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The Digital Revolution: Lights and Shadows

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Journal of Economic Literature classication: A0, A1, O30.

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Lecture Delivered at Fundación Ramón Areces

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1 Introduction

The digital revolution has brought about a wave of technological optimism, sustained by all the things technology does for us in our every day lives: taking pictures or videos of anything, being in constant communication, or improving our navigation skills by using the GPS, are now part of our daily activities, but unimaginable just twenty years ago.

This is in principle good, but it has a dark side, as the poor use of the new technologies may lead us to become lazier and to replace rational processes of deliberation with the mechanical accumulation of numbers and data, which, apparently, help objective and clear decision-making.

This dark side produces a number of pathologies. For example, in the world of academic economists, the "top5itis" is a disease consisting of reducing the evaluation of the scholarly contributions of a researcher to the count of her "top5",s, i.e., her publications in a given list of top journals. Other diseases of the digital era include the VAR-itis in the world of soccer, the scooteritis in the world of new means of transportation, or the digital populism affecting entire societies, especially their political processes.

This lecture provides the point of view of an academic economist describing and explaining how these pathologies cause distortions that affect the

processes of making decisions.

2 Two Historical Antecedents

Although our specie has seen numerous revolutions that changed the nature of human interactions dramatically, I will concentrate here on two, which are sometimes compared to the current digital revolution. These are the revolution brought about by the printing press in the 15th century, and the first industrial revolution in the 18th century.

Johannes Gutenberg was a German goldsmith and inventor, who built the first printing press some time during the middle of the 1400's. Following the fall of the Roman Empire, the cultural world in most of Europe was confined to monasteries (the most important exception was the Islamic domination in Spain, vibrant with its top scholars in mathematics, medicine, literature, and legal studies). But in the rest of Europe, for essentially 1000 years the production and transmission of knowledge was left in the hands of the monks belonging to different monastic orders. This was remarkable, as due almost exclusively to their work, many treasures of the Classical Antiquity were preserved, not lost. It follows that the cultural level of these societies was

very low, with literacy being absent in the lower classes and found only among the members of the clergy as well as a small number of motivated nobile men, who, exceptionally, developed an interest in letters and scholarship and were less inclined to take arms.

The invention of the printing press made it possible to popularize books and culture. It eventually led to the Renaissance and, more generally, to the birth of the middle class. This profound change in society had its enemies, as the members of the political and religious ruling classes understood that the new way to access and disseminate knowledge was not going to play in their favor.

The second historical episode I want to visit is the first industrial revolution, which started in England in the mid 1700's. Following important advances in agriculture, industrial production was revolutionized due to the introduction of machines in productive processes. This meant a significant expansion of the production possibilities frontier, based on the vast increase of productivity, i.e., much more output was produced for a given amount of input, say hours of labor. As a consequence, the size of the "social pie" grew, manifesting itself in the increase in firms' profits in the first instance.

However, for a while, this "social pie" was not fairly distributed, as it

was appropriated almost entirely by the class of capitalists and land owners. These were the days of uncontrolled exploitation of labor, which included all kinds of unfair practices, such as excessively long hours, poor working conditions, and extremely low wages. In response, the Luddite movement advocated the physical destruction of machines. Although its origins, associated with the weiver Ned Ludd, are not confirmed and it is possible that in them there is more fiction than truth, the reality was that many episodes of vandalism took place during the last decades of the 18th and first decades of the 19th centuries, in which knitting machines at first and various types of engines and industrial equipment later were destroyed.

I am bringing up here the reluctance of the ruling classes, in the case of the printing press revolution, and the Luddites, in the case of the first industrial revolution, to remind us that every revolution of this kind, which ended up being a positive change for societies, also generated opposition. And the effects of such tensions were also positive. Indeed, history saw slow changes in the organization of societies that eventually led to a reallocation of power, away from the aristocratic and religious elites, and in favor of the middle classes, as happened for example in a number of Italian republics and German principalities. In the case of the industrial revolution, the role of the

unions was a useful channel through which the Luddite rage was transmitted, and eventually translated, into better legislation that protected workers from the abuses of free and wild capitalist practices. My attempt here is, therefore, that of a civilized neoLuddite: I will not advocate for the destruction of the new technologies, but I think it will be productive to point out the risks of misusing them.

3 The Digital Revolution: Lights

The digital revolution, based on the Internet as an infinite source of information, big data that provides massive quantitative documentation in response to almost every question, and the social media, which facilitate the communication and transmission of messages in a free and unrestricted fashion, has changed our world dramatically. From the point of view of productive processes, it has meant an impressive shift outwards of the production possibilities frontier. We are able to produce much more, and we are able to do it better.

For example, the purchase of many goods can be expedited with online orders, the delivery of packages via regular mail can be tracked down pretty

much in real time, and the dissemination of knowledge associated with a new scientific paper is immediate, as soon as the author posts it on her webpage. We can be in constant communication with the people we wish, we can send pictures or videos of whatever we are doing, we make our driving more efficient by relying on global positioning systems. We can obtain statistics about our health parameters from a device that monitors our daily activity, we can watch our favorite show or listen to our favorite radio program whenever and wherever we want, we can even choose our ideal love partner in specialized websites. The list goes on and on, and I will not argue with the fact that all these changes, properly measured, can be understood as an increase in the size of the "social pie," from which most of us have benefitted. But my role today is to point out some of its shortcomings, with the associated "diseases" that they have created.

4 The Digital Revolution: Shadows

All the modifications to daily life described in the last section, as a partial list of positive changes, should be counterbalanced by the negative effects that they have created:

- Basic practices of consumer protection have been relaxed or abandoned, leading to dangerous situations. For example, baby formula, probably produced in countries with low safety standards, has been sold in the Internet and has poisoned babies.

- The tracking of a package in the mail sometimes reveals the inefficiencies in the system, contributing to the unhappiness and frustration of the consumer. For instance, my wife and I live in Rhode Island, and once a package we ordered that was coming from California came all the way to Massachusetts to then go back to Arizona, before it finally arrived.

- The immediate dissemination of knowledge facilitated by the Internet, has created an embarrassment of richess. Many scholars now feel they do not have time to read every paper they receive because there are so many, and it is possible that the final effect is that they end up reading much less than they used to. This has produced the disease of "top5itis," which I will mention briefly later.

- Being in constant communication with the people that are not in the room is done by holding on to a digital device 24 hours a day 7 days

a week. The effect is many times the deterioration of basic human relations. It is hard to conduct a regular conversation, as it is often interrupted with the attention demanded by the digital device. Our attention span has been dramatically reduced, to the point that it is interfering with our cognitive and deliberative processes. For example, some of my students have complained to me that my exercises can be too hard, in the sense that their solutions cannot be found with a click of the mouse in the Internet. The assumption made is clearly that any question must have an immediate answer in the web; there is no room for using our brain to make us think of the solution. And it also has physical health consequences. Being glued to a digital device or a screen has produced what doctors call "sedentarism," which will have implications for our physical health, especially among our young generations.

- Sending pictures or videos of our life has implications for privacy and, frankly, for the good taste of many of such visual images. Indeed, the world does not need to see what you do in the bathroom or in the bedroom. And, once these images are out there, they may fall in the hands of people who will not use them to the advantage of the person

posting them. This invasion of privacy is not confined to images; for instance, it extends to all information consumers provide, explicitly or implicitly, in online purchases.

- By relying exclusively on the GPS, drivers may now pay less atttention to where they are going, resulting in a new form of moral hazard, leading to a poorer quality of driving. A few years ago, the reliance on not properly updated software did fool a driver in our family into believing that there is a bridge to cross a river, when that bridge was actually long gone.

- We can obsess regarding the statistics about our health parameters, leading to situations of anxiety. Moreover, we can deny reality if it is not recorded by a digital device. My wife and I joke about this, when her i-watch fails to record the first 45 minutes of our long walks: "well, I guess we haven't walked as much as we thought..."

- By watching or listening to shows on demand, we deemphasize the social dimension of such shows. In the old days, it was a nice example of social cohesion when everyone was watching the nightly news or a popular T.V. series at the same time. I hear that now, in some birthday

parties, each teenager is just watching his or her favorite show in his or her device, cutting down entirely the natural social interaction of talking to his or her friends in the room.

- Dating services in the Internet and the easy availability of adult content may lead to issues of violation of privacy, manipulation of identity, and abuse of unprotected populations, especially young children.

As I said above to praise the positive aspects, the list goes on and on, and for each positive change, one should also be aware of the negative consequences that the change brings about.

5 Several Diseases of the Digital Era

For lack of a better term, we can refer to the different problems created by the digital era as *digitalitis.* As manifestations of digitalitis in some of the issues described above, a number of specific diseases have appeared. We describe them briefly.

Top5itis: In the academic world, it is important to carefully evaluate the scientific output produced by a researcher or an institution. This has led to the idea of rankings of journals. In the academic profession in economics, an

extended practice is the count of publications in the "top5" journals. Leaving aside the issue that the establishment of this powerful oligopoly is unclear, let us agree that such summary statistics are useful. The problem is when this becomes an obsession, which rules out all other criteria in the evaluation. A wrong belief has been created that a paper is of good quality if and only if it has been published in one of the top5 journals. This has produced a number of perverse incentives, by which the extremely powerful editors of these journals are courted strategically by an entire class of scholars that, understanding the incentive scheme, is willing to play this game. Unfortunately, instances of inbreeding and favoritism abound. As in many other oligopolies, innovation of ideas is stifled, and in contrast, work that continues the agendas of the dominant club is favored. And in the end, sadly, some scholars are led to believe that there is no need to read many papers, since the "objective" evaluation has already taken place by the top5 seal of approval. This superficial assessment will no doubt lead to a lowering of standards of the profession, obviously a bad state of affairs, as knowledge for the sake of knowledge is not pursued as vigorously as it should. Last year I published a satirical piece about this disease, and Heckman and coauthors have done interesting empirical work about it.

VAR-itis: In the world of soccer, many infamous refereeing calls were made over the years. They involved clear violations of the rules of the sport, and they were documented by T.V. replays. The Video Assisted Refereeing (VAR) has recently come to rescue. The VAR is based on a powerful technology that uses multiple cameras to catch all possible angles of a given play. This is in principle a very useful tool to have, but the problem is once again that we have an embarrassment of richess. When there are so many versions of a play, differing only in fractions of seconds, one needs to bring to bear good statistical analysis. Indeed, in any sample of data, there are some outliers that will contradict the general message that should be extracted from them. This is why the notion of confidence intervals and significance levels should be adopted, for example, to rule that in an off-side call a band of several centimeters should be allowed in order to validate a play as legal. This would be in consonnance with the original spirit of the sport, by which only clear-cut violations of the off-side rule should count to invalidate a play, and it would help speed up the calls made by the VAR, whose current slow interventions are creating many tensions among fans of the sport.

Scooteritis: It is important to develop means of transportation that are inexpensive and ecologically sustainable. In this context, in many cities there

has been an explosion of new, ecologically-friendly vehicles, mostly scooters and electric bicycles, which are rented hourly and dropped off anywhere, at the user's destination. Using GPS technology, the firm who owns these vehicles eventually comes to pick them up. The problem they create is a basic externality. Indeed, sidewalks are a public good and cannot be turned into a private good owned by these businesses or their users. For example, scooteritis causes a serious problem to people with disabilities, like myself, as random obstacles may crop up anywhere in any sidewalk. I can report that in one incident last summer I fell down in the street, tripping with one of these vehicles when I was walking too fast to stop the blow. Proper regulation would be desirable in order to restore the public good nature of our city sidewalks.

Digital populism: I left for the end the most important one of all, as it is jeopardizing our democracies. Superficial arguments and discussions, manipulated data, fake news, angry tones in communication, have all become far more ubiquotous in these days of the Internet and social media, and they are polluting our basic institutions. Many people have learned to distrust those institutions and elect politicians who campaign on a message that sells well, typically to an uninformed part of the electorate, a message that is

usually not well thought out or properly subjected to rational scrutiny. This empovrished public discourse has definitely led to poorer quality of politicians being elected across the board in many countries.

6 Concluding Remarks

What to do about these imperfections? Two kinds of policies occur to me. First, on the supply side, a host of new regulations are needed, including actions to counter monopoly power in the Internet, introduce quality controls in the dissemination of information, and crack down on websites that produce fake news and disinformation. On the demand side, the key variable is education, by insisting on the need of raising the critical analysis and evaluation of any kind of material one receives. On the latter dimension, after my fall last summer, as a way to raise awareness, my wife started leaving notes on poorly-parked scooters encouraging them to pay more attention and leave the sidewalks clear (when she told me, I called her nice initiative the "Handicapped Zorro.")

In closing, we should always remember that technology should be at the service of humans, and not the other way around. If we are to continue to be

called the rational specie, we should not stop using our rational capabilities. The new tools brought about by the digital revolution have a clear potential to enhance those capabilities, but let us be aware of its shortcomings and stay away from its misuse.