Arocena *et al.*
European Journal of Futures Research (2022) 10:3
https://doi.org/10.1186/s40309-022-00189-4

European Journal
of Futures Research

RESEARCH ARTICLE

Technological disruption and democracy in the twenty-first century

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Summary

In 2019, sociologist Manuel Castells categorically stated that liberal democracy has exhausted its historical trajectory and, quoting some verses by Octavio Paz, expressed: "Not what it could have been:/it is what it was./And what it was is dead." In this paper, we will reflect on this diagnosis based on five interrelated questions. To what extent is liberal democracy being affected by the current informational technological acceleration? Is there really a democratic crisis? What lessons can be learned from the Cambridge Analytica event? Will it be possible to manipulate feelings: hacking humans? What are the paths available for the future?

Introduction

At least until 2015, the Internet and social networks enjoyed enormous popularity due to their democratizing qualities. There was no question, or apparently not enough evidence to question, about a possible negative impact. The most skeptical just questioned the importance of social networks without noticing negative effects[1]. Indeed, during the so-called Arab Spring (2010–2013), Western media and to a lesser extent political elites and academic circles (see, e.g., [5]), were quick to highlight the virtues of the Facebook, YouTube, and Twitter revolutions. Young people "connected by the Internet" put an end to "despotism and corruption," highlighted *El País* of Madrid[2]. The networks, said the *New York Times*, offered "a way for the discontented to organize and mobilize". More effectively than political parties, it continued, "the strength and agility of the networks clearly caught up with the authorities[3]." The premise was appealing in its simplicity: networks gave voice to citizens who feel underrepresented by the establishment or oppressed by tyrannical leaders.

The optimistic narrative that the Internet and social networks were a powerful medium for the spread of liberal democracy lost steam sometime later. History was repeating itself: *homo twitter* turned out to be just as manipulable as *homo videns*. And social networks, an agora shared by citizens committed to democracy, was also used by tyrants and extremists. The "democratic alarm bells" of the West went off after Donald Trump's triumph.

As it later turned out, Cambridge Analytica, aided by Facebook's security omissions, had attempted to manipulate US voters by becoming a key player in the 2016 presidential election. Despite the difficulties to isolate this effect empirically and to establish the weight of this variable on Donald Trump's victory, it is worth asking: to what extent is liberal democracy being affected by the current information technology revolution? Is there really a democratic crisis linked to technological acceleration? What lessons can be learned from the Cambridge Analytica event? and What are the paths

[1] Peter Beaumont, "The truth about Twitter, Facebook and the uprising in the Aarab world": https://www.theguardian.com/world/2011/feb/25/twitter-facebook-uprisings-arab-libya:

[2] Javier Valenzuela, "Europa y la revolución democrática árabe": https://elpais.com/diario/2011/01/29/opinion/1296255611_850215.html

[3] Jennifer Preston, "Movement began with outrage and a Facebook page that gave it an outlet": https://www.nytimes.com/2011/02/06/world/middleeast/06face.html

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available for the future? Seeking to provide a rough answer to these questions, this paper critically reflects on the premises of Yuval Noah Harari [14, 15] and Manuel Castells [6, 7] on the crisis of the liberal narrative, and in particular of democracy. Roughly speaking, according to the first author, while it is unlikely that in the coming decades we will face a robot rebellion, it is likely that democracy will face, increasingly more frequently, to armies of bots that, using the information we provide online, seek to sell us not only commercial products but also political products and ideologies. And for Manuel Castells, liberal democracy is in an acute crisis of legitimacy because the institutions on which it was built do not have the confidence of the population; neither the states, political parties, Catholic Church, the judiciary nor the media have the necessary legitimacy among citizens, undermined in part by political corruption, media scandals and awareness of the enormous economic inequality that characterizes today's societies. If it is also true that there are some exceptions in particular countries regarding some of these institutions, which still maintain significant levels of trust, data for the past decades show an overall descending trend in the confidence and legitimacy of democracy[4]. We must also mention that the promise of expansion of liberal democracy, together with the wave of globalization of information technologies to areas other than the "West" in the twenty-first century, has not occurred. Authoritarian regimes in much of Asian and African countries have not changed with the expansion of communication technologies. So much so that for this sociologist, one of the most brilliant interpreters of the information age, and an enthusiastic defender of the democratizing power of the Internet at the beginning of the millennium, "today liberal democracy has exhausted its historical journey" [7] and it is necessary to re-found it in new institutions that awaken the legitimacy of citizens in the third decade of the twenty-first century.

The following is a brief state of the art on the current information technology revolution, a reflection on the limits and possibilities of democracy, and a consideration of the challenges facing this political regime in the face of some of the most significant technological advances.

The information technology revolution: where we have come from, where we are now, and where we are headed

The starting point of this brief state of the art is to underline a perceptible reality: we are witnessing a process of far-reaching transformations that is rapidly taking hold and technological acceleration is one of its main drivers. However, to understand where we are, we must make the effort to trace where we have come from and project some possible futures where we are headed, knowing that in the latter case we will be wrong. For analytical purposes, it is possible to argue that the course of human history has been shaped by different revolutions. Revolutions, says Karl Schwab, "[...] have occurred throughout history when new technologies and new ways of perceiving the world have been introduced triggering a profound change in economic systems and social structures" ([31]: 14).

The cognitive revolution marked the beginning of human history. The development of an upright posture, opposable thumbs and mainly changes in the brain and in the neurological organization of homo sapiens led to a great leap in their cognitive capacity. As a consequence, humans managed to think in unprecedented ways, communicate using a new type of language and culturally accumulate information [3, 14]. These capabilities allowed the development of more efficient technologies for production, transportation, and communication, giving way, tens of thousands of years later, to the agricultural revolution. The manipulation of different species of animals and plants improved food production, while stimulating population growth by facilitating the emergence of larger human settlements. Mechanical production, marked by the invention of the steam engine and the construction of the railroad, was the first step in the industrial revolution that had just begun in the eighteenth century. Subsequently, the advent of electricity and the assembly line gave way to mass production, the second major link in the industrial revolution. Finally, the development of computers and the Internet in the 1960s gave rise to the so-called third industrial revolution [3, 13, 31]. Regardless of whether we accept the idea that we are currently at the dawn of the fourth industrial revolution, as Schwab argues, or still continue in the third industrial revolution, as another sector of the literature indicates [26], we are, as stated at the beginning, facing a perceptible set of events. What are the characteristics of this new revolution and what effects could be expected in the near future?

According to Schwab [31], the current technological revolution is characterized, first of all, by the speed of innovation and diffusion: "everything is happening at a much faster pace than ever before." Unlike previous revolutions, change is no longer linear but exponential and marches at the pace of Moore's Law, according to which computational power doubles every 18 months [33]. The possibilities of having millions of people connected via the Internet has resulted in unprecedented data processing and storage capacity. As a consequence, each new technology begets, in turn, newer and more powerful technology. A second characteristic lies in the

[4] See for example Latinobarometer and Eurobarometer and the descending support for democracy considered as "the best political system".

breadth and depth of the changes: many radical changes are occurring simultaneously. The interaction of various disciplines and discoveries of different kinds have ceased to be part of fiction and have become tangible realities. Today, the fusion of technologies encompasses various fields and three megatrends can be highlighted: (i) physical: autonomous vehicles, 3D printing, advanced robotics, new smart materials that self-repair or clean themselves; (ii) digital: Internet of things, AI; and, (iii) biological: genetic manipulation and advances in the field of medicine ([31]: 22–31). Finally, a third characteristic is related to the profound transformation generated by the impact of these new developments. Not only are we witnessing the creation of new business models and the reshaping of production, consumption, and transportation systems, but, at the societal level, a paradigm shift is occurring in the way we communicate, express ourselves, inform, entertain, and even in how our governments and various policy areas are managed.

Despite the relative consensus on the major current trends, there is no single narrative on how to live with these changes, let alone what will happen in the future. Authors such as Bill Joy [19] and more recently Kevin Kelly [20], draw attention regarding the presence of at least a triad of narratives: utopian, dystopian, and protopian. While the former argue that technological progress—artificial intelligence, gene editing and nanotechnologies—will bring with it the possibility of transcending the natural evolution of the human species through the mastery of artificial selection creating "super humans," the latter assert that the possibility of an unprecedented accumulation of power in the hands of isolated individuals or restricted groups with easy access to knowledge and materials and self-reproducing power of new technologies, poses a greater threat than nuclear weapons. Finally, in the midst of these antagonistic visions, those who argue that technology will lead us toward protopia argue that the future is neither so dramatic nor so exciting and call for acceptance of the "inevitable" trends imposed by the technological revolution.

Given the multiplicity of scenarios, there are a variety of reactions and positions regarding what could be assumed in the face of the changes. From those who, in line with the first account, advocate an unrestricted impulse to technological innovations, to those who perceive that the prohibition of technological progress is the necessary path, and finally those who prefer to adopt a vigilant posture towards the inevitable trends imposed by the technological revolutions in artificial intelligence, genetic engineering and robotics, excluding both extremes. As will be seen in the following sections, this variety of narratives, challenges and possible paths to follow are also present in discussions related to democracy.

The boundary between the "ideal" and the "real": the Gordian knot of democracy

Democracy is one of the issues that has aroused most interest among scholars in the social sciences and humanities. Without the need for an exhaustive analysis, it is possible to identify multiple ways of defining and redefining this concept. Such is the proliferation that in their classic work on democracy with adjectives, Collier and Levitsky [8] managed to identify 550 sub-types of democracy. What is certain is that after the process that Samuel Huntington [17] called the third wave of democratization, and once the various transitions were over, most of the countries that accompanied that wave, many of them Latin American, managed to maintain, with logical variations, that political regime. However, if we look at any index of democracy, we will clearly see that this political order is almost totally restricted to the regions of the world that we place in the West, including Latin America ("the other West") and Oceania. In the rest of the world, democracy is something exceptional and infrequent, and some more recent democratization processes that held promise, such as the Arab Spring, have ended in disappointing failures. A quick look to any Democracy Index shows clearly that liberal democracies are still concentrated in Europe, Oceania and the Americas. In the Democracy Index elaborated by *The Economist* in 2020, only 23 countries from 167 analyzed, are categorized as "full democracies," and 20 of them are concentrated in these areas of the globe, (being the other three countries Japan, South Korea, and Mauritius).

As democracy, as a unit of analysis, increased, researchers began to ask new questions and use new variables that would make it possible to complexify and observe the different attributes of this "new phenomenon." A clear example of this was the rise of studies on the quality of democracy [11] and democratic deficit [1]. However, despite the increase in standards and measurement tools, consensus on the conceptualization of democracy is far from being achieved [10]. Perhaps, one of the keys lies, as Pierre Rosanvallon ([27]: 29) recently suggested, in the fact that: "Historically, democracy has always manifested itself as both a promise and a problem. Promise of a regime in accordance with the needs of society, founded on the realization of a double imperative of equality and autonomy. The problem of a reality that is often far from satisfying these noble ideals." Since it is a human construct, full of expectations and disappointments, determining the real scope of democracy is no easy task. As Guillermo O'Donnell observed, even if we were able to "[...] establish a boundary point that separates all democracies from all non-democracies, the location of that point depends on the questions we ask, and will therefore always be arbitrary" ([22]:70).

Some of the most prominent scholars of political science have done battle in this area. Norberto Bobbio [2] called attention to the false promises of democracy, highlighting structural inadequacies in matters of participation, representation, power and transparency. Giovanni Sartori [28], for his part, made a distinction between real democracies, as they exist in reality, and ideal democracies, i.e., as we would like them to be. Even more radically, Robert Dahl [9] argued that democracy is not possible, coining the term polyarchy.

More recently, in *What to Expect from Democracy. Limits and possibilities of self-government*, Adam Przeworski [25] attempted to free real democracies from the false expectations of the ideal of self-government. According to the author, representative democracy has failed to solve, and probably will not solve, four challenges that, even today, continue to provoke widespread dissatisfaction. Przeworski begins his analysis by exploring the controversial terrain of equality. According to him, one of the most incisive criticisms of democracy is based on its inability to generate socioeconomic equality and, as a result, to forge a social situation where political equality coexists with social and economic inequality. According to the author, in modern societies, where land is no longer the most important source of income, it is difficult to equalize productive assets. Even if it were possible to equalize income-earning capacity, inequality would resurface in a market economy. "We cannot expect democracy to do what perhaps no system of political institutions can do," (2010:50). Another issue that continues to plague modern democracies is the nostalgia for effective participation. As Przeworski explains, although in representative democracies voters have real choices, they will never choose among all conceivable possibilities since it is only possible to choose among the proposed options. And furthermore, despite the diversity of options, no one can, individually, make a proposed alternative to the chosen one. Ultimately, the second limit of democracy lies in its impossibility of making people feel that their political participation is effective. However, according to the author, "[...]collective self-government is achieved not when each voter has influence in the final outcome, but when the collective choice is the result of the sum of individual wills" (2010: 167). A third limit of democracy lies in the impossibility of providing perfect agentivity, that is, ensuring that governments do what they are supposed to do: represent. Given that in modern democracies voters delegate their interests to representatives, explains Przeworski, the latter are expected to effectively represent those interests. But, on the understanding that representatives also have interests, agentivity costs are unavoidable. Nevertheless, democracy is the only system in which accountability mechanisms work. Finally, another challenge of democracy lies in the difficulty of balancing order with non-interference. According to the author, maximizing freedom while interfering as little as possible in private life and guaranteeing, at the same time, as much security as possible, "[...] is not easy to solve and can never be solved once and for all" (p. 245). Insofar as any legal order is a form of oppression, some people will have to live for some time under laws that are not to their liking.

Three conclusions can be drawn from this brief overview. First, democracy is not timeless. What worked in Rome and Athens (self-government of the people) was not possible in modern, voluminous industrial societies (representative democracy). Second, democracy is not perfect. It has, as we have seen, at least four major limits. Finally, as a result of these particularities, there is an irreconcilable gap between expectations—what we expect from democracy—and reality—what actually happens. Nevertheless, Przeworski asserts (p. 53), "recognizing the limits serves to direct efforts towards them and, also, to show the directions of feasible reforms."

With this, it is worth questioning: (i) will democracy be able to manage the changes imposed by technological disruption; (ii) will technological disruption increase or expand the limits of democracy.

Key challenges of democracy in the technological disruption

"In its present form democracy will not survive the fusion of biotechnology and infotechnology. Either it will successfully reinvent itself in a radically new way, or humans will end up living in digital dictatorships" ([15]: 89). This interpretation is diaphanously coincident with that of Manuel Castells enunciated at the beginning: either liberal democracy is refounded or the risks of new authoritarianisms will be increasingly frequent.

Although validly questionable, Harari's works [13–15] constitute a significant reference for anyone interested in understanding and critically analyzing the impact of the current informational technological revolution on the political order built by the West in recent decades. Technology continues to develop exponentially, while democracy appears, a priori, rather immobile and with little capacity to respond.

In this context, Harari's work invites a joint reflection on the history, present and future of humanity. Our species, argues the author in *Homo Sapiens* (2014), has managed to dominate the planet because of its ability to construct narratives and cooperate on the basis of these flexibly and in large numbers. Any large-scale human cooperation, Harari asserts, is established on the basis of

common myths that exist only in the collective imagination: from the gods in antiquity, to the modern ideal of democracy. For at least three centuries, Harari asserts in *Homo Deus* (2015), our Western societies have been organized under a narrative in which human experience is the supreme source of authority: humanism. Over time, the evolution of this narrative splintered into three main branches: liberal humanism (democracy, human rights and free market capitalist-socialist); socialist humanism (including communism); and evolutionary humanism (including fascism). The victory of the Allies during the Second World War put an end to fascism and with it to evolutionary humanism, while the victory of the West during the Cold War put an end to socialist humanism. Since then, democracy, human rights and free market capitalism seemed destined to endure indeterminately, as Francis Fukuyama [12] put it in his famous and controversial "end of history."

However, Harari reflects, "history took an unexpected turn, and now, after the collapse of fascism and communism, liberalism is in trouble" ([15]: 14). According to the author, the liberal narrative considers individual free will as the most important value. While in economic matters "the customer is right," in politics "the voter knows what he wants." From this conception: "democracy assumes that human feelings reflect a mysterious and profound "free will," which is the ultimate source of authority, and while some people are more intelligent than others, all humans are equally free. Like Einstein and Dawkins, an illiterate servant girl also has free will, so that on election day her feelings (represented by her vote) count as much as anyone else's ([15]: 66–7)."

This assumption would currently be the Achilles' heel of liberal democracy. "Once someone [...] has the technological ability to access and manipulate the human heart, democratic politics will be transformed into an emotional puppet show," Harari asserts ([15]: 67). That voters may be subject to manipulation is not a new concern. In an article written more than half a century ago, Joseph Schumpeter, one of the precursors of the theory of democracy, argued that the information and arguments presented to voters are always at the service of a political intention. In this respect, he asserted: "the normal citizen descends to a lower level of mental performance as soon as he enters the field of politics [...] he argues and analyzes in a way that he himself would describe as childish if it were within the sphere of his effective interests ([30]: 235)."

Equally skeptical was Sartori [29] in writing *Homo videns*. According to him, with the development of TV, homo sapiens entered a crisis; a crisis of loss of knowledge and the capacity to know. The permanent exposure to the bombardment of images brought about a loss in the capacity of abstraction and reasoning, producing an apathetic and manipulable being. Although the author concentrated his efforts on analyzing the impact of television, he reflected on the future of an idea that, at the time of his analysis, was incipient: the Internet. In theory, he asserted, "the Internet should stimulate cultural growth. But in practice the opposite may happen, since the homo videns is already formed when confronted with the network" (1998: 55)[5]. In this regard, he states: "be that as it may, for ordinary mortals, cybernetic navigation is only a kind of video-game. And if they take this navigation too seriously, "ordinary" cybernauts run the risk of losing their sense of reality, that is to say, the limits between the true and the false, between the existent and the imaginary. For them, everything becomes a trap and manipulation and everything can be manipulated and falsified (1998: 58)".

It is now necessary to return to the second question raised earlier: are the Internet and social networks the new agents of manipulation; and will it be possible to manipulate feelings, to hack humans?

It is not easy to empirically prove how much influence *Cambridge Analytica* had on Donald Trump's triumph, whether Russian disinformation campaigns have really been decisive in any political-electoral outcome, [6] or whether Jair Bolsonaro's WhatsApp groups in Brazil tipped the balance in his favor.[7] Nor is it possible to predict with certainty whether anyone will have the technological capacity in the future to access and manipulate the human heart, as Harari argues. Or whether, as Ian Morris [21] asserts, democracy will disappear when its inability to solve the problems of the future is exposed, leaving our political decisions in the hands of algorithms. Despite the difficulties in establishing the degree of influence of the phenomenon, that is, to prove how much it influences, it is possible to highlight three empirical trends to reflect on why such incidence occurs: (a) our most mundane decisions, such as, for example, seeking information and discussing political issues, expose a marked dependence on different types of AI, such as search engines and social networks; (b) as a product of the above, we transfer significant volumes of personal information to third parties; and, (c) such information, in addition to being commercially and politically valuable, is concentrated in a tiny elite with the necessary capacity for processing it.

[5] The optimistic thesis developed by César Cansino [4] assures that homo twitter surpassed homo videns highlighting the benefits of social networks in politics.

[6] In this regard can be found in the recent book by Timothy Snyder [32].

[7] See Mike Isaac and Kevin Roose, "Las noticias falsas inundan WhatsApp en Brasil": https://www.nytimes.com/es/2018/10/23/brasil-whatsapp-noticias-falsas/

But how do these trends affect democracy? According to the thesis underpinning this paper, there are, in principle, two risks: (a) loss of freedom vis-à-vis algorithms: listen to the algorithm and (b) loss of equality vis-à-vis data: those who own the data own the future [14, 15].

In one of her most recent works, Cathy O'Neil [23] investigated the impact of big data on democracy. Analyzing studies conducted by the technology companies themselves, she argues that despite the lack of evidence that Facebook, Google, or Amazon are using their AI to cause harm, the potential for abuse is enormous. Generally, the author asserts, companies are focused on making money. However, she warns, their profits are closely tied to government policies, e.g., tax regulations. By trivializing the power of these companies, O'Neil asserts, we lose sight of two relevant issues. On the one hand, algorithms are not neutral. Companies determine, according to their own interests, what we see and learn on their social networks or search engines. On the other hand, their potential comes not only from their reach but also from their ability to influence their own customers and to use their own customers to influence their friends. By way of example, the author cites two recent social experiments. The first was conducted by Facebook in 2012 and involved 680,000 users with the aim of determining whether updates in their news feed could affect their mood.[8] Using linguistic software, Facebook categorized positive and negative updates and then exposed users to them. By evaluating subsequent behavior, they found evidence that proved their hypothesis about changes in mood states: those who were exposed to negative updates produced more negative content and vice versa. Their conclusion: "Emotional states can be transferred..., leading people to experience the same emotions without their awareness" ([23]: 156- 7). In a similar vein, another research conducted by two American academics managed to determine the potential of Google to influence individual voting. The researchers asked undecided voters to use a search engine to inform themselves about the upcoming election. The engines they used were programmed to skew search results by favoring one party over another. Those results, the researchers claimed, changed voting preferences by 20% ([23]: 157).

The underlying issue, as Harari argues, is that we tend to think that AIs will reveal themselves against us when the real problem is just the opposite: "We should fear them because they will probably always obey their masters and will never rebel. There is nothing wrong with blind obedience, of course, as long as robots serve benign masters" (2018: 84). In addition to these challenges in the realm of freedom and equality, there are others concerning representation and participation. After the *Cambridge Analytica* event, the Internet and social networks are in the eye of the storm. The presence of armies of bots, trolls and fakes at the service of leaders of dubious democratic reputation, cases of foreign interference and the generation of so-called information bubbles (responsible for the increase in polarization and intolerance), are some of the visible effects of the misuse of the network.

The current crisis of representation suffered by democracy has not only affected the political system. Any interlocutor perceived as an ally of the establishment has been discredited, as is the case of the traditional media. One of the theses supported by the optimistic narrative was that the "Internet revolution" would allow every user to be an inexhaustible source of news. In theory, increased participation and information dissemination by citizens/voters themselves would be a successful remedy for those who felt unrepresented or oppressed by undemocratic governments and their media partners. In practice, however, the thesis suffers from at least three blind spots. On the one hand, the fact that every citizen/reader could generate news exposed the infinity of users willing to create harmful content for disinformation purposes. On the other hand, the fact of generating their own content does not guarantee users their control. As seen above, companies began to develop algorithms that filter information on our behalf. Finally, and in relation to the above, the network does not guarantee the exclusion of perverse interests, whether corporate or political.

One additional way to address the interrelation between technology disruption and democracy is through the dimension of rebellion, democracy as rebellion. In a recent press column, Richard Youngs, author of the book *Rebuilding European Democracy: Resistance and Renewal in an Illiberal Age* [34], *evaluates that:* "The narrative of democratic crisis and the populist surge is too one-sided. European politics is in fact in a state of push-and-pull between democratic rollback and democratic revival."[9] He points that recently in many European countries several grassroot movements have challenged authoritarian populisms. Despite the authoritarian surge in countries like Poland and Hungary, and the increasing populist threats to democracy, we have also seen an increment in grassroot movements against corruption, a broad democratic reform agenda, with climate change alerts, abortion defense, polarization critiques and pro dialogue organizations, direct democracy expressed in the Brexit, referendums and several others. These forms

[8] https://www.pnas.org/content/111/24/8788.full

[9] Richard Youngs: "It's not all about populism: grassroots democracy is thriving across Europe", *The Guardian*, 16/9/2021

of opposition to authoritarian agendas provide hope for the survival of democracy, at least in Europe, the region he analyzes. But, as we have seen, Europe is still the region with the best democratic performance in present.

Some significant parallels can be drawn between these European contexts and what is occurring in several Latin American countries. If we can see a dramatic non democratic populism in Jair Bolsonaro, the elected president of Brazil, or in Ortega's corrupt Nicaragua, or in Maduro's flawed revolutionary Venezuela, at the same time it is also relevant to highlight the other side of the coin. An unprecedent mobilization of students in Chile against the cost and privatization of education, street mobilizations and a final push to win the vote towards a new Constitutional Assembly, which was elected with gender parity and where the majority elected members do not come from the traditional political parties, but from the indigenous movement, or alternative social organizations; in the same vein the protests of Equatorian indigenous movements have the power to block antipopular measures from President Lasso; and in Bolivia the far right authoritarian movement that put off power Evo Morales, now has been defeated by the same forces that supported Morales, mainly the indigenous population, which is at least half of the Bolivians.

Young's counterbalance between populist authoritarianisms that misuse information networks and private data of citizens and the quick and more spontaneous ways of protest of alternative social movements and organizations, leads us to the idea of democracy as rebellion.

In a recent article, "Democracy needs rebellion," Markus Pausch [24], the author, brings into consideration the relevance and importance of resistance and rebellion for maintaining the spirit of democracy. Analyzing the works of French writer and essayist Albert Camus, rebellion emerges as one irreducible sphere of democracy, including several arguments for a "theory of democracy as rebellion," which include the "integral components of doubt, criticism, modesty and doubt" (Pausch: 103). Its bottom line is the right to say no, the right to revolt against what you consider unjust, false or unethical. Revolt and rebellion are not revolution, they do not follow a complete ideological program to change the world in a certain "meaningful" way, or in some kind of sense of historical direction. Revolt and rebellion do not take up arms to fight for power or to bring down the enemy, unless as self-defense or resistance towards occupation. Revolt and rebellion are more spontaneous and do not "necessarily lead to systematic democracy." In a world interpreted as having no final meaning, the attitude of rebellion is a radical democratic value, complemented by dialogue and self-awareness that one's own beliefs or convictions can also be mistaken. In tune with the main topic of this article "Geoffrey de Lagasnerie stressed the importance of revolt against new technologies of surveillance and other forms of authoritarianism (Pausch: 98)."

Of course, beside the freedom and the right to rebel there must be some consciousness of disagreement, of rejection of the unjust and the will to act against. When minds are hacked, this is the ultimate peril of power, as subordinates get in tune with tyrants. In colonization theory, this is the case, as so eloquently showed Frantz Fanon in *Black Skin, White Masks*, when the colonized internalize the need of colonization convinced by the colonizers. This should be our main concern, regarding AI, big data, networks, bioengineering, and democracy, as Harari summarizes: "To put it in a very, very concise way, I think we are entering the era of hacking human beings, not just hacking smartphones and bank accounts, but really hacking homo sapiens which was impossible before. I mean, AI gives us the computing power necessary and biology gives us the necessary biological knowledge and when you combine the two you get the ability to hack human beings and if you continue to try, and build society on the philosophical ideas of the 18th century about the individual and freewill and then all that in a world where it's feasible technically to hack millions of people systematically, it's just not going to work. And we need an updated story...And our problem is that we need to defend the story from the nostalgic fantasies at the same time that we are replacing it by something else" ([16]:19).

In short, as we have tried to show, democracy has been affected in several ways. So far, some of the companies involved have made extensive *mea culpas*, promising to implement measures to mitigate the negative effects.[10] However, they continue to have control of information and unprecedented potential for abuse. To think that they alone will solve the problem is a dangerous call for complacency.

Final reflections and conclusion

The French philosopher Éric Sadin wrote a few years ago a book entitled "*The Silicolonization of the World*." He speaks there of a liberal spirit of adventure. That same nineteenth century American spirit of adventure that made possible the expansion to the West Coast and enabled gold to be mined indiscriminately, would today be repeated in Silicon Valley and from there to the whole

[10] In a series of columns grouped under the title Difficult Questions: What Impact Do Social Networks Have on Democracy, Facebook acknowledged "the negative influences" of social networks on "democratic well-being." Consult online: https://ltam.newsroom.fb.com/news/h/preguntas-dificiles-que-impacto-tienen-las-redes-sociales-en-la-democracia/

world through technological acceleration and the data economy. This technological adventure is driven by a very particular group of young university graduates, with long and flexible working hours and a level of comfort unthinkable for their parents' generations. Motivated by the promise of improving their quality of life, of rapid social promotion and recognition, these young people have managed to modify the logic of how capitalism works today, driving the massive collection of data. As if it were a nostalgia for the past, this has been given the name of data mining, but today with personal information, yours, mine, everybody's. And something else, the place where all this took place in its beginning was nicknamed as the valley of silicon, the essential mineral to produce microprocessors and other computer components (Sadin, 2016: 27).

This ethos has transcended North American borders and has been installed as a new paradigm of economic production, social organization and political domination. Increasingly common is the replacement of workers in factories by robots operated by computers with artificial intelligence, much more effective and less "problematic." Visually this can be seen in the new intelligent technological cities, or technopolis, such as Highway 128 in Boston, Akademgorodok in Russia, or Tsukuba in Japan.[11] Moreover, politics has entered an algorithmic phase in which a large part of voters are seduced by messages tailored to their needs by technological systems that know them better than they know themselves. Behind these innovations lies a vision of the world that can be synthesized as technoliberalism.

Technoliberalism is the predominant philosophy of Silicon Valley that assimilates an updated strand of the economic liberalism of the classics along with a new faith in the liberating potential of technology. "Technolibertarian ontology consists of disqualifying human action for the benefit of a 'higher computational' being," writes Sadin (2018: 126). The ultimate goal of this philosophy would be to throw off the shackles of the political and advance on the road to human emancipation from the state, the political class and judicial norms. For this, the appeal is to a superior intelligent digital system, capable of constituting a kind of global collective conscience with the greatest autonomy and capacity to select the best for humanity within a set of possible scenarios.[12] Patri Friedman (Milton Friedman's grandson and former Google engineer) confesses it fully: "there are so many things that are important and that we are excited about that we could do, but we can't because they would be illegal" (Sadin 2018: 127).

In its early days towards the end of the twentieth century, the democratizing potential of the Internet was one of the main attractions of the global network. It was emphasized again and again that anyone could access unlimited information almost for free, that knowledge is power, and that this power would be shared horizontally enabling the empowerment of citizens. This was the view of Manuel Castells (2016), one of the pioneers in analyzing the information age in depth, to Steve Jobs, the founder of Apple; from Bill Gates, the multi-billionaire who created Microsoft, to Jeremy Rifkin, the exegete of the third digital industrial revolution. It was precisely the latter who spoke of lateral power: "a collaborative power unleashed by the union of internet technology and renewable energies [that] radically restructures human relationships from vertical (top-down) to horizontal (side-to-side)" ([26]: 19). Castells also described in great detail this horizontality of power; the new prototype of social organization was the network, without a single center but with multiple nodes. Thus, scientific communities, consumer groups, social activists and voters began to link up through network interaction. We are talking about the rise of forums, blogs or the beginning of peer-to-peer (p2p) sharing that led to popular copyright lawsuits, such as *Metallica vs. Napster*. Although this perspective may sound naïve in the third decade of the twenty-first century, there are still recurring events that give it its place. For example, the anti-racist mobilizations in the West in 2020 over the death of one African-American at the hands of police officers in the USA, or, some years ago the so called Arab Spring, or the Occupy Wall Street movement. So, why then does this initial liberating potential of the Internet sound so naïve today?

The suspicions and criticisms about this promise of democratization collide in the present with the obscenity of the concentration of power; the accumulation of economic wealth, technological power, and information power. It is the so-called big four that dominate this new stage of artificial intelligence: Google, Facebook, Amazon, and Apple; it is their founders who own an outrageous percentage of global wealth; and it is their digital systems that access and control the personal data of the majority of the world's population. In totalitarian regimes, where some of these companies are prevented from operating, it is in the State itself and its allies that power, wealth and information are concentrated. The Chinese state has been empowered by technology, not the other way around, as previously speculated. China has incorporated, for example, the so-called social credit, where the behavior of a good communist is recorded in a score that will benefit or not the inhabitants for every purchase they make, when it

[11] For more on the creation, consolidation and expansion of technopoles, see Castells and Hall *The Technopoles of the World,* 1994.

[12] The film Transcendence (2014), precisely, explores this topic. Its plot can be seen at https://www.imdb.com/title/tt2209764/

is time to start negotiations, to have or not to pay a guarantee for renting a car, and even to travel freely between provinces: "Dear passengers, those who travel without a ticket, who behave disorderly or smoke in public places will be punished according to the rules and their behavior will be recorded in the credit and individual information system. To avoid any negative record on your personal credit follow the rules and comply with the orders on the train and station" (audio on a 2018 Shanghai train; *El Mundo*, 31 October 2018).

Although the polysemy of democracy is high, it can be condensed as a certain political regime that empowers citizens because they have the rights to choose their representatives and be elected, in a social context of freedoms, with relatively autonomous individuals who believe they know or feel what they think is best, with political parties competing for their vote. For a democracy to function more or less well there must be, first of all, as Max Weber pointed out, a belief in the legitimacy of the institutional framework that guarantees it. Without this belief it is not possible to sustain it. This is one of the main challenges for democracy in the context of silicolonization. It is precisely because people have stopped believing in the institutions that cemented these political regimes in the last century. Political parties do not have credibility, parliaments do not deserve the trust of voters, and candidates are perceived as self-interested individuals. This can easily be seen in many of the opinion polls conducted in recent years in almost all parts of the world where such polls are conducted without censorship. The institutions that forged democracy as the best-known political regime no longer enjoy the confidence of the people. Or, to put it another way, the citizenry has bracketed the belief in their legitimacy [7]. The avalanche of information and misinformation circulating in social networks has contributed to this, which, in the words of Umberto Eco, "give space to legions of idiots."

A second challenge, as fundamental as the recovery of trust in institutions, and related to it, refers to the autonomy of people to know what they want or feel. What is happening with the acceleration of artificial intelligence technologies is that they are radically calling this second belief into question. It is no longer citizens who know best what they want or what would be best for them, but rather the algorithms that process all our personal information have much more accurate conclusions about what we are, feel, and want. By analyzing our fingerprints left on the digital devices that accompany us every day around the clock, there is no deception or mistake. The information is there, we can no longer lie to ourselves because the mirror of what we really are is built by an artificial intelligence system that knows more about us than we know about ourselves. Who has not experienced that after a search for a purchase on the Internet began to receive recommendations of the best possibilities for their family type? This is repeated in all planes of life, from politics to love, from tourism to reading, from religion to housing or health.

Therein lies the temptation of the young technoliberals who have colonized us from Silicon Valley, they and their technologies believe that they are about to build a new and much better world. Whether it will be better, we do not know, but that it is already radically new there is no doubt. And all of the above leads us to think, following the thinking of Harari and Max Tegmark, who had a very interesting discussion on democracy and AI, that democracy's days are numbered. [13] Tegmark notes that in the debates between Trump and Clinton there was no mention of AI, not even when they talked about jobs. And Harari, even more harshly states that, unlike the events that preceded us, now and in the future much more efficiently, there will be a computer system that will know more and better about us than we do ourselves. Neither god nor the emperor knew about us; the AI can relieve a profile about me in seconds, and he asks: "how does democracy work in a world where someone understands the voter better than the voter understands himself? And the same with the free market. I mean, if the customer is not right, if the algorithm is right, then we need a completely different economic system. That's the big question I think we should focus on. I don't have the answer, but any story that is relevant to the 21st century will have to answer this question."

While the concept of silicolonization of the world may be seductive in explaining certain things, such as the fragility of nation states, it is important to note that the affectation of nation states occurs when systems of government are open, as is the case with democracy. In closed political systems, on the contrary, it seems that the logic is inverse: it serves to allow the autopoiesis of that same closed system, perfecting and expanding it.

Democracy is in crisis. This is nothing new, but now it is compounded by the impact of the voracity of the latest generation of information technologies. Despite its limits, no political project has so far succeeded in simultaneously providing greater possibilities for participation, representation, freedom and equality. Nevertheless, in the immediate term, the lack of reforms, skepticism, and irrational expectations continue to give rise to populist campaigns. Recent events have exposed the other side of the digital world. In times of skepticism and a marked dependence on different types of AI in a network full of bots, trolls, and fakes, unprecedented standards of

[13] Available in: https://futureoflife.org/2019/12/31/on-consciousness-morality-effective-altruism-myth-with-yuval-noah-harari-max-tegmark/

polarization and intolerance are intensifying and crystallizing with the coming to power of leaders of dubious democratic reputation.

Blind trust in "technologies for liberation" and a trivialization of the negative effects of the misuse of the network and big data has led to a significant gap. As various scholars have acknowledged, today's democracies need new methodologies that allow it to armor itself against the toxic combination of these factors. In particular we would like to introduce at this final stage, for further developments, the works of Sheila Jasanoff and the concept of how "sociotechnical imaginaries" relate and fabric power. "Sociotechnical imaginaries occupy the blank space between two important literatures, the construction of imaginaries in political and cultural theory and of sociotechnical systems in STS" ([18]: 5)[14]. We tend to believe that democracies die spectacularly, at the hands of armed men; the problem is that democracy can die at the hands of elected leaders who hide behind the network.

Perhaps, as Kofi A. Annan recently asserted, the key is that if technology does not stand still, neither should democracy. It reinvents itself or it is destined to perish.

Authors' contributions
Authorship is equally shared between the three authors. All authors read and approved the final manuscript.

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Funding
Not applicable.

Availability of data and materials
Not applicable.

[14] For further research in this vein, crucial authors are: Wiebe Bijker (*Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*. Cambridge, MA: MIT Press, 1997); George Marcus (*Technoscientific Imaginaries: Conversations, Profiles, and Memoirs*. Chicago: University of Chicago Press, 1995); and Yaron Ezrahi (*Imagined Democracies: Necessary Political Fictions*. New York: Cambridge, University Press, 2015)

Declarations

Competing interests
The authors declare that they have no competing interests.

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Received: 12 July 2021 Accepted: 11 January 2022
Published online: 27 March 2022

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