**Innovation Management Feb 9th, 2023 (20 points)[[1]](#footnote-0)(\*)**

**Q1 - (Commentary - 6 pt):** *”… many companies working on [Quantum computing] technology are in a race to prove that today’s […] systems can reach so-called quantum advantage — the point at which a quantum computer can perform a useful task more efficiently than a traditional, or “classical”, machine, ushering in commercial use of the technology.*

*Four years ago, John Preskill, a professor of theoretical physics at the California Institute of Technology, predicted that quantum systems would start to outperform and might have commercial uses once they reached 50-100 qubits in size. But that moment has come and gone without quantum systems showing any clear superiority. IBM unveiled a 127-qubit computer more than a year ago, and last month announced that a new 433-qubit processor would be available in the first quarter of 2023.*

*These days, Preskill sounds more cautious. “I expect that for practical applications with significant business value we’ll have to wait for error-corrected fault-tolerant quantum computers,” he said, adding that this was likely to be “a ways off”. But he added that today’s systems already had scientific value.*

*One reason that hopes have retreated is that new ways have been found to program classical computers to handle tasks that were once thought to be beyond them. This has pushed back the quantum frontier, delaying the moment when people building quantum systems can claim an advantage, said Oskar Painter, head of quantum hardware in the cloud computing division at Amazon, one of the tech companies that is building its own quantum computer. “They never finally could say, ‘This will be better’” he said.*

*After years of rising expectations, the lack of practical uses for the technology has led some experts to warn of a potential “quantum winter” — a period when disappointment about a new technology leads to a waning of interest for a number of years. The term is borrowed from the AI “winters” of the 1970s and 1980s, when a number of promising research avenues turned out to be dead ends, setting the field back for prolonged periods. “People are worried it will be really harsh,” said Painter at Amazon Web Services. Like many in the field, though, he said that any short-term backlash was unlikely to hit long-term research funding. “I don’t think it will go away.”*

*Receding hopes for early benefits from quantum computing have already contributed to a sharp fall in the stocks of a handful of companies that rode the wave of enthusiasm over the sector to go public since the middle of 2021. Based on their peak share prices soon after they each went public, Arqit, IonQ, D-Wave and Rigetti reached a combined value of $12.5bn. That has since fallen to $1.4bn. Among the events to batter the quantum companies last year, IonQ was hit by a report from a short seller claiming its technology did not live up to its claims, while Rigetti founder Chad Rigetti was removed as chief executive before quitting the company late in the year.*

*Part of the problem facing the sector has been an excess of “hype” about the technology, said Constantin Gonciulea, chief technology officer of advanced technology at Wells Fargo. He compared the build-up of expectations around quantum to the crypto industry, as many non-experts have been drawn into the field and promises for the technology have far outgrown its potential in the near term.*

*Despite this, companies working on the first quantum machines and software still insist that practical uses of the technology are just around the corner — while continuing to carefully avoid giving too precise a prediction about exactly when that will be. For some quantum companies, [recent results arising in China are] a sign that the technology’s big moment is drawing nearer. But for the doubters, the apparent impracticality of the research will serve as confirmation that quantum computing is still an impressive science experiment rather than a practical technology.”*

This article extract comes from a recent (Jan 10th) issue of the *Financial Times,* is an interesting case study in the context of innovation management. Specifically,

* This case exemplifies a few theoretical topics that have been covered in class. Which ones do you spot and why do you think they apply to the case?
* Suppose that a high-tech investment fund is considering whether or not to buy shares in the “quantum computing” firms that are mentioned in the article, taking advantage of the recent fall in their share price. They have arranged meetings with these firms, and hire you as a consultant. What are the 2-3 key questions you would ask the managers of these firms, with respect to their strategy, and what is the reason for the questions?

**Q2 - (Open question - 4pt): In the context of strategic management of innovation, does it make sense for a firm to acquire another firm? If so, what are the main advantages, disadvantages and risks associated to this choice?** **If possible, make use of original examples (i.e. examples that have not been mentioned during lectures).**

**Q3 - (Closed question - 2pt): A technological gatekeeper is … (select the correct answer)**

[] The firm which is recognized as the technological leader in an industry, compared to its competitors

[] The project manager in charge of a high-tech project that is carried out within an alliance involving more than one firm

[\*] An organizational role that facilitates the flow of technological knowledge within the firm and coming from outside the firm

[] The manager that is in charge of designing training programs for employees engaged in research and development

**Q4 – (Closed question - 2pt): From the perspective of economic geography, innovation tends to occur …. (select the correct answer)**

[] Just about anywhere, since the world is now globalized and people can communicate effortlessly

[\*] In well-functioning “local innovation systems”, in which one can observe economies of agglomeration, and a significant interplay among private, public and academic actors

[] In well-functioning “local innovation systems”, in which one can observe economies of scale, scope and learning, and a significant interplay among private, public and academic actors

[] In key financial centers, since innovation requires significant funding

**Q5 (Closed question - 2pt): A technological standard represents… (select the most correct answer)**

[] The technology and/or product architecture that has become dominant in the industry

[] A legally established set of prescriptions to be followed when designing a product

[\*] A set of specifications that add economic value to the product simply because of its conformity to the standard

[] The best-performing technical solution present in the market

**Q6 - (Closed question - 2pt): When discussing barriers to innovation… (select the correct answer)**

[\*] Both innovating and non-innovating firms encounter barriers to innovation, which tend to be quite different in the two cases

[] Innovating and non-innovating firms encounter the same barriers when they pursue innovation

[] Non-innovating firms encounter barriers that deter them from innovating, but firms that are already innovating do not experience any substantial problem any more

[] It is misleading to discuss barriers to innovation in relation to firms, since they should be discussed at the level of the industry

**Q7 - (Closed question - 2pt): In a digital platform, the so-called “disjunction” between encoded data from user participation and reality is essentially related to ... (select the correct answer):**

[] …time. In fact, it takes at least a few minutes for this data to propagate to the data warehouse, before it can be analyzed.

[] …hardware. It occurs when traces from user participation come from unreliable sensors.

[] …software. It occurs when bugs are present at some point in the technology stack.

[\*] …the gap between actual user behavior and the behavior defined by the platform.

1. (\*) no answer (open questions) = 0 pt

   no answer (closed questions) = -0,5 pt

   wrong answer (closed questions) = -0,5 pt [↑](#footnote-ref-0)