Costa: https://www.linkedin.com/in/andre-/

John Galani: https://www.linkedin.com/in/john-galani/

Frédéric Van Weyenbergh: https://www.linkedin.com/in/fredericvanweyenbergh/

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