

# Social, Political and Human Challenges of the Digital Transformation

Luis T. Magalhães, IST.

At “Particle Physics: From Fundamental Science to Society – a tribute to Gaspar Barreira”, Univ. de Lisboa, 11 SEP 2019, session on The digital transformation challenges - focusing on data and advanced computing

Today I intend to point out shortly what I think are the most serious challenges of the digital transformation, namely the social, political and human challenges. This is very different from other talks in this conference, but when I thought about what I could address to better honour “Gaspar”, I could not think of a better theme than you will see why.

Before, let me say a few words about “Gaspar” and our encounter.

He was a most extraordinary person, whom I greatly admired, and we came to establish a very solid friendship.

I only met him when he was leading “LIP” while “Mariano Gago” was in his first term as minister.

I was President of FCT and every now and then we had to handle common business related to “LIP” management and to the Portugal-CERN program, in particular the training of young engineers at CERN.

These meetings were sufficient to grasp the high qualities of the Man, but the first real engaging encounter we had was when both of us were in minister “Gago” delegation in a visit to the White House Office of Science and Technology in Washington.

In spare time we had then the first opportunity of chatting about the real important things in life in between some interesting scientific and technical discussions.

I was so impressed by him at the time that I remember asking “Mariano Gago”: How did you find this extraordinary guy?!

Much later, when I was President of the Knowledge Society Agency, coordinating national ICT policy, and “Gaspar” was again leading “LIP” while “Gago” was in his second term as minister, we **worked** and **conspired** together for the creation of the European Grid Initiative trying to prevent its capture by some central European countries (in which together with Spanish and other allies we were partially successful) and for securing the financial and physical conditions for the effectiveness of the Portuguese Grid Initiative, and this part worked rather well. It was at that time that I met our Spanish colleagues in this session whom I am very happy to meet again here.

We talked frequently about general politics, and science and technology policy. And we found a surprisingly spontaneous agreement of concerns and views, even in the most controversial, and sometimes uncomfortable, issues, what happens only to like-minded persons.

-----

I should say much more about “Gaspar”, but let me use the little time left for trying to tell you what I think are the most important and difficult challenges of the **digital transformation**.

There is a tendency to look at it with a **technology-optimistic eye** and to concentrate on the wide opportunities it opens, on measuring and marvelling on its progress, and on fostering its adoption and possible economic benefits. But, as it usually happens in major technology revolutions, **the most important and difficult challenges are on how social, political and life-style processes adjust to the deep changes brought by a powerful enabling technology**.

The admirable progress that happened in **digital computer power and convenience**, in **mobile ever higher-speed telecommunications** and in **robotics** has indeed opened a wealth of opportunities unavailable just a few decades ago. The promises of **large data set analytics**, **artificial intelligence**, **further cyber-physical applications**, and **their convergence** in all realms of human intervention are staggering.

**The involved challenges are worth targets of the attention of the most creative minds.**

**In addition, national public policy must pay the highest attention to ensure the conditions for the flourishing of these areas at the frontiers of knowledge**, as being just a follower is not an option if we are to secure better quality of life conditions for our citizens in a competitive environment.

The awareness of the need of this driving of technology and knowledge is common, even if frequently the necessary well-tailored policies are not adopted and their urgency is overlooked.

**The development of these technologies in the benefit of citizens requires ambitious well-crafted public measures, even if this is a very difficult task.**

However, this is only one face of the coin.

The other face of the coin is that:

**1<sup>o</sup>) In economy:** Ever more powerful digital technology deployment, if untamed (this is if not **well regulated** and **taxed**, especially when provided from abroad) drives unbalanced higher concentration of capital in much fewer people and nations, due to the monopolist effects of large networks and the global reach and scalability of the immaterial digital technology. **Revenues of capital and of work drift further apart.**

Besides, digital systems replace routine workers in growing complexity tasks, so that **good job opportunities** require **more** and **different education**.

**2<sup>o</sup>) In society: Increasing knowledge** is required to deal well with sophisticated digital applications and to understand the conditions of their use for personal and collective benefit, which is rendered even more difficult by the emergence of large data set analytics, artificial intelligence and sophisticated cyber-physical applications. This again drives **increasing inequality** and requires **higher levels of general education** (for example, much higher analytic capacity and critical thinking); it is not just digital literacy and skills.

**3<sup>o</sup>) In politics:** The **representative democracy processes** developed for the time of printed paper one-to-many asynchronous mediated communication are **breaking down** with the prevalence of the instantaneous and visually compelling **TV communication** and the ludic interactive **social networks**, with the associated phenomena of **fake-news** that spread fast and are impossible to counter effectively with all who have received them, and also by the **tendency to just follow like-minded people** in social networks, opening an avenue to populist politicians.

**With the failure of traditional representative democracy, new political processes have to be developed for democracy to thrive in the digital society.**

**4<sup>o</sup>) In persons:** Smart-phone enabled digital communication and applications, if unchecked, **capture such an high attention span** of each person in superficial remote activities that **quality time for deep thinking, meaningful deliberation, concentrated analyses** and **study** becomes too scarce (we only need to watch digitally born millennials for a few hours and how they avidly they use smart-phones to grasp this).

**The catch** is that precisely when you need more knowledge and more advanced education to deal well with digital technology, you are more distracted by that technology and have less quality time to engage in deep personal learning. This requires **a change in life-style** to be enhanced by **education**, the proposal of **new engaging focuses of attention**, and **new processes in schools and other organizations**.

These are far more important and difficult challenges than the purely technological ones.

It is by answering these challenges that the sustainability of open democratic societies with human quality of life will be decided. And here is where "Gaspar" comes again because I am sure he would readily agree.

As scientists we have a special responsibility of contributing to tackle them. After all, if they are not overcome, science and technology progress would be worthless to humanity.

**We urgently need that these challenges be addressed at least as effectively as the challenges of digital technology progress.**

**We must quickly bring also this objective to our agendas and to the Public Policy Agenda.**