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Patrick Nicolet, CEO of Linebreak Ltd., former Group Chief Technology Officer of Capgemini

Francois, it will get even faster.

Francois Barrault, Founder and Chairman of FDB Partners, Chairman of IDATE DigiWorld

Thank you, Thierry for inviting us to this great conference. Patrick gave me a challenge, he asked me to say in seven minutes what I said in 40 minutes at Stanford last week and one of the main things about quantum is speed, so I will try to be as fast as I can.

We have talked a lot about AI and there are three pillars in it. In fact, I hate this term Artificial Intelligence... remember Bergson says the machine is the arm of the workers and we are really talking about Augmented Intelligence, Shared Intelligence like Waze as an extension of our brain. Artificial Intelligence, Augmented Intelligence has three pillars: the hardware, the transmission and the software. Why we have been talking about AI so much over the last four or five years? There are three reasons. First, technology has increased the power and speed by incredible numbers and for the first time in the industry the three pillars have grown very fast. Second, we all experienced ChatGPT in December and everybody is now talking about it and using it for letters, speeches, reports.

Last, nobody really understands AI, it is complicated and it is a very good tool for journalists, the media or clickers, because of that. It can create fear like Cold War, so it has been used as material at length to scare us, so do not worry it is not scary. Scary themes generates click and attention and of course generates revenue!

As you said, Artificial Intelligence really started in 1936, then in 1953 Turing's team started and there was the first outcome in 1956. I have been involved in AI since 1982, so I have seen the evolution and the use explosion of the power of Technology.

Today, I am going to talk about quantum, which I would say is and will be a revolution. Do you know what a revolution and an evolution are?

iPhone 1 was a revolution, iPhone 15 is an evolution. The first story of quantum brings us to the famous picture of Planck, Schrodinger, Einstein at the Solvay headquarters, which was the first meeting to talk about what quantum is, then you have all the quantum physics, electrons, atoms, photons, etc. In the 1950s, 1970s, there is the introduction of transition transistors, lasers and other technology and since 2020, lots of labs have started to look at what quantum is, if it can be applied and how quantum and AI are going to transform the world.

Quantum is easy to understand and there were three revolutions, first analogue computers, analogue being zero to 100; then we moved to 01, bits and bytes or the digital era; and now it



is time to come back to a much more natural and organic model, which is photons, electrons and atoms. Nature hates binary. In some countries you have Swiss and Cheddar, in some others you have 365 cheeses and we are moving to the 365 cheese technology because as humans we are much more inclined to do analogue and nuance, which is a very smooth transition from zero to one, than the brutal zero to one. Quantum is going to use lots of natural things where photons will talk to photons, atom to atom, and there is a huge amount of energy available on this transformation.

What is driving the quantum timeline? My colleague, Toby, talked about post-quantum cryptography and there will be a huge revolution for quantum. For example, on cybersecurity, I won the contract for the London Olympic Games in 2012 and we had 700 000 attacks per day. I talked to the Minister of the Olympics two weeks ago and they are forecasting 5 million attacks per day, which is huge and there will be robots all over the world. Imagine if you are a hacker, you are famous because you ask around somewhere, but if everything stops in the final of the 100 meters, you are a hero and part of the Hall of Fame of the hackers' world. Now is the time to make the step to leapfrog to another technology: quantum. And post-quantum cryptography is the future of cryptography where you encrypt your data, transport and decrypt and the transport is impossible to attack. At least, we will soon have a quantum safe environment.

What is very interesting is that quantum is power, size, very low energy and also sensing. For example, many of you have a smart watch that analyzes your heartbeat and quantum sensing will be able to analyze the magnetic field of your heart and it will be 1 million times more accurate than anything else. The power of quantum computing, quantum technology and AI will absolutely transform the world. There is plenty of replication. I was talking about sensing: when you look at medicine, for example, when you are sick it is already too late because the weak signals you have been getting, being tired, hurting a little bit and then only you go to the doctor who asks about your symptoms, pathology and have a little chat. At some point, quantum sensing will be embedded in your body, if you want it of course, and it will make it possible to do real-time analysis of your entire metabolism, look at the pathology on the web through AI. In the future, when you will go to the doctor he will have the symptoms, the analysis, and the pathology.

The 30-minute slot you have with them is five minutes of symptoms/pathology analysis and 25 minutes talking about kids, holidays, etc., and the emotional intelligence of the doctor will be at its best.

This apply also to many jobs or functions where the task will be replaced by the machine and will free up some quality time to have a more personal of emotional conversation.

Drug discovery is another application. During Covid we were very late in developing a drug, which normally takes 10 to 15 years, but quantum simulation systems will make it possible to do it in two to four years. It is not one day or one month but it will be a huge revolution so that, depending on what new illnesses arise (and there will be a lot of new viruses in the future), you will be able to develop new drugs. It is the same for materials for aerospace or for luxury brands, now there are lots of rich and famous vegans who want a famous Kelly bag but not in leather, so it will also help brands to manufacture new materials in a very short period of time.

In summary there are a lot of different things. The future is now. Be ready for this huge revolution after 35 years of evolution.

Patrick Nicolet



Thank you. Just a quick summary before I open the floor for questions. What we have tried to show you today is that there is a breakthrough with so-called generative AI or supporting large language models, as was explained, which is what has drawn attention and put it at the top of the agenda because there is a new future. It has already been deployed to manage complex systems and it can help solve some of our most pressing challenges, of which one is cybersecurity. If you like AI as it is today, you will love it tomorrow with quantum, if I can summarize the session like this. We have a lot of questions.