PATRICK NICOLET

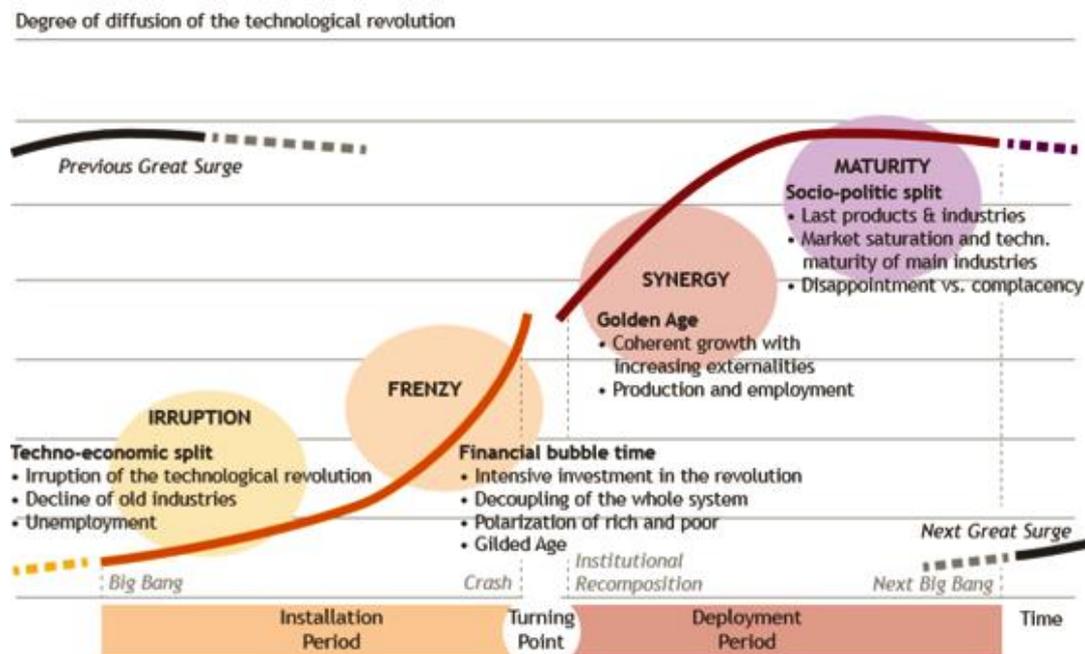Capgemini's Group Chief Technology Officer

Abstract

Information and Communication Technologies (ICT) form the backbone of our societies, but their usage so far has been centered on short-term convenience slowly taking a toll on the Earth finite resources. In this context, what if the most pressing healthcare challenge for mankind is not COVID-19 itself but a deeper transformation of our individual and collective practices and behaviors through planet-centric design. After all, mankind is only as healthy as its ecosystem. And since any technology is a solution in search of a problem, ICT can easily be repurposed to support this new sustainable and healthy world.

However, our ability to design and run such planet-centric models supported by information technology depends on our capacity to harness the potential of different technology domains such as artificial intelligence or cloud which are all supported by three technology principles: data, security and standards. In this article, we show how the ability to shape these principles have become a new geopolitical battleground.

1. Planet-centric design

It is any technology expert's natural tendency to focus on the way a technology works – the 'how?', when their audience is oftentimes more interested in the reason why this technology should work – the 'so what?'. Technology is, after all, a solution in search of a problem. What is therefore the problem(s) we are looking to solve through the massive deployment of Information and Communication Technologies (ICT) which form the cornerstone of our modern societies since the 1970's? As often, history is the best teacher.

Neo-Schumpeterian economist Carlota Perez's seminal work on techno-economic paradigm shifts and the theory of great surges[1] offers a retrospective view of previous technology revolutions starting with the industrial revolution and followed by the age of steam and railways, the age of steel, electricity and heavy engineering and the age of oil, automobiles, and mass production. For Perez, these 50-60 year-long ages are all characterized by a first phase of massive technological disruption where the value is captured by the few before a turning point leads to a phase of stabilization in which society takes back control and decides on the best applications for the technology.

Degree of diffusion of the technological revolution

Previous Great Surge

MATURITY
Socio-politic split
• Last products & industries
• Market saturation and techn. maturity of main industries
• Disappointment vs. complacency

SYNERGY

Golden Age
• Coherent growth with increasing externalities
• Production and employment

FRENZY

IRRUPTION

Techno-economic split
• Irruption of the technological revolution
• Decline of old industries
• Unemployment

Financial bubble time
• Intensive investment in the revolution
• Decoupling of the whole system
• Polarization of rich and poor
• Gilded Age

Institutional Recomposition

Next Great Surge

Big Bang — *Crash* — *Next Big Bang*

| Installation Period | Turning Point | Deployment Period | Time |

Recurring phases of each great surge in the core countries[2]

We find ourselves in the middle of the age of information and telecommunication which started with the mass production of processors, led by Intel at the end of the 20th century. This paved the way for other technology companies to emerge such as Google, Amazon, Facebook or Apple whose excesses are now well documented and often make the headlines, especially when it comes to the near to monopolistic situation some of them are experiencing on the market. Recent and increasingly pressing calls for dismantling these companies echo back to past examples such as Rockefeller's Standard Oil which controlled up to 90% of the U.S. oil refining and distribution before the Supreme Court ruled to

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[1] Carlota Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, Edward Elgar, 2002.

[2] Carlota Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* quoted in https://www.synthese-informatique.com/qu-est-ce-que-la-revolution-numerique/les-cycles-de-carlota-perez

end its monopoly in 1911 by breaking it up and forcing it to sell its affiliates. According to Perez's model, we are approaching this turning point where society takes back control and aligns on shared goals for what to do with technology. The 'so what?' question.

In France, despite social turmoil and a tense political climate, a recent study by think tank Destin Commun shows that 68% of the French population believes that the environment is an issue that can bring people together across lines of division[3]. Although counterintuitive, this demonstrates increasing awareness on the fragility of a system based on finite resources as we commemorate Earth Day sooner and sooner each year. It is now clear that business models centered on mere consumer satisfaction have taken us to the brink of collapse to the point that some scientists now consider we have entered a new geological era that they call Anthropocene as a reference to the impact of human activities on the planet.

In this context, what if the most pressing healthcare challenge for mankind isn't COVID-19 itself but a deeper transformation of our individual and collective practices and behaviors through planet-centric design. After all, mankind is only as healthy as its ecosystem. Organizations had long been focused on the improvement of the product or service they were providing when a user-centric model emerged offering to shift the mindset to the experience of the consumer, leveraging ICT to improve the understanding of their customers. Social listening for instance allowed brands to send targeted adds for goods or services which you can now literally receive on your doorstep.

From product and user to planet focus[4]

A similar shift is now required to find the right balance between societal needs and their impact on the resources of our planet; connect these needs to the societal and local reality to ensure maximum added value for the users, the enterprises and the planet; account for the short, middle and long-term benefits; and adopt a systemic approach to apprehend all stakeholders, their interconnections and the societal needs[5]. Awareness around global warming and the need to protect our ecosystems has spread in recent years beyond activists' circles and many companies now include sustainability, not only as part of their corporate social responsibility agenda but as a core element of their long-term strategies. These efforts from both the public and private sectors as well as the end-users need to be uplifted if we want to build a sustainable and healthy environment for our generation and the ones to come. ICT can become the infrastructure for this new sustainable world with concrete examples already in place for instance the French platform Agrilocal[6] which connects local producers with public buyers or startup Elzeard[7] which brings the power of technology to small farmers.

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[3] Finding France, can the environment reunite France? Destin Commun (More in Common France), MiC Report, February 2020
[4] https://medium.com/ideas-by-idean/moving-away-from-product-focused-wellbeing-2cfb513dfae0
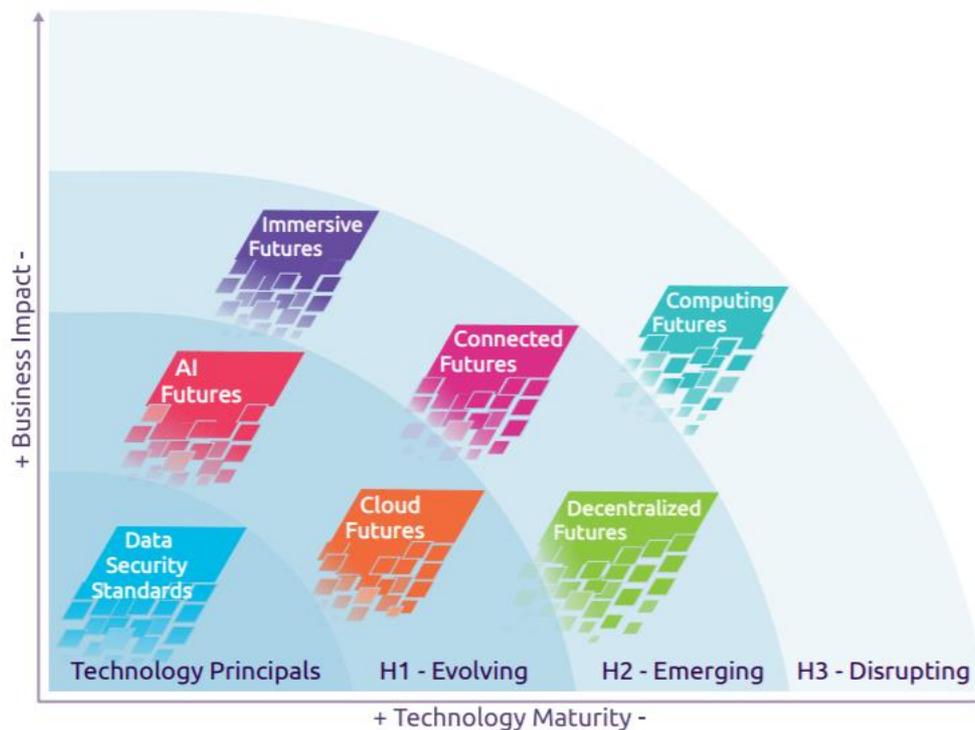[5] https://www.idean.com/spotlight/insight-le-planet-centric-design-ou-le-faire-fair
[6] https://agriculture.gouv.fr/agrilocal-le-portail-qui-met-en-relation-les-producteurs-locaux-et-les-acheteurs-publics
[7] https://www.elzeard.co/

2. Technology Principles and Geopolitics

Our ability to design and run planet-centric models supported by information technology depends on our capacity to harness the potential of different technology domains who are in different state of maturity. Artificial intelligence and cloud computing are already in wide enterprise adoption but still evolving significantly while augmented and virtual reality or 5G are in limited enterprise adoption but emerging strongly. Others like quantum may not yet be enterprise viable yet but definitely have a big disruptive potential.

Technology Principals and Horizons[8]

All of these domains are supported by three technology principals namely data, security and standards. The French Institute for International Relations (Ifri) has joined forces with consulting and IT services provider Capgemini to study the geopolitical dynamics surrounding the definition and control of these technology principles and published several reports on the topic. In November 2020, they have launched a dedicated research program co-founded with Dassault Systèmes, Crédit Mutuel Equity, Orange and the French Institute for Research in Computer Science and Automation (INRIA) [9].

3. Data

Getting, storing, making the most of, and communicating data is the object of information technology. In July 2018, our report warned: "Data no longer should be understood as a sole commercial or regulatory issue, but rather as an actual stake of international politics. Mastering data is an issue involving different

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[8] TechnoVision Future Thinking, Capgemini, June 2020 https://www.capgemini.com/wp-content/uploads/2020/06/Future_Thinking-Report.pdf
[9] https://www.ifri.org/fr/espace-media/communiques/lifri-lance-nouveau-programme-geopolitique-technologies

set of actors, with diverging motivations: it is a sovereignty and national security stake for states, a democratic stake for people (personal data), and a fundamental source of value creation for companies."[10] Back then, we invited the European Union to not only settle for its General Data Protection Regulation but develop an industrial strategy which includes data relocalization to protect our digital sovereignty against the USA and China.

The battle for healthcare data rages on. According to our most recent study with Ifri on the GovTech market, the GAFAM represent 73,3% of global investments in artificial intelligence for Healthcare[11]. During the COVID-19 sanitary crisis, 23 European countries chose to use an interface developed by Apple or Google for their tracing application, France being a notable exception for sovereignty reason according to Cedric O, Secretary of State for the Digital Economy. So far it has been downloaded by 10 million people[12]. On October 14th, 2020, the French Conseil d'Etat validated the launch of the Health Data Hub, a platform designed to share health data for research purposes. However, Microsoft which was the original pick to host the data on its cloud platform may be evicted from the project due to data protection regulation.

Battles around date localization however will not absolve western countries' leaders from their shared blatant inability to exploit publicly available data to mitigate the spread of the COVID-19 pandemic through cluster tracking while some were able to organize election or re-election campaigns for which the use of citizen's publicly available personal data allowed to design effective targeted campaigns.

4. Security

Security is equally important to keep an organization alive. However, it was never part of the information technology's initial design which focused solely on performance and cost. The transfer of value online, through data, generated growing interest from government agencies and organized crime alike. In another note from November 2019, we showed how digital power was now fully integrated in the portfolio of coercive measures used by states against each other. "Being powerful in the digital world requires the ability to create a favorable ecosystem, to control data, to control networks' competitive edges and to coordinate its digital capabilities with other forms of power." [13]

As for data, security concerns around healthcare are on the rise. In a recent blog post, Tom Burt, Corporate Vice President, Customer Security & Trust at Microsoft wrote "In recent months, we've detected cyberattacks from three nation-state actors targeting seven prominent companies directly involved in researching vaccines and treatments for COVID-19. The targets include leading pharmaceutical companies and vaccine researchers in Canada, France, India, South Korea and the United States. The attacks came from Strontium, an actor originating from Russia, and two actors originating from North Korea that we call Zinc and Cerium." [14]

5. Standards

Information technologies are built in silos and require standards for technology portability – preserving your independence from one vendor – and for technology interoperability – enabling you to work with

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[10] https://www.ifri.org/sites/default/files/atoms/files/gomart_nocetti_tonon_europe_geopolitics_data_2018.pdf

[11] https://www.ifri.org/sites/default/files/atoms/files/tonon_govtech_nov2020.pdf

[12] https://www.ecranmobile.fr/Tous-Anti-Covid-passe-le-cap-des-10-millions-d-utilisateurs_a68494.html

[13] Jean-Christophe Noël, "What is Digital Power?", Etudes de l'Ifri, Ifri, November 2019.

[14] https://blogs.microsoft.com/on-the-issues/2020/11/13/health-care-cyberattacks-covid-19-paris-peace-forum/

others. The ability to create standards is an attribute of the digital power of a state. In December 2019, our study on China's smart city model presented how Chinese technology companies teamed up to propose an "in a box" smart city solution for urban areas located in emerging countries especially in Africa. Not only was it designed to opened new market for Chinas' technology champions, but it was also a core instrument of the Chinese government's expansion strategy (Belt & Road) through its active proselytism of the concept of safe city, rather than smart. "Trade tensions have already led to technological tensions, and the US-China rivalry will shape the way that smart cities develop globally. It is unlikely that smart cities will be able to smoothly combine Chinese and US/Western technologies in the future."[15]

Standards in healthcare are critical to any democratic society. Recent examples in countries like Japan and South Korea have shown that distributed systems which respect the individual's right to privacy while offering the possibility to collaborate in times of crises. Their response to the COVID-19 sanitary crisis helped debunk the Chinese narrative tying up use of technology and limitation of individual rights in a centrally managed system deployed in smart cities such as Wuhan, which was the epicenter of the pandemic.

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[15] Alice Ekman, "China's Smart Cities: The New Geopolitical Battleground", Etudes de l'Ifri, Ifri, December 2019.