RESPONSE OF THE INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TO COVID-19 CRISIS

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Abstract: *The COVID-19 crisis has not only highlighted the critical role of information and communication technology (ICT) for the continued functioning of societies, but has also brought to the forefront the astonishing digital inequalities between and within countries.*

Linked to the strong belief that technology can be a source of good for everyone, members of ICT organizations have stepped up their efforts and engaged in activities that have proven essential to saving lives and maintaining economies at an somewhat level as acceptable.

In this study-article there were used many bibliographic sources, from countries on several continents and with different political and administrative regimes to highlight the very serious views and concerns of the scientific environment, supported by the respective political and state leaderships, in purpose to cooperate in order to find solutions to save this civilization from the current health catastrophe.

The authors, through their technical-military expertise, analyzed the most significant aspects related to the involvement of information and communication technology (ICT), seen as a positive response to the health crisis that has invaded humanity, managing to present some more important elements of its evolution.

Keywords: *Information and communication technology, Artificial Intelligence, digital transformation, digital services, telemedicine, cyber attackers.*

Introduction

The unprecedented COVID-19 crisis has demonstrated the vital role of information and communication technologies (ICTs) in mutual informing to state level but also to the level of ordinary people as well as in developing

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collaborative and supporting relationships to find the most appropriate medical and administrative solutions.

Now, more than ever, the International Telecommunication Union (ITU) has committed itself to harnessing the quality of its diverse members to make humanity safer, stronger and more connected.

ITU Secretary General Houlin Zhao appreciated that "*The resilience of networks and people since the onset of this pandemic has indeed been extraordinary. The world has seen the accelerated digitalization of many businesses and services, including teleworking and video conferencing systems in and out of the workplace, access to health care, education and essential goods and services*"[1].

It emerged from the concerns of the ITU that the information and communication technologies (ICT) sector responded positively to the information needs of the COVID-19 crisis, but also highlighted the importance of global connectivity as well as reducing the digital gap in the pandemic response. Since entering the world stage, COVID-19 has dramatically broken the existing scenario of how to govern countries, how to live with others and how to participate in the global economy. A paper, written by Klaus Schwab (founder of the *World Economic Forum*) and Thierry Malleret (author of the monthly *Barometer*), "COVID-19: The Great Reset"[2] takes into account Covid-19 far-reaching and dramatic implications for the world of tomorrow.

"The main objective of the book is to help understand what follows in a multitude of fields. Published in July 2020, in the midst of a crisis and when other waves of infection could occur, it is a hybrid between a contemporary essay and an academic snapshot of a crucial moment in history. It includes theory and practical examples, but it is mainly explanatory, containing many assumptions and ideas about how the post-pandemic world might, and perhaps should, look"[3].

I believe that 2020 is a crossroads year. The next year we can consider to be a stage of the great reset. A path will lead us to a better, more

[1] Houlin Zhao (ITU Secretary-General), *Tech's response to COVID-19,* ITU News MAGAZINE No. 03, 2020, p.1.
[2] Klaus Schwab, Thierry Malleret, *COVID-19: THE GREAT RESET,* Publisher: Forum Publishing, Year: 2020.
[3] *Ibidem,* p.4.

inclusive, fairer and more respectful world for *Mother Nature*. The other will take us into a world that resembles the one we just left behind - but worse and constantly defeated by ugly surprises. We therefore need to understand well that the challenges that are coming may be more important than we have so far chosen to imagine, but our reset capacity could also be greater than we previously dared to hope.

We are often advised to think at the macro level. But maybe we need to start thinking on a more micro level. We are good at imagining the great traditional dangers we face, however unlikely it may have become, such as military attacks and invasions and planning large-scale symmetrical responses for them.

Governments spend billions of dollars to achieve huge militarization, to track the movement of armies on the planet, and to play war games against potential enemies. The U.S. alone allocates nearly three-quarters of a trillion dollars to its defense budget each year. And yet, we were not prepared to defend ourselves against a small virus. It could prove that this viral stain will cause mankind the greatest economic, political and social damage since World War II.

Experience has shown that communities experiencing epidemics, or other adverse events, respond best and with the least anxiety when the normal social functioning of the community is least disrupted.

Yes, the economic and human consequences are obvious: More than 50 million Americans have applied for unemployment payment; The U.S. economy fell with 1/3 in the second quarter, the strongest decline ever recorded.

In a very recent paper on the negative effects of the Covid-19 epidemic and quarantine it is estimated that:

"The damage goes far beyond bank accounts. Since March, drug overdose deaths have increased from New Jersey to British Columbia; crimes have grown in many of the major American cities (We don't know exactly how much, because although we obsessively count coronavirus deaths in real time, we pay much less attention to other causes of death). Millions of "effective" surgeries have been delayed around the world, leading to untold misfortunes for patients suffering from chronic pain, joint

deficiencies and other conditions, and even death for people requiring heart surgery or cancer care.

Hundreds of millions of children around the world have been taken back the chance to learn and play at school. Anxiety and depression are on the rise; on social media people publicly declare they are proud that they have not been out for months. The lockdowns punished us all (except technology companies and social media who register record profits)"[4].

This analysis is not about the pandemic, but rather about the world that is born as a result of the pandemic and - more importantly - our responses to it. Any great shock can have various effects, depending on the state of the world at the time and how human beings react - with fear or denial and possibly adaptation. In the case of the new coronavirus, the impact is formed by the reality that the world is deeply technically interconnected, that most countries were not prepared for the pandemic, and that, in as its consequence, in many of them - including the richest nations in the world - societies and their economies were closed in a way unprecedented in human history.

This analysis is about a "post-pandemic world" not because the coronavirus is behind us, but because we have crossed a crucial threshold.

Almost everyone who is alive had been spared the experience of a serious infection until now. But now we know how a pandemic looks like. We have seen the challenges and costs of responding to this. The COVID-19 pandemic may persist, but even if it is eradicated, new outbreaks of other diseases may occur in the future.

With this knowledge and experience, we now live in a new era: post-pandemic.

What exactly are the consequences of this pandemic?

Some have suggested it would turn out to be the articulated event of modern history, a moment that changes its course forever. Others believe that after a vaccine, we will quickly return to social life as usual.

Others argue that the pandemic will not reshape history so much, but will accelerate it. This last scenario seems the most likely outcome. There is

[4] Alex Berenson, *Unreported Truths about COVID-19 and Lockdowns: Part 2: Update and Examination of Lockdowns as a Strategy,* Publisher: Blue Deep, Inc., Year: 2020, pp. 40-41.

an aphorism that "*There are decades when nothing happens but there are weeks in which decades happen*". The post-pandemic world will, in many ways, be an accelerated version of the world that we knew.

But when we put our lives in a fast advance, events no longer evolve naturally and the consequences can be disruptive, even deadly, and **all needs a big reset.**

Technological reset

When Klaus Schwab published in 2016 "The Fourth Industrial Revolution"[5], he argued that "*Technology and digitalization will revolutionize everything, making the adage overused and often misused << this time is different >> to be available this time. Quite simply, major technological innovations are on the verge of fueling important changes around the world*" [6].

In this paper we find a cluster of visionary ideas such as: ubiquitous supercomputers, mobile equipment, artificial intelligence robots, automated driving machines, ..., neuro-technological improvements of the brain, genetic editing. The evidence of dramatic change is around us and it is happening at an exponentially increasing speed.

Professor Klaus Schwab, founder and executive chairman of the World Economic Forum, has been at the heart of global affairs for over four decades. He is convinced that the period of change we are experiencing is more significant, and the ramifications of the last technological revolution are deeper than any previous period of human history. He called this era *the fourth industrial revolution*.

The multitude of ideas and wisdom in the global network of business, government, civil society and youth leaders are concerns of the World Economic Forum[7].

This book looks deeply at the future, which it has foreseen and is unfolding today, and how we can take collective responsibility to ensure that it is a positive one for all of us.

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[5] Klaus Schwab, *The Fourth Industrial Revolution*, Publisher: World Economic Forum, Geneva, Switzerland, 2016.

[6] *Ibidem,* p. 9.

[7] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 53.

In the four short years since then, technological progress has evolved impressively quickly. Artificial Intelligence (AI) is now around us, from drones and voice recognition to virtual assistants and translation software. Our mobile devices have become an integral and permanent part of our personal and professional lives, helping us on many different fronts, anticipating our needs, listening to us and locating us, even when they are not asked to do so.

Automation and robots reconfigure how companies work with amazing speed and scale returns unthinkable just a few years ago. Innovation in genetics, with synthetic biology now on the horizon is also interesting, paving the way for developments in healthcare that are innovative. Biotechnology still does not stop, as recent innovations have enabled the identification and sequencing of the coronavirus genome much faster than in the past, as well as the development of more effective diagnoses. In addition, the latest biotechnology techniques using RNA[8] and DNA platforms make it possible to develop vaccines faster than ever. They could also help develop new bioengineering treatments.

In short, the speed and scale of the *"Fourth Industrial Revolution"* have been and continue to be remarkable. This author argues that the pandemic will further accelerate innovation, catalyzing technological changes already under way (comparable to the exacerbating effect it has had on other underlying domestic and global problems) and it will be the "turbocharger" of any digital business or digital dimension of any business. It will also emphasize one of the biggest social and individual challenges raised by technology: privacy. We will see how contact tracking has an unparalleled capacity and has a quasi-essential place in the technical endowments needed to combat COVID-19, while being positioned to become a facilitator of mass surveillance.

[8] **RNA** – **R**ibo**n**ucleic **A**cid is a nucleic acid that uses hereditary information carried by **D**eoxyribo**n**ucleic **A**cid (DNA) for protein synthesis. The RNA molecule has a structure analogous to that of a strand of DNA. In the cell nucleus, the genetic information carried by DNA is transmitted into RNA, then translated into a cytoplasm protein that is the totality of the elements in a molecule, except the nucleus, *[Dicţionar de Medicină Larousse, Ed. Univers Enciclopedic 1998, Manualul Merk, ediţia a XVIII-a, Editura ALL]*.

Global change acceleration

With the pandemic, the *"digital transformation"* to which analysts have been referring for years, without being exactly sure what it meant, has found its catalyst. A major effect of the social closure will be the expansion and progress of the digital world in a decisive and often permanent way. This is visible not only in its most common and anecdotal aspects (more online conversations, more streaming for entertainment, more digital content in general), but also under conditions of forcing deeper changes in the way companies operate.

At national level, the risks to the field of national security and defense, according to the opinions of contemporary military specialists, expressed in a field's paper, are regarded as... *"in addition to the lack of borders, at the level of the new environment of manifestation of human society, other characteristics are overlapping such as the anonymity of the actions taken, the legislative gaps and not least the possibility of carrying out activities and actions in the permanent virtual environment from any place that are not conditional on a physical presence or the availability of major financial and technical resources"*[9].

In April 2020, several technological leaders noticed how quickly and radically the needs created by the health crisis precipitated the adoption of a wide range of technologies. In just one month, it emerged that many companies technologically took over, very quickly, a few lost years. For those with digital experience, this meant good things, while for others, a very poor (sometimes catastrophic) outlook.

Satya Nadella[10], Microsoft CEO, noted that social and physical distance requirements have created *"everything at a distance",* bringing the

[9] Gheorghe BOARU, Benedictos IORGA, *Implicațiile participării forțelor militare românești la operațiile de tip coaliție, asupra evoluției și dezvoltării Sistemului Militar Național de Comunicații și Informatic*, Editura SITECH, Craiova, 2020, p. 239.

[10] **Satya Narayana Nadella** is an Indian-American engineer. He currently serves as Microsoft's Chief Executive Officer (CEO), following Steve Ballmer in 2014. Prior to becoming Chief Executive Officer, he was The Executive Vice President of Microsoft Cloud Group and Enterprise Group, responsible for building and running the company's computing platforms, available at https://ro.wikipedia.org/wiki/Satya_Nadella, accessed on 04.11.2020.

adoption of a wide range of technologies by two years, while Sundar Pichai[11], CEO of Google, marveled at the impressive leap in digital activity, forecasting a *"significant and sustainable"* effect on sectors as different as online work, education, shopping, medicine and entertainment. Both specialists were cited by Richard Waters[12] in the article "*Lockdown has brought the digital future forward - but are we going to slide back?*"

Two American authors state in a recent paper that *"Despite all our advances and technologies over the last few centuries, we are still susceptible to the smallest things - a virus. In fact, owed to our technology, we could be even more vulnerable"*[13]. In the same paper he quotes the great inventor of Istria-Romanian origin Nikola Tesla (Nicolae Teslea, the original surname-Drăghici) who once said: *"There is a difference between progress and technology, progress benefits mankind. Technology does not necessarily do that"*[14].

The focus of efforts to conduct online activities often reduces user alertness, which can lead to loss or tainted information caused by various forms of cyber-attacks. *"Beyond such high-level attacks, reports of attacks on companies, which have also occurred in recent years, have also revealed that their losses have not been negligible. Such events highlighted the vulnerability of ICT and brought the European information security agenda to the forefront of important political issues. All this has sounded a strong*

[11] **Pichai Sundararajan**, also known as Sundar Pichai, is an Indian-American engineer, current chief executive of Alphabet Inc., and Google Inc., available at https://ro.wikipedia.org/wiki/Sundar_Pichai, accessed on 04.11.2020.
[12] Waters, Richard**,** *Lockdown has brought the digital future forward – but will we slip back?* Financial Times, 1 May 2020, available at https://www.ft.com/content/f1bf5ba5-1029-4252-9150-b4440478a2e7, accesed on 04.11.2020.
Authors note: Richard Waters is the west coast editor of FT, based in San Francisco. He leads a technology-focused team of writers in Silicon Valley. He also writes extensively about the technology industry and the uses and impact of technology. His current areas of interest include artificial intelligence and the growing power of major U.S. technology platforms, available at www.ft.com › richard-waters, accessed on 04.11.2020.
[13] Lawrence Knorr, Barbara Matthews, *After the Pandemic: Visions of Life Post COVID-19,* Sunbury press, Mechanicsburg, PA USA, April 27, 2020, p. 6.
[14] *Ibidem.*

alarm for the EU and convinced that cybersecurity must urgently move to the forefront of the EU's political agenda"[15].

Digital services consumers

During the lockdown, many consumers who previously were not willing to rely too much on digital apps and services were forced to change their habits almost overnight: watching movies online instead of going to the cinema, eating delivered meals instead of going out to restaurants, talking to friends from a distance instead of meeting them in the flesh and bones, talking to colleagues on a screen instead of chatting at a coffee shop, exercising online instead of going to the gym and so on. Thus, almost instantly, most things became *"electronic things":* e-learning, e-commerce, e-games, e-books, e-support.

Some of the old habits will surely return (the joy and pleasure of personal contacts cannot be matched - after all we are social animals!). But many of the technological behaviors that we were forced to adopt during the shutdown will become naturally more familiar. As social and physical distance persists, relying more on digital platforms to communicate, work or ask for advice, or order something, little by little, will gain ground on already rooted habits.

In addition, the advantages and disadvantages of online versus offline will be subject to constant control through a variety of objectives. If health considerations become paramount, we can decide, for example, that a cycling class in front of a home screen does not match the cohabitation and fun of doing so with a group in a live class, but it is actually safer (and cheaper!). The same reasoning applies to many different areas, such as participation into at a meeting (Zoom is safer, cheaper, greener and much more convenient), a distant family meeting for the weekend (the WhatsApp family group is not as fun, but again, safer, cheaper and more environmentally friendly) or even attendance to an academic course (not as satisfying, but cheaper and more convenient).

[15] Col. (rtr.) prof.univ.dr. Gheorghe Boaru, *Securitatea cibernetică în Uniunea Europeană*, Revista Academiei de Științe ale Securității Naționale, nr. 2/2017, p. 67.

Regulations and regulators

This transition to more "digital" in our professional and personal life will also be supported and accelerated by regulatory authorities. So far, governments have often slowed the pace of adoption of new technologies through lengthy meditations on what the best regulatory framework should look like, but, as the example of telemedicine and drone delivery now shows, a forced dramatic acceleration of necessity is possible.

During the lockdowns, there was a sudden quasi-global relaxation of regulations that had previously hindered progress in areas where technology had been available for years, because there were no better or available options.

What until recently was inconceivable suddenly became possible and we can be sure that even those patients who experienced how easy and convenient telemedicine was and even the regulators who did it, may want a return to normality.

"The new regulations will remain in place. In the same idea, a similar story unfolds in the U.S. with the Federal Aviation Authority, but also in other countries, related to the regulation of rapid tracking on the delivery of drones. The current imperative to propel, no matter what, the "contactless economy" and the subsequent desire of regulators to accelerate it mean that there are no restrictions.

What is true for sensitive areas until recently, such as telemedicine and drone delivery, also applies to more common and well-covered regulatory areas, such as mobile payments. Just to give a trivial example, in the middle of the lockdown (in April 2020), European banking regulators decided to increase the amount that buyers can pay using their mobile devices, while reducing authentication requirements that previously made it difficult to make payments using platforms such as PayPal or Venmo. Such movements will accelerate digital "prevalence" in our daily lives, though not without the contingent cybersecurity problems"[16].

Artificial Intelligence and jobs

In one form or another, social and physical distancing measures may persist after the pandemic itself disappears, justifying the decision in many

[16] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 54.

companies in different industries to accelerate automation. After a while, long-term concerns about technological unemployment will disappear, as companies stress the need to restructure the workplace in a way that minimizes close human contact.

"Indeed, automation technologies are particularly suitable for a world where human beings cannot get too close to each other or are willing to reduce their interactions"[17]. Our persistent and possibly lasting fear of being infected with a virus (COVID-19 or another) will thus accelerate the relentless march of automation, especially in the areas most likely to automate.

In 2016, two academics from Oxford University concluded (the paper: *"The Future of Employment: How Affordable Are Jobs By Computerization?"* in the Technological Forecast and Social Change journal) that "*up to 86% of restaurant jobs, 75% of retail jobs and 59% of entertainment jobs could be automated by 2035*"[18].

These three industries are among the most affected by the pandemic and where automation, for reasons of hygiene and cleanliness, will be a necessity which, in turn, will further accelerate the transition to more technology and more digital. There is an additional phenomenon set to support the expansion of automation: when *"economic distancing"* could follow social distance. As countries move inwards and global companies are shortening their super-efficient but very fragile supply chains, automation and robots, which allow for more local production while keeping costs low, will be highly sought after.

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[17] Klaus Schwab, Thierry Malleret, *op. cit*, p.54.

[18] Frey, Carl Benedikt and Michael A. Osborne, *The future of employment: How susceptible are jobs to computerisation?,* in Technological Forecasting and Social Change, vol. 114, January 2017, pp. 254-280, available at https://www.sciencedirect.com/science/-article/pii/S00401625 16302244*,* accessed on 20.01.2020.

The automation process was set in motion many years ago, but the critical issue is once again about the accelerated pace of change and transition: the pandemic will hasten the adoption of automation in the workplace and the introduction of more robots into our personal and professional lives.

Since the onset of lockdowns, it has become apparent that robots and AI were a "natural" alternative when human labor was not available. Furthermore, they have been used wherever possible to reduce health risks to human employees.

At a time when physical distancing became an obligation, robots were deployed to places as different as warehouses, supermarkets and hospitals in a wide range of activities, from shelving scanning (an area where AI has made huge progress) to cleaning and, of course, robotic delivery - an important component that will soon become an important part of health supply chains, which in turn will lead to the *"contactless"* delivery of food and other essential products.

With regard to many other technologies that were on the distant horizon of adoption (such as telemedicine), businesses, consumers and public authorities are now rushing to *turbo-fuel* the speed of adoption.

In cities as varied as Hangzhou, Washington DC and Tel Aviv, efforts are under way to move from pilot programs to large-scale operations capable of putting an army of delivery robots on land and in the air. Chinese e-commerce giants like Alibaba and jd.com are confident that in the next 12-18 months, autonomous delivery could become widespread in China - much earlier than anticipated before the pandemic.

Maximum attention is often focused on industrial robots, as they are the most visible face of automation, but radical acceleration also comes in automation of the workplace through software and machine learning. The so-called Robotic Process Automation (RPA) makes companies more efficient by installing computer software that rivals and replaces the actions of a human worker.

This can take many forms, from the Microsoft financial group to consolidating and simplifying reports, tools, and different content in an automated role-based custom portal, to an oil company that installs software that sends images of a pipeline to an AI engine, to compare images with an existing database and warn relevant employees of potential problems. In all

cases, RPA helps to reduce the time spent compiling and validating data and therefore reduces costs (to the detriment of a likely increase in unemployment, as defined as *"Economic reset"*).

During the height of the pandemic, RPA gained its reputation by proving its effectiveness in managing volume increases; thus, ratified in the post-pandemic era, the process will be launched and accelerated. Two examples demonstrate this point. RPA solutions have helped some hospitals disseminate COVID-19 test results, saving nurses activity up to three hours of work per day. Similarly, an AI digital device normally used to respond to online customer requests has been adapted to help digital medical platforms identify patients online for COVID-19 symptoms. For all these reasons, Bain & Company (a consulting company) estimates that the number of companies implementing this automation of business processes will double over the next two years, a timeline that the pandemic can shorten even further[19].

Tracking and monitoring contacts

An important lesson can be learned from countries that have been more effective in dealing with the pandemic (especially Asian nations): technology in general and digital aid in particular. Successful contact tracking has proven to be a key component of a successful strategy against COVID-19.

While lockdowns are effective at reducing the reproduction rate of the coronavirus, they do not eliminate the threat posed by the pandemic. In addition, they come, economically, at a harmful social cost. It will be very difficult to fight COVID-19 without an effective treatment or vaccine and, until then, the most effective way to reduce or stop transmission of the virus is by spreading testing followed by isolating cases, tracking contacts and quarantine contacts exposed to infected people.

[19] Heric, Michael, et al., *Intelligent Automation: Getting Employees to Embrace the Bots,* Bain &Company, 8 April 2020, available at https://www.bain.com/insights/intelligent-automation-getting-employeesembrace-bots, accessed on 05.10.2020.

As we will see below, *"in the process the technology can be a rapid shortening, allowing public health officials to quickly identify infected people, thus containing an outbreak before it begins to spread.*

The detection and follow-up of contacts are therefore essential components of the response of the public health authorities to COVID-19. Both terms are often used interchangeably, yet they have slightly different meanings. A tracking app gets real-time information, for example, determining a person's current location by geo-data through GPS coordinates or the location of the radio cell.

Instead, detection consists of obtaining retrospective perspectives, such as identifying physical contacts between people using Bluetooth. None of them offer a miraculous solution that completely stops the spread of the pandemic, but they make it possible to call the alarm almost immediately, allowing early intervention, thus limiting or specifying the outbreak, especially when it occurs in overspreading environments (such as a community or family gathering). For reasons of convenience and ease of reading, we will combine the two and use them interchangeably (as press articles often do)"[20].

The most effective form of identifying or tracking is obviously the technology-powered one: it not only allows the tracking back of all contacts with which the user of a mobile phone has been in contact, but also the tracking of the user's real-time movements, which in turn provides the possibility to better apply a lockdown and warn other mobile users situated near the COVID carrier that they have been exposed to an infected person.

It is no surprise that digital tracking has become one of the most sensitive public health issues, raising acute concerns about the privacy of the persons around the world.

In the early stages of the pandemic, many countries (mostly in East Asia, but also others such as Israel) decided to implement digital tracking in various forms. They went from retroactively tracking past contagion chains to real-time tracking of movements, to restrict a person infected with COVID-19 and to impose subsequent quarantines or partial lockdowns.

From the beginning, China, Hong Kong and South Korea have implemented coercive and intrusive digital tracking measures. They made

[20] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 55.

the decision to track people without their consent through their mobile and credit card data and even used video surveillance (in South Korea).

In addition, some economies have imposed mandatory electronic bracelets for travel arrivals and quarantined persons (in Hong Kong) to alert people who are likely to be infected. Others opted for "middle" solutions, where people placed in quarantine are equipped with a mobile phone to monitor their location and be publicly identified if they break the rules.

"The most popular digital tracking solution that was talked about was the TraceTogether app run by the Singapore Ministry of Health. It seems to provide the "ideal" balance between efficiency and privacy issues, keeping user data on the phone rather than on a server and assigning login data anonymously. Contact detection only works with the latest versions of Bluetooth (an obvious limitation in many less digitally advanced countries, where a large percentage of mobile phones do not have enough Bluetooth capacity for effective detection). Bluetooth accurately identifies the user's physical contacts with another user of the application at about two meters and, if there is a risk of COVID-19 transmission, the application will warn the contact, at which point the transmission of stored data to the ministry, regarding health status, becomes mandatory (but the anonymity of the contact is maintained). TraceTogether is therefore non-intrusive in terms of privacy, and its open source code makes it usable by any country anywhere in the world, yet the proponents of privacy object that there are still risks"[21].

If the entire population of a country downloaded the app and if there was a sharp increase in COVID-19 infections, then the app could end up identifying most people. Cyber intrusions, system operator trust issues, and data retention timing raise additional privacy issues.

There are also other options. These are mainly related to the availability of open and verifiable source codes and guarantees relating to data surveillance and duration of data preservation. Common standards and rules could be adopted, especially in the EU, where many citizens fear that the pandemic will force a compromise between their privacy and their health.

[21] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 55.

But as Margrethe Vestager, the EU Commissioner for Competition, observed: "*I think this is a false dilemma, because you can do so many things with technology that does not invade your privacy. I think very often, when people say it can only be done one way, it's because they want the data for their own purposes. We have made a set of guidelines, and with the Member States we have translated it into a toolbox, so that you can make a voluntary application with decentralized storage, with Bluetooth technology. You can use technology to track the virus, but you can still give people freedom of choice and, by doing so, people trust that the technology is for tracking viruses and not for other purposes. I think it is essential to show that we are really talking when we say that you should be able to trust technology when you use it, that this is not the beginning of a new era of surveillance. This is for tracking the virus, and this can help us open up our societies"*[22].

Again, we would like to stress that this is a rapid and extremely volatile situation. Apple and Google's announcement in April that they are working together to develop an app that health officials could use to control the movements and connections of a person infected with the virus indicates a possible exit for companies most concerned about data privacy and who fear digital surveillance above all else.

The person wearing the mobile phone should voluntarily download the app and should agree to share the data, and the two companies have made it clear that their technology will not be provided to public health agencies that do not comply with their privacy rules.

"But voluntary contact tracking applications have a problem: they maintain the privacy of their users, but are only effective when the level of participation is high enough - a question of collective action that once again emphasizes the deeply interconnected nature of modern life under individualism as the façade of contractual rights and obligations. No voluntary contract tracking app will work unless people are willing to provide their own personal data to the government agency that monitors the system; if any person refuses to download the app (and therefore refuse

[22] Chotiner, Isaac, *The Coronavirus and the Future of Big Tech*, The New Yorker, 29 April 2020, available at https://www.newyorker.com/news/q-and-a/the-coronavirus-and-the-future-of-big-, accessed on 05.06.2020.

information about a possible infection, movements and contacts), everyone will be negatively affected. Ultimately, citizens will only use the app if they consider it trustworthy, which is itself dependent on trust in the government and public authorities. At the end of June 2020, the experience with tracking applications was recent and mixed. Less than 30 countries have developed them"[23].

In Europe, some countries such as Germany and Italy have launched applications based on the system developed by Apple and Google, while other countries, such as France, have decided to develop their own app, raising interoperability issues. In general, technical issues and privacy concerns appeared to affect the use and adoption rate of the application.

Just to give a few examples: The UK, following technical errors and criticism from privacy activists, made a reverse change and decided to replace the internally developed contact tracking app with the model offered by Apple and Google. Norway has suspended use of its app for privacy reasons, while in France, just three weeks after its launch, the StopCovid app simply failed to launch, with a very low adoption rate (1.9 million people) followed by frequent decisions to uninstall it.

Today, there are about 5.2 billion smartphones in the world, each with the potential to help identify who is infected, where and often by whom. This unprecedented opportunity may explain why various surveys conducted in the U.S. and Europe during their lockdowns indicated that an increasing number of citizens seemed to favor the tracking of smartphones from public authorities (within very specific limits). But, as always, the devil lies in the details of politics and its execution.

"Questions such as whether digital tracking should be mandatory or voluntary, whether data should be collected anonymously or personally, and whether information should be collected privately or disclosed publicly contain many different shades of black and white, making it extremely difficult to accept on an unified digital tracking model in a collective way.

[23] Holmes, Oliver, et al., *Coronavirus mass surveillance could be here to stay, experts say*, The Guardian, 18 June 2020, available at https://www.theguardian.com/world/2020/jun/18/coronavirus-mass-surveillancecould-be-here-to-stay-tracking, accessed on 20.07.2020.

All these questions and the anxiety they can cause have been exacerbated by the growth of corporations that track the health of employees that emerged in the early stages of the national reopening. They will continually increase in relevance as the "crown pandemic" persists and fears other possible pandemic stretches.

As the coronavirus crisis withdraws and people begin to return to work, the corporate movement will be towards greater surveillance; for better or worse, companies will track and sometimes even record what their workforce does"[24].

The trend could take many different forms, from measuring body temperatures with thermal cameras to monitoring through an application how employees respect social distance. This is bound to raise deep regulatory and privacy issues, which many companies will reject by arguing that if they do not increase digital surveillance, they will not be able to reopen and operate without risking new infections (and will in some cases be responsible). Thus, they will "quote" health and safety as justification for increased surveillance.

The continuing concern expressed by legislators, academics and trade unionists is that supervisory tools will remain in place after the crisis and even when a vaccine is eventually found, simply because employers have no incentive to eliminate a surveillance system once it has been installed, especially if one of the indirect benefits of supervision is to check employee productivity.

This was the case after the terrorist attacks of September 11, 2001. Around the world, new security measures, such as the widespread use of cameras, the need for electronic identity cards and the registration of employees or visitors, in and out, have become rules. At the time, these measures were considered extreme, but today they are used everywhere and considered *"normal"*.

A growing number of analysts, policy makers and security professionals fear that the same will now happen with the technological solutions put in place to counter the pandemic. They foresee a dystopian world before us.

[24] Klaus Schwab, Thierry Malleret, *op. cit.,* pp. 56-57.

Dystopia risk[25]

A dystopian society is characterized by the presence of one of the authoritarian or totalitarian forms of government or by some form of oppression or social control[26].

Now that information and communication technologies penetrate almost every aspect of our lives and forms of social participation, any digital experience we have can be transformed into a *"product"* designed to monitor and anticipate our behavior.

"The risk of possible dystopia comes from this observation. In recent years, it has fed countless works of art, from novels such as "The Handmaid's Tale" to "The Black Mirror" TV series. In academia, it finds expression in research undertaken by scholars such as Shoshana Zuboff. Her book "Surveillance Capitalism" warns of reinventing customers as data sources, transforming the economy, politics, society and our own lives by producing deeply anti-democratic asymmetries of knowledge and power that accumulate knowledge"[27].

In the coming months and years, the exchange between public health benefits and loss of privacy will be carefully weighed, becoming the subject of many animated conversations and heated debates.

Most people, fearing the danger posed by COVID-19, will ask: Isn't it foolish not to use the power of technology to come to our salvation when we are victims of an outbreak and face a life-and-death situation? Then they will be willing to give up a lot of confidentiality and agree that, in such circumstances, public power can rightly remove individual rights. Then, when the crisis is over, some may realize that their country has suddenly turned into a place where they no longer want to live. This thought process is nothing new.

"In recent years, both governments and business companies have used increasingly sophisticated technologies to monitor and sometimes

[25] **DYSTOPIA** - Modern term constructed in opposition to *utopia* and which applies to an imagined and negative world. Among the dystopian creations are more famous "Time Machine" by G. H. Wells, "1984" by G. Orwell and "We" by E. Zamiatin.

[26] ro.wikipedia.org › wiki › Distopie.

[27] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 57.

manipulate citizens and employees; if we are not vigilant, warns privacy advocates, the pandemic will mark an important point in the history of supervision"[28].

The argument put forward by those who fear, especially, by the control of technology over personal freedom is clear and simple: in the name of public health, some elements of privacy will be abandoned for the benefit of the closure of an epidemic, just as the terrorist attacks of 11 September have triggered greater and permanent security in the name of protecting public safety. Then, without realizing it, we will fall victim to surveillance of new powers that will never retreat and that could be redirected as political means going to sinister ends.

As the latest news has exposed beyond a reasonable doubt that the pandemic could open an era of active health surveillance, made possible by detecting smartphone location, facial recognition, cameras and other technologies that identify sources of infection and track the spread of a disease in almost real time.

Despite all the precautions that some countries take to control the power of technology and limit surveillance (others are not so concerned), some thinkers worry about how some of the quick choices we make today will influence our societies for years to come. The historian Yuval Noah Harari is one of them.

In a recent article, he argues that *"we will make a fundamental choice between totalitarian surveillance and citizen empowerment. It is worth putting out his argument in detail: surveillance technology is developing at high speed and what seemed science fiction 10 years ago is today old news. As a thought experiment, one should consider a hypothetical government that requires each citizen to wear a biometric bracelet that monitors body temperature and heart rate 24 hours a day. The resulting data is accumulated and analyzed by government algorithms.*

Algorithms will know that you are sick even before you know it, and they will also know where you have been and who you have met. The chains of infection could be drastically shortened and even cut altogether. Such a

[28] Harari, Yuval Noah, *The world after coronavirus*, Financial Times, 20 March 2020, available at https://www.ft.com/content/ 19d90308-6858-11ea-a3c9-1fe6fedcca75, accessed on 05.05.2020.

system could undoubtedly stop the epidemic in a few days. Sounds great, doesn't it? The downside is, of course, that this would give legitimacy to a terrifying new surveillance system"[29].

But if you can monitor what happens to body temperature, blood pressure and heart rate while watching a video, you can find out what makes me laugh, what makes me cry and what makes me really angry. It is crucial to remember that anger, joy, boredom and love are biological phenomena just like fever and cough. The same technology that identifies cough could also identify laughter. If corporations and governments start collecting our biometric metadata, they can know us much better than we know ourselves, and then not only can they predict our feelings, but they can manipulate our feelings and sell us whatever they want - either a product or a politician.

"Biometric monitoring would make Cambridge Analytica data hacking tactics seem something from the Stone Age. Imagine North Korea in 2030, when every citizen has to wear a biometric bracelet 24 hours a day. If you listen to a speech by the Great Leader and the bracelet picks up the story signs of anger, you are finished"[30].

We will be warned! Some social commentators, such as Evgeny Morozov[31], go even further, convinced that the pandemic heralds a dark future of techno-totalitarian state surveillance. His argument, based on the concept of *"technological solutionism"* presented in a book written in 2012, argues that the *"technological solutions"* offered to contain the pandemic will necessarily take surveillance to the next level. He sees evidence of this in two distinct aspects of *"solutionism"* in the government's responses to the pandemic. On the one hand, there are *"progressive solutionists"* who believe that adequate exposure through an app to the correct information about infection could cause people to behave in the public interest. On the other hand, there are *"punitive solutionists"* determined to use vast digital

[29] Harari, Yuval Noah, *op. cit.*
[30] *Ibidem.*
[31] Morozov, Evgeny, *The tech 'solutions' for coronavirus take the surveillance state to the next level*, The Guardian, 25 April 2020, available at https://www.theguardian.com/-commentisfree/2020/apr/15/techcoronavirus-surveilance-state-digital-disrupt, accessed on 20.05.2020.

surveillance infrastructure to reduce our daily activities and punish any violation.

What Morozov perceives as the greatest and ultimate danger to our political systems and freedoms is that the *"successful"* example of technology in monitoring and containing the pandemic will strengthen the solutionist toolkit as the default option for addressing all other existential issues - from inequality to climate change. *"After all, it is much easier to implement a solutionist technology to influence individual behavior than to ask difficult political questions about the root causes of these crises"*[32].

Accelerating digitization

In the pre-pandemic era, the rumor of *"digital transformation"* was the mantra (sacred formula with magical and educational value) of most councils and executive committees.

"Digital was the "key", it had to be implemented "decisively" and it was seen as a < Prerequisite for success! >> Since then, in just a few months, the mantra has become a necessity - even, in the case of some companies, a matter of life or death. This is explicable and understandable. During the shutdown, we depended entirely on the Net for most things: from work and education to socialization.

Online services have allowed us to maintain a semblance of normality and it is natural that "online" is the biggest beneficiary of the pandemic, giving an extraordinary boost to the technologies and processes that allow us to do things remotely: universal broadband internet, mobile and remote payments and viable e-government services, among others"[33].

As a direct consequence, companies that were already operating online had to benefit from a lasting competitive advantage. As more and more things and services are offered through our mobile phones and computers, companies will thrive in sectors as disparate as e-commerce, contactless operations, digital content, robots and drone deliveries (to name a few). It is not by chance that companies like Alibaba, Amazon, Netflix and Zoom have emerged as *"winners"* from pandemic lockdowns.

In general, the consumer sector moved first and fastest. From the contactless experience required of many food and retail companies during

[32] Morozov, Evgeny, *op.cit.*
[33] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 60.

the lockdown to virtual showrooms in the manufacturing industry, allowing customers to browse and choose the products they like the most, thus, most business-to-consumer companies quickly understood the need to offer customers a digital journey *"from start to finish"*.

"As some lockdowns ended and some economies came back to life, similar opportunities emerged in business-to-business applications, especially in manufacturing where physical distance and rules had to be implemented with short notice, often in difficult environments (e.g. on assembly lines). As a direct result, IoT (Internet of Things) made an impressive foray. Some companies that have been slow in the past, before the lockdown, in adopting IoT now embrace it largely with the specific goal of doing as many things remotely as possible"[34].

Equipment maintenance, management inventory, relationships with suppliers or safety strategies: all these different activities can now be performed (largely) through a computer. IoT offers companies not only the means to execute and comply with the rules of social distancing, but also to reduce costs and implement more agile operations.

But there are also risks posed by cyber attackers who are sometimes more agile than Internet users as individuals or institutions.

"We need to devote more intellectual effort to analyzing the impact of this technology, the vulnerabilities it creates and the optimal way to mitigate vulnerabilities. This intellectual effort must also be directed towards the ethical and moral dimensions and obligations of the competent bodies of the state to protect the privacy and safety of its citizens against catastrophes that may be caused by cyber attackers" [35].

During the height of the pandemic, O2O - from online to offline - gained a major change, underlining the importance of having both an online and offline presence.

This phenomenon of blurring the distinction between online and offline, as identified by the famous scientific fiction writer William Gibson,

[34] Klaus Schwab, Thierry Malleret, *op. cit.,* p. 60.

[35] Col. (ret.) Professor Gheorghe Boaru, Ph.D., *PANDEMIA DE CORONAVIRUS ȘI SECURITATEA CIBERNETICĂ*, Revista Academiei de Științe ale Securității Naționale nr.1 (08), Year V/2020, p. 43.

who stated *"Our world is eternal",* with the relentless opening of cyberspace, emerged as one of the strongest trends of the post-COVID-19 era.

The pandemic crisis accelerated this eversion phenomenon, as it forced us and encouraged us towards a digital world, *"without weight",* faster than ever, thus, more economic activities had no choice but to conduct themselves digitally: education, consultancy, publishing and much more. "*We could go so far as to say that, for a while, teleportation replaced transport: most executive committee meetings, board meetings, team meetings, brainstorming exercises and other forms of personal or social interaction had to take place remotely. This new reality is captured in the market capitalization of Zoom (the videoconference company) which climbed to $70 billion in June 2020, the largest (at that time) than that of any U.S. airline.*

At the same time, large online companies such as Amazon and Alibaba have expanded decisively in the O2O business, especially in retail and logistics"[36].

Trends such as telemedicine or remote work that have spread widely during the shutdown are unlikely to retreat - for them it will never return to the status quo that prevailed before the pandemic. Telemedicine, in particular, will benefit considerably. For obvious reasons, healthcare is one of the most heavily regulated industries in the world, which inevitably slows the pace of innovation. But the need to address the pandemic with any available means (plus, during the outbreak, the need to protect health workers by allowing them to work remotely) has removed some of the regulatory and legislative impediments related to the adoption of telemedicine.

In the future, it is certain that more medical care will be provided remotely. In turn, it will accelerate the trend towards easier and at home diagnosis, such as smart toilets capable of tracking health data and carrying out health tests. Similarly, the pandemic may prove to be an advantage for online education.

[36] Thornhill, John, *How Covid-19 is accelerating the shift from transport to teleport*, Financial Times, 30 March 2020, available at https://www.ft.com/content/050ea832-7268-11ea-95fe-fcd274e920ca, accessed on 25.05.2020.

In Asia, the shift to online education has been particularly notable, with a sharp increase in the number of digital student enrolments, a much higher rating for online education companies and more available capital for *"ed-tech"* start-ups. The flipside of this particular currency will be an increase in pressure on institutions that offer traditional methods of education to validate their value and justify their fees.

Interesting are also the developments in the "IT industry" of the Russian Federation presented in an exceptional study[37], valuable both by the freshness of the data (August 2020) and by the contributions of the authors (14 of whom are ministers), published on 9 October 2020 in a volume of 740 pages.

Before the crisis it is appreciated that "... the specificity of the Russian IT industry lies in the fact that the main sales volume is not accounted for by the sold software, but by custom development and IT integration services. This accounts for about 2/3 of the domestic IT market and the bulk of the IT services export. And although domestic export teams are concentrated in the highly skilled outsourcing sector, the current situation has a negative side. In fact, accustomed development is a kind of latent brain drain, as Russian programmers work to create products for the benefit of foreign corporations. Inadequate equity prevents Russian IT companies from investing in the development and marketing of circulating products and loans in high-margin segments of the global software market"[38].

During the pandemic the *IT industry* of the Russian Federation experienced spectacular developments as well as new uses. Thus, it is considered that *"The development of digital technologies and telecommunications infrastructure, as it turned out with the onset of the pandemic, has reached such a high level that, in just a few weeks, it has been possible to significantly mitigate and, in certain sectors of the*

[37] В. А. Мау (главный редактор), Г. И. Идрисов, Я. И. Кузьминов, А. Д. Радыгин, В. А. Садовничий, С. Г. Синельников-Мурылев, *ОБЩЕСТВО И ПАНДЕМИЯ Опыт и уроки борьбы с COVID-19 в России (*author's note*: Society and pandemics. Experience and lessons in the fight against COVID-19 in Russia)*, Москва, 2020.
[38] *Ibidem*, p. 386.

economy, overcome the epidemiological barriers that have arisen. After the introduction of the self-isolation regime, Russian businesses, universities and authorities were able to quickly organize the remote work of employees, which was facilitated, in particular, by the IT infrastructure previously created. The most popular solutions were for videoconferencing, remote access, teamwork, cloud storage, identity and digital signature"[39].

In the *"Western world"* the amplification of the digitization of many areas of social life has allowed some activities to continue to be carried out with performances that ensure the life close to normality of people. An enlightening example is that of the UK. *"In the UK, less than 1% of initial medical consultations took place via video link in 2019; under lockdown, 100% are done remotely. In another example, a top U.S. retailer in 2019 wanted to launch a limited delivery business and its plan was expected to last 18 months. During the lockdown, it went into operation in less than a week - allowing it to serve its customers while maintaining the livelihoods of its workforce. Online banking interactions increased to 90% during the crisis, from 10%, without a decrease in quality and an increase in compliance, while providing a customer experience that is not just about online banking"*[40]. Similar examples abound.

The response to the mitigation of social relations to the pandemic and the physical distancing measures imposed during the lockdown will also lead to the emergence of e-commerce as an industry with a growing trend. Consumers need products and, if they cannot shop, they will inevitably resort to purchasing them online. As it becomes habit, people who had never bought online before will start to feel comfortable with this process, while people who have *"partly"* bought online probably rely more on this system. This was evident during the lockdowns. In the U.S., Amazon and Walmart have hired 250,000 workers to keep up with rising demand and built a massive infrastructure for online delivery. This accelerated growth in e-commerce means that giants in the online retail industry are likely to emerge

[39] B. A. May et al., *op. cit.,* p. 386.
[40] Sneader, Kevin and Shubham Singhal, *From thinking about the next normal to making it work: What to stop, start, and accelerate*, McKinsey & Company, 15 May 2020, available at https://www.mckinsey.com/featuredinsights/leadership/ from-thinking-about-the-next-normal-to-making-it-work-what-to-stop-start-andaccelerate#, accessed on 25.06.2020.

from the crisis even stronger than they were in the pre-pandemic era. There are always two parts to a story: as the habit of shopping online becomes more widespread, it will further discourage direct retail sales.

Conclusions

Baruch Spinoza (Latinized: Benedictus of Spinoza), the 17th-century philosopher who resisted oppressive authority all his life, had the famous reflection: *"Fear cannot be deprived of hope and hope of fear"*. This is a good guiding principle to conclude this article (study), along with the thought that nothing is inevitable and that we must be symmetrically aware of both good and bad results. Dystopian scenarios are not a fatality. It is true that in the post-pandemic era, personal health and well-being will become a much higher priority for society, which is why the genius of technological surveillance will not be put back into the glass globe.

It is important for those who govern but also for each of us personally that we can control and harness the benefits of technology without sacrificing our individual and collective values and freedoms.

People worry that as AI becomes more developed, we will rely on our computers so much that we will end up thinking of them as friends and becoming incapable of living without them.

Our phone can already give us more information than any human we know. It can solve complex tasks in a nanosecond. It can make us joyful with entertainment content from current or past time and space. And yet, we can never confuse it with a friend. The smarter a machine becomes in calculating data and providing answers, the more it forces us to think about what is uniquely human about us, beyond our ability to reason.

In fact, intelligent machines could make us award our human companions even more for their creativity, fad, unpredictability, warmth and privacy. That is not such a weird thought.

Much of their history, people have been praised for many qualities, other than their power to calculate - bravery, loyalty, generosity, faith, love. Now the rush to digital life is broad, fast and *"ruthless"* real.

We believe that whatever technological developments and whatever the rules are, people can never be robots. And the robots should be used only for the good of the people.

Perhaps one of the profound consequences of the *technological explosion* will be that it could make us prize more the human values within us, which will remain unaltered.

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