Overlooked Yet Crucial: Data Quality and Interoperability

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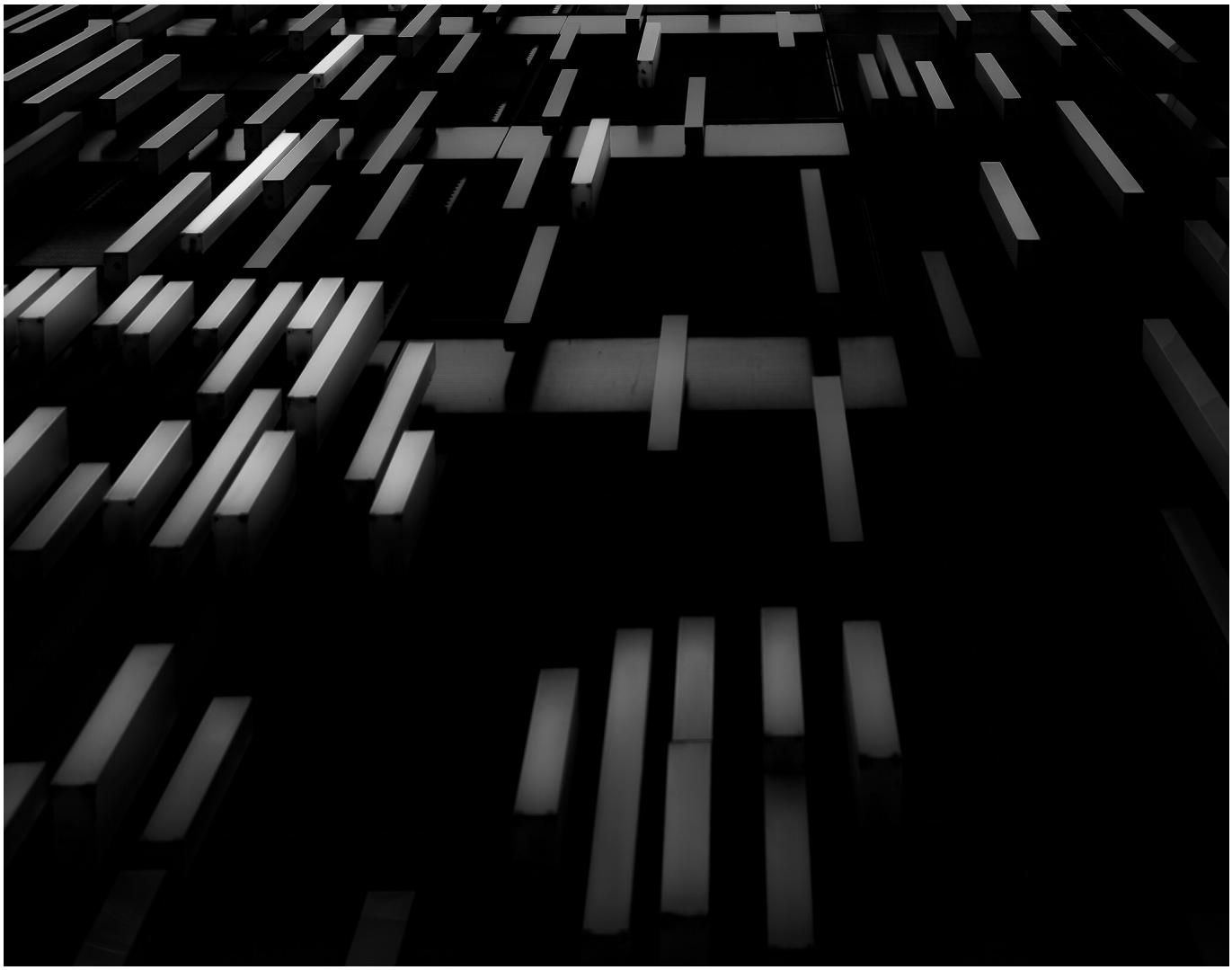

The world's political and corporate leaders tend to agree that high intensity, training quality data frames (TQD) embedded through **Artificial Intelligence (AI) systems are progressively permeating all aspects of our lives**.[1] The current technologies, grounded on sophisticated algorithms and big data, have become of strategic importance for countries and for leading corporations worldwide.[2] The **TQD** has demonstrated to be one of the most transformative human-built forces in the current days.[3]

Reliance on big data has generated both extensive **social benefits and widespread concerns**, from enforcing automated disinformation campaigns — using bots to spread millions of tweets across the Internet and meddling in foreign elections — to training AI systems in order to identify premature signs of cancer and therefore allow for more targeted precise medical treatments.[4] As expected, the TQD system and the complex algorithms which might derive from the former started to be extensively **incorporated in the sphere of military affairs**.

Military development and the production of **autonomous or semiautonomous vehicles**, based on millions of coding lines, have **become key elements in fighting terrorist networks** and near-peer competitors, therefore minimizing the risk of human casualties. Conducting cyberattacks by **manipulating an adversary's data** or developing **breach risk predictions** by analysing one's own IT asset inventory has also become an advanced tactic to defend or attack physical and non-physical infrastructures.[5]

The application of the TQD and AI currently allow these technologies to claim a status quo position among other high-tech innovations. It does not come as a surprise, consequently, that a global **competition has emerged between the United States, China and Europe**, with experts such as Nathalie Smuha describing the ongoing situation as a **"race" to develop, secure and implement such application**s.[6] Advanced state economies and even private firms claim to lead such a race or some of its aspects, with the final goal to gain a competitive advantage which might shape the **next decades of "Great Power" competition**.

However, foreign antagonism between states and domestic rivalries between private businesses are not the only features concerning the efficient exploitation of big data and AI systems. New questions arise about **data sharing within private institutions and between state departments**.[7] The academic literature has shown already cross-departments jealousies in the private sphere and inter-service rivalries between different branches of a country's armed forces.[8]

The American Department of Defence (DOD) has underlined the critical importance and **potential problems of making data accessible and interoperable among various branches** of the DOD, but not, for example, for other US intelligence agencies. The Pentagon started to advocate for — and implement — standard data formats, machine-to-machine communications, and strengthen cross-department data loss prevention systems.[9]

Former Secretary of Defense David Norquist as well as his successor Kathleen Hicks share the same position on data sharing, claiming that "*any DOD data is a resource for the whole agency*".[10] The new **Digital Modernization program adopted by the DOD** – which has the broad aim of moving the department from simple automation to AI algorithms, allowing for time-saving and better decision-making processes – owes its success to the **vast flows of data in need to be standardized across all the branches of the Pentagon**.

According to Hicks, the DOD's bureaucratic apparatus "*must view data as a strategic asset and avoid trapping their valuable information in their own siloed storage systems*".[11] As the argument goes, the new trajectory for data sharing started to take concrete shape and be embraced by the US officials since 2020. However, there are still a few matters on hold. The DOD has also raised the **issue of data accessibility across their branches**. A comprehensive review is currently being implemented around data accessibility with a documented, standard **Application Programming Interface** (API) – a **common platform which facilitates the brand-new formation, retrieval, sharing, utilization, and management of data**. Furthermore, the innovative DOD's API has to provide additional new security clearances and a granular privilege management for all the personnel involved, as the DOD remains the world's largest employer.[12]

If AI, training quality data (TQD), cloud storage, 5G, and others are the technologies of the present, the ground-breaking next step in the high-tech realm might find its answer in physics with new technologies such as **quantum mechanics and quantum computing**. This emerging playing field **could revolutionize and speed up information processing by "hundreds of years"** and confer significant **economic and national security advantages** to countries and businesses that dominate it.

By 2018, according to the *Washington Post*, the People's Republic of **China** had just about "**twice as many patent filings as the United States for quantum technology overal**l", a variety of patents that give significant advantages to Beijing in terms of **securing from legal actions their communications and cryptology devices.[13]** According to Jeanne Whalen, even President Xi Jinping has become personally interested in quantum technology research, with Chinese scientists occasionally giving him lab tours.[14]

On the other hand, the **United States leads the world** in patents relating to the most prized segment of the field – **quantum computers** – thanks to heavy investments by IBM, Google, Microsoft, and others.[15] However, the question that spontaneously arises revolves around the **regulation** of this new technology, its **purpose**, and **how the relationship between private American businesses and the government will unfold** consequently, shaping the American democratic fabric for decades to come.

According to Patinformatics LLC, a leading full-service advisory firm specializing in patent analytics, the People's Republic of **China** (PRC) could be at the forefront and in a solid position to **sell and dictate quantum's tech patent market**, considering the amounts owned by Chinese universities and companies.[16] Chinese scientists did not discuss any military applications of quantum technology; however, much of the research they are pursuing can have apparent **uses in commercial and defence domains**, experts claim.

In part motivated by the PRC's breakthrough, the United State Congress passed the **National Quantum Initiative Act** in 2018, which approved a baseline of **$300 million** in funding per year until 2022, ten-time less than mainland China.[17] The United States Department of Energy (DOE) was the primary beneficiary, among other federal agencies such as NASA, the DOD, and the NSA, one of the country's leading intelligence agencies.[18] These agencies are planning to set up **intertwined quantum-focused research laboratories** and collaborate with US academia and the private sector.[19]

For now, **China is lagging behind in the quantum industry compared to the United States**, falling behind in the mission to build a well-working quantum computer, which is perhaps the most important race in the field. While research centres all over the world are racing to create the first viable quantum computers, fundamental questions remain about how this technology could be used or misused. To maintain that strategic advantage, **the US and other democracies must pay greater attention to the quality of their data and how to make them more inter-operational**.

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