Business and Academics the future of cooperating between the organizations.

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Abstract: The following text presents the study of the evolution of quantum computing. It suggests some steps that can be taken among research groups. Keep in mind that this work must be perceived as basic research between the collaborators and the way business structures are at the forefront. In this context, there are well-known practices that help industries manage better in times of rapid change. This article highlights only a few very common aspects of governance and the main goal was to offer a better way to measure the effectiveness of the cooperation process.

Keywords: industry; academics; benchmarking; quantum; science;

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• INTRODUCTION

Business companies turn out to have a big piece of data about their products, the market needs, and their customers. They already put in use the fruits of Machine learning and Artificial Intelligence at this stage. They use algorithms that analyze the collected data and the result is: that we have some suggestions about what product to buy for example. Selecting an option will yield a reward that depends on an uncertain state of our nature (like if you want to buy some medicine online you should ask your GP it is the right choice, based on his knowledge of us as his patient). What I want to illustrate here is the question: Can we act like our doctor, when it comes to adopting good practices for Quantum Computing. The answer is yes and there's no even better time for this. One thing is clear Quantum Development is maturing. At this race, we have a great intersection between organizations both from the Academic and Industrial fields. Just to name a few here: Honeywell Quantum Solutions, Cambridge Quantum Computing, Oxford Quantum circuits, Xanadu, Amazon, UST of China, as well big names like Intel, IBM, Google, Microsoft, etc. And so now it's more than feasible for different kinds of individuals to work together in modular groups. The European Union also demonstrated interest and make it a clear sign that they have to catch up on this. If we as researchers, scientists have to wait on the leading companies for their technologies - we have to keep one thing in mind that in the end they are very determined to make their profit -overall. By saying that, I don't want to sound like mean that software and hardware companies are not beneficial for us, but that they will need our help to conquer quantum computing challenges and only then we can build that new ecosystem.

Quantum computing technology is a big topic today. Big tech companies like Google and IBM are even further ahead if we talk about physical quantum computers. We can say that in the last two decades technologies are constantly changing, this requires new standards, the development of new practices, and what we can summarize is that it directly affects our way of life. Therefore is we strive to adapt quickly.Another thing about Commercial giants is that they gain ubiquitous influence - that is sometimes overpowering for institutions such as academics, so this is adjusting the two more difficult. For the sake of overcoming the temporary limitations of Quantum Phenomena, I suggest that we as a scientist, can learn from the practices of the big businesses. They are good at Managing. Longstanding businesses are known for their successful transformations and re-engineering their structures and to be perceived reliable at the same time.

- **INOVATION**

The good thing is that we as researchers have plenty of room for innovation. We figured out that this isn't a sprint - so a step-by-step is the best approach before we learn to run fast. Everyday scientific journals add some great papers about great combinations of methods and models for optimisations for a variety of problems.

[1] In this work which is done by a group of researchers they reveal a basic scheme of a quantum solution in finance.

1. As a first step, they define the loading of data from classical computer systems. To this end, it is necessary to minimize the steps when transferring data from a classic to a quantum computer - this is definitely a place where you need to approach with extreme precision.

2. The second step of course, the need to use quantum computers is to speed up computing power. Algorithms will play an important role in the manipulation of qubits. There are several different types of quantum computer systems in the world, and this logically means that topologies can also differ significantly. The task will be considered correctly completed if it leads to a meaningful result of the implementation.

3. Third is the reading of the data will be based again on the classic computer. For this purpose, it will be necessary to approach with a certain wit, how to approach the design and reading of the results of the procedure themselves. The problem is that due to the capricious nature of the qubits, they quickly lose their superposition and return to their original state.This process results in the distribution of possible results and will be repeated many times - until the most probable answer is confirmed.

The second article that I want to highlight here is one that is published on the Cornell University web page. The paper is about the symbiosis of Machine Learning and Quantum Computation. Here you can find very well explained tools integrated well implemented for the Banking field [2]. Keep are still using entry level technologies at this point.

- **THE PURPOUSE OF QUANTUM COMPUTING**

Meanwhile this summer China gives a bold statement that they reached Quantum supremacy, even if it's true we're still using the so-called Noisy Intermediate Scale Quantum or NISQ devices (the name is given by John Preskill) but we can only imagine how many great inventions can be done in fields of Pharmacy, or new material will be explored, for example, like quantum mechanic Brownian motion in chemistry and so on. All this is great news . Like the given examples above here, we focused only on some digital examples of where these techniques are helping us to make decisions. Some people believe that at the end of this decade we can expect to pass the NISQ era by advancing in error correction practices for the qubits and by growing the amount of the quantum storage space or Q-ram. Only then we can reach the full potential of this exciting endeavour.

Experts are saying there is no need to fully get rid of the binary computer systems that we are using today. Just we have to adjust the two systems to work well together and maybe the quantum computers will continue to work as a server and we can reach them remotely as a clients. It wont be surprise for me to hear about some clever marketers offering even more accessible quantum machines in future. On one side are people with the knowledge and on the other side are the people with the money, and this is the pure formula of success. I can't remember someone whose life does not change for good because of the powerful smartphones we have today. They changed the game and that was in the context of fewer than 20 years and the regulations didn't come late. Every major technical evolution brings some regulation work - otherwise, it will be chaos. We must be sure that we are taking the right steps that will prevent our binary systems from the quantum power of breaking them down.

- **UNDERSTANDING PERFORMANCE**

We will be able to understand the dynamics of a system only when analyzing it. But before we build one system we have to be clear about what we want to build. In the process of building it, we have to arbiter how things go. Here is the place to make another reference to a book [3] where the author writes about benchmarking: "Bench-measuring is an analytical process of gap analysis. It defines the location and the magnitude of performance gaps and builds an imperative close to the gap." Also "Bench-Learning is the application of knowledge learned from other companies to your own organization." In this context, if benchmarking has played a significant role through the business changes maybe it can also be applied to quantum developments. We need a well-orchestrated harmony between organisations because it is the only way that things can happen faster.

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• THE IMPORTANCE OF SCIENCE

And I want to make the last citation right here from a book [4] to that subject: "Industry adopted and evolved the culture of technology within industry because it directly uses technology, but industry has never wholly adopted and evolved the culture of science within industry because it only indirectly use science. In contrast,

universities have adopted and evolved the culture of science because they directly use science in education. But universities have only partially adopted and evolved the culture of technology (and only in their professional schools of engineering and medicine, and not in their schools of art and science)"

These words are highlighting of the major differences between Industries and universities - and we hope that they will continue to change for the better.

• CONCLUSION

While scientist has their long-term mindset, Tech companies like to solve contemporary problems thus the fact that they like to be rewarded in form of commercial and financial success the two has to work hand in hand for the sake of quantum development.

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