

Exploring Potential Antitrust Risks for Quantum Computing

Minding Your Business on April 27, 2026

Put “quantum” in front of almost anything and it tends to evoke a singular reaction: it must be highly technical, theoretical, or out of reach. But when it comes to “quantum computing” – especially the *business* of quantum computing – those instincts are misplaced. That is because the competitive dynamics driving this industry are, in many ways, deeply familiar.

Quantum computing, like every major technological innovation that has come before it, presents new capabilities layered onto old economic realities. The shift from classical to quantum computing is no more mysterious from a competition standpoint than the move from the horse-and-buggy to the Model T. Though the technology changes, questions of competition – e.g., who controls access to key resources and sets standards, and how firms leverage early advantages – remain largely the same.

Here, we explore how the antitrust laws might apply to the emerging industry of quantum computing. And while the science side of quantum computing is novel, certain core business risks associated with the industry are not. Even in its early, pre-commercial stage, familiar antitrust issues are already on the horizon.

1. The Quantum Stack: A New Architecture for Competition

First, some basics. What is quantum computing? At their core, quantum computers differ from classical computers in how they process information. Traditional computers rely on bits: binary units that express either as 0 or 1. Quantum computers, however, run on *qubits*, which are not bound by the same binary constraints and can exist in multiple states simultaneously. This property enables quantum systems to simulate seemingly contradictory states in parallel, offering users the potential to solve certain, more complicated problems more efficiently than their classical counterparts.

This technological advantage is not just theoretical. Cloud providers offer quantum as a service (QaaS), giving users access to the power that quantum computers provide without needing to own all the hardware. Providing access to quantum machines has allowed for partnerships in the pharmaceutical, aerospace, finance, and energy sectors, among others.

But QaaS is more than just remote access to machines. It can be better understood as a platform layer that aggregates hardware and software, giving developers the tools to build and run applications and execute queries. Often, these platforms do not own the underlying hardware, instead routing access across multiple third-party systems.

Using a quantum computer therefore means engaging with the “quantum stack”—a layered architecture spanning hardware, control systems, compilers, intermediate representations (IRs), programming languages, and cloud interfaces.

These vertically-integrated quantum stacks are battlegrounds for competition. Unlike classical computing, where decades of development have shaped standards and interoperability, layers in the quantum stack are still under development and therefore up for grabs. Firms are competing not only to develop the hardware layers of the stack, but also the software layers that determine how users interact with the rest of the system.

2. To Favor, Or Not to Favor? Layer Leveraging in the Stack

The quantum stack is a potential source of antitrust risk because firms that control critical layers can create bottlenecks that limit competition.

One potential antitrust risk for quantum computing could come from self-preferencing within these vertically integrated stacks. Firms have and will likely continue to develop and operate across multiple layers within the stack. Doing so will provide the opportunity to preference their own products through the vertical stack, raising self-preferencing concerns. This raises a familiar question: when does product integration become anticompetitive self-preferencing?

In this way, the business of quantum computing implicates well-established antitrust principles governing platform control and vertical integration. Courts have long recognized that dominant firms have used a combination of technical integration and contractual or strategic conduct to entrench their position. While integration can be procompetitive, it becomes unlawful when used to foreclose rivals and maintain monopoly power—particularly where technical design choices are combined with contractual or strategic conduct that limits interoperability or raises switching costs.

Platform leveraging remains a key issue in antitrust, which could take on a new form in quantum computing: “layer leveraging.” In the quantum context, that kind of self-preferencing could take several forms. For example, if requests are submitted through a provider’s own interface, they might get access to certain additional features or be prioritized as the request moves through the stack. While there may be pro-competitive benefits to these kinds of preferences, there is the potential for them to stifle competition if they become effectively required for meaningful participation.

3. Standard Wars: Coordination, Control, and Exclusion

Competition in quantum computing will not just play out between the layers. It is also occurring in the way each layer interacts with the others, especially in the race to set standards. Because these layer-to-layer communications are still being developed, standard forms of interaction are actively being defined. As these languages develop, the race for standardization will be vital.

Standards are essential to the growth of any technological ecosystem. They are important because they help ensure interoperability among platforms, reduce costs, and grow markets. Standards regularly prove their effectiveness. Take, for example, USB ports. The fact that many computers and devices share these common plugs allows for greater interoperability among platforms.

Standards will likely have a role to play in the development of the quantum computing ecosystem as well. The layered nature of the quantum stack creates multiple potential sites for standardization—from programming languages to intermediate representations to hardware interfaces. In quantum computing, interoperability is particularly valuable because enterprises are unlikely to commit to a single hardware modality or vendor.

Another potential issue comes between competing “languages” that operate at different layers of the stack. For example, some languages may operate at the “hardware” layer—that is, one that tells the physical machine what functions to perform in response to user inputs. Another language exists at the intermediate layer, which would allow communication with multiple hardware levels, and also a variety of different inputs. While both languages aim to facilitate interoperability, because they operate at different levels of the stack, there is an inherent tension between the two: which language will become the standard that all others must conform to, and why?

Antitrust law has long recognized both the benefits and risks of standard-setting. Cases such as *Allied Tube* and *Hydrolevel* demonstrate that private standards organizations can be liable when their processes are manipulated to exclude competitors. As a result, quantum industry groups that support certain languages, like the QIR Alliance, could face scrutiny as they support certain standards or exclude others.

These risks are not hypothetical. Because quantum standards are still emerging, relatively small governance decisions – such as which features become mandatory or which profiles are supported – could determine which firms are able to compete. In a market defined by scarce hardware and high switching costs, such decisions may have outsized competitive impact.

4. The Foundations of Power: Infrastructure, Inputs, and Foreclosure Risk

A different set of issues sits upstream. Even with open standards, competition can be constrained by who controls the physical inputs that make the stack possible. Quantum hardware is scarce, capital-intensive, and dependent on highly specialized components, including cryogenic systems, advanced electronics, and advanced fabrication techniques. Access to these inputs is limited, and supply chains are both fragmented and concentrated.

These constraints create natural chokepoints. A small number of suppliers could shape the pace and direction of development. These dependencies are compounded by strong lock-in effects: quantum hardware is typically co-designed with specific control systems and software, making it costly to switch suppliers once a technological path has been chosen. Early control over key inputs may therefore allow firms to raise rivals' costs or secure preferential access to critical infrastructure. The result is a supply chain where substitution is difficult and disruptions can translate into downstream market power.

Regulatory attention is already beginning to focus on these risks. Most notably, the Italian Competition Authority (AGCM) has opened an inquiry into the quantum computing sector, examining whether early-stage consolidation, vertical integration, or preferential access to infrastructure could distort competition. While still exploratory, this investigation signals that authorities are analyzing quantum computing through the lens of input foreclosure and ecosystem control. These concerns echo earlier antitrust scrutiny in semiconductor manufacturing, telecommunications infrastructure, and cloud computing—industries where upstream control has shaped downstream competition. In the quantum context, however, the combination of technical complexity, supplier concentration, and immature supply chains may make such bottlenecks especially acute.

5. Old Doctrines, New Technology

It is tempting to frame quantum computing as a race defined by qubit counts or error rates. But market structure and how industry players navigate these antitrust challenges may matter just as much.

Quantum computing may be new, but many of the antitrust issues it raises are not. Self-preferencing, standards manipulation, and interoperability issues have long been central concerns in technology markets—and quantum computing is unlikely to be an exception.

Of course, other new antitrust issues may emerge as this new field continues to commercialize. Because the industry is still in its formative stages, decisions made today will likely shape competitive dynamics down the road.

- **Colin Kass**

Partner

- **David A. Munkittrick**

Partner

- **Erica Taylor Jones**

Associate

- **Peter C. Angelica**

Associate