



CEST

Centro de Estudos Sociedade e Tecnologia



Universidade de São Paulo

Bulletin - Volume 6, Number 08, November/2021

5G: Freedom to Dream

Marcel Simonette & Mário E. S. Magalhães

There is a market mantra that the arrival of the 5G network will be the solution to many problems. It will impact various sectors of society. Advantages due to easy connections and a revolution in the daily lives of companies. Opportunities for factories to improve production management with faster internet. And it will be the mechanism of significant impact on society through Smart Cities and the Internet of Things.

What really changes? Will we really have wonders that are unattainable today? How? When can we enjoy them? Where can we enjoy them? With what risks and with what challenges or new and unexpected consequences?

In practice, 5G changes a few things. It will allow us to put all our electrical and electronic devices on a high-speed communication network to exchange information that can take place in real-time, without waiting or delays, if our devices are prepared for it. The city or countryside, the environment we are in, must also be prepared by providing the 5G signal.

For cell phone users, the benefits are far from being a reality nationwide. The 5G auction, and the 5G by itself, do not materialize the promised benefits. There are bureaucracies to be overcome, such as permission to install antennas and towers, and tower sharing rules. The 5G antennas are smaller than the current ones, but the 5G frequency range presents difficulties in overcoming walls and other obstacles. Therefore, more antennas and, consequently, more towers will be needed, which will demand the sharing of towers among operators. The Brazilian Association of Telecommunications Infrastructure (Abrintel) estimates that the 5G network will need three to four times more antennas than the 4G network. Remember

that 4G technology is not yet a reality in large parts of the national territory or other countries.

5G technology is an enabler of technological development. However, due to the necessary changes in the current telecommunications infrastructure, it will take years for the advantages such as increased data transfer speed and decreased delay to be felt. Furthermore, there is the investment required by each individual and company to exchange their smartphones and other local network equipment.

This change will be accelerated when and if we have an application that will greatly benefit its users. The famous "killer application", like music on iPods, instant messaging on smartphones with voice and image, and

easy access to networks. This killer use of the 5G solution has yet to be delineated; perhaps it will be applications like a real-time Waze projected on the glass in our cars as a head-up display or some medical or entertainment application. We don't know yet. But when it appears, it will dominate the market and

lead to the adoption of technology like WhatsApp did (can anyone imagine, in Brazil today, messages without audio?). Or Tik Tok (where would dance video fever spread?).

Unlike 4G, in which the perception of speed gain and media consumption on cell phones brought practical advantages in the use of mobile telephony, 5G will not bring noticeable differences to the general user. Devices with processing power will have performance comparable to Wi-Fi networks connections, now widely available in the cities. However, in areas further away from the big cities, they will depend on the coverage of antennas or satellites, which may take some time.

For companies, the low latency, and the ability of 5G to handle a greater number of devices connected simultaneously will be a differential, considering companies with multiple locations in their production and/or commercial parks. In unique locations, 5G will

The 5G auction, and the 5G by itself, do not materialize the promised benefits. There are bureaucracies to be overcome



need to be an investment that must be justified against the data networks already in place. There is a lot to be done. Updating teams' knowledge about the specifics of 5G networks, planning and adapting processes to the new technology, and acquiring equipment and tools. A focus is needed on issues related to security and management of networks that with 5G become hybrid, part internal, partly provided by concessionaires or operators.

There is a fascination with technology in general. The technological evolution is inevitable, and it is always accompanied by positive and negative aspects.

It should be considered that the migration to 5G widens the inequality between urban regions, and between urban and rural areas, given the different economic capacities of the regions and the limitations of technology, for example, in the coverage of the rural regions. The same happens among people in their ability to acquire and master new technologies.

Security is a challenge. The 5G technology is a powerful tool for malicious people, as there are features that facilitate distributed service browsing attacks (DDoS) and other attacks based on "brute force" (forms of attack based on testing a large number or all the possibilities of a solution). As Nick Espinosa set it in the Fourth Law of Cybersecurity: "With innovation comes opportunity for exploitation." How we prepare security solutions to take advantage of 5G can decide the success or failure of the technology.

Companies are susceptible to these security risks. The investments required for cyber defence are complex, as there is the demand to allow multiple sites or employees at multiple locations to connect to the enterprise at high speed. The security perimeter becomes even more fluid, where any breach can quickly transmit large volumes of information, even before they are detected by DLP (Data Loss Prevention) strategies or solutions.

As a result, privacy risks are heightened for companies and individuals. The area covered by a 5G antenna signal, called the cell, is much smaller than the area covered by the 4G and 3G antennas. This allows much more accurate geolocation data to be obtained, leading to the possibility of accurately identifying the location and time of a position of a user of a 5G device. Location and tracking data are precious, both for marketing and monitoring people, and directly address issues related to privacy and the possibilities of social control in totalitarian regimes.

But there are always beneficiaries that emerge in times of change. In this case, the legal world must create the structures, contracts, rules, and laws to organize and protect all participants, on the other hand, the insurance companies. As a result, the cyber risk insurance modalities are expected to have significant growth. In addition, some applications can be a reality with 5G, which creates demands for specific insurance segments such as autonomous cars, smart homes, and material or bodily damage due to technical failures or resulting from cyber-attacks.

Without a doubt, 5G is a technology that allows us to think about new solutions and dreams. However, every solution must consider its complexity and unpredictable emergent behaviours, and not all dreams are good. Freedom to dream is not just dreaming.

The technological evolution is inevitable, and it is always accompanied by positive and negative aspects



Marcel Simonette is researcher at CEST-USP and Professor of the MBA-USP Data Science and Analytics at PECE – USP



Mario E. S. Magalhães is researcher at CEST-USP, his focus on Enterprise and IT Architecture, Digital Transformation, Dispute Resolution and Engineering Ethics in Sociotechnical Systems.

Academic Coordinator: Edison Spina

This article is a result of the author's ascertainment and analysis, without compulsorily reflecting CEST's opinion.