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FOUR QUESTIONS FOR TECHNO-ETHICS

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Abstract: There are four basic techno-ethical questions that are often overseen in discussing the application of technologies. They are often taken for granted, for Modernity seemed to already have an answer for them. This oblivion, we claim, is at the root of certain disfunctions of the current discussions of techno-ethics, like their excessive sectionalization and frequent overlapping, their confusion, and their short-sightedness. This could be avoided by focusing on the questions of human dignity, biophysical limits of the earth, progress, and happiness. These, we propose, are far more relevant in judging technologies than the ones often put today.

Keywords: *progress, happiness, technology, human dignity, self-limitation*

1. INTRODUCTION

Techno-ethics attempts to assess the application of technology on the environment, people, and society. To do this, it must pose questions to the specific ways technology is applied. The powerful impetus of technological development in the last century has placed such a big number of files on the worktable of techno-ethics that it has been impossible to tackle with them as they were produced. Because of this, one can have the impression that techno-ethics "always arrives late", and that, in the end, it deals only with giving a "seal of ethical quality" to whatever techno-science does. This effect translates into legislation, producing what Sheila Jasanoff (2019: chapter 3) has called "law lag": "the claim that scientific and technological innovation inevitably proceeds at a more rapid clip than legal rulemaking, so that the law is doomed to lag behind the frontiers of science and technology" (Jasanoff, 2011). This seems to confirm a certain "technological determinism", according to which humanity must adapt itself to what science and technology, through their own dynamics, are going to place on the face of the earth. On the other hand, the profusion of works in this field has divided the techno-ethical debate into specialties linked to each technology, generating overlaps, confusion, and frequently relegating fundamental questions (Sætra & Danaher, 2022). In other words, techno-ethics often debates about the biases and dangers in the application of the technique, but often forgets to do the same about the foundations of its developments.

Necessarily, techno-ethics implies an interdisciplinary dialogue between ethics and techno-scientific knowledge and practices, as well as with socio-political and environmental facts. In this interdisciplinary dialogue, it is easy for some ideas to be directly inherited from Modernity, given that the techno-science paradigm is rooted in the thought of that period. We believe that such ideas may be "part of the problem." The aim of this paper is to point out four of these ideas that, in our opinion, should be reviewed and clarified so that the task of techno-ethics be more fruitful.

These ideas are the dignity of the human being, the existence of limits in the natural world, the idea of progress, and the idea of power or control in relation to happiness.

2. THE CASE ABOUT HUMAN DIGNITY

At the beginning of Modernity, in the reflection of Francisco de Vitoria, the idea that the rights of people are rooted in their very nature, and therefore are prior to any positive law, already appears clearly; and at the other end of Modernity we have Kant, who believes that the person must always be treated as an "end in itself" and never just as a means. Somehow, the primacy of the human being is rooted in Judeo-Christian theology. However, gradually, God the creator, who justifies the pre-eminence of the human being, is more and more just a metaphysical device, necessary to keep the buildings of rationality and morality standing. This is already easily spotted in Descartes and definitively in Kant, for whom God is finally a transcendent idea necessary to justify the moral order.

At the gates of the 19th century, the Declaration of the Rights of Man and of the Citizen of 1789, now without any religious reference, begins by stating that "Men are born and remain free and equal in rights", and in its article 2 they list those "natural and imprescriptible rights" of man, which turn out to be: "liberty, property, security and resistance to oppression". It is the constitutional claim whereupon the project of a democratic society is built, but which is postulated without being philosophically argued. However, due to the unanimous agreement on this idea, it has not been socially questioned more than at specific moments due to the pressure of some ideologies. In reality, the intrinsic and inviolable dignity of the human being is a concept whose philosophical foundation has remained pending since the end of Modernity, and this lack is becoming more and more visible.

In recent decades, the foundation of the concept of human dignity has been questioned, to the extent of being considered by some as a useless or empty concept[1]. In particular, the weakness of the concept of human dignity appears more dramatically where the scope and limits of what is human (or not) are discussed. Among these places, we can point the discussion about the dignity of animals, the possibility of manipulating the human genetic code and the project of creating machines whose intelligence is indistinguishable from the human brain. The last two instances refer directly to two technological fields of great activity in research and innovation.

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[1] "The notion of dignity should be discarded as a potential foundation for rights claims unless, and until, its source, nature, relevance and meaning are determined" (Bagaric & Allan, 2006).

The progress of bioengineering has put new thorny issues on the worktable of applied ethics. The technical possibility of manipulating the gene pool opens the way to the creation of transgenic plant and animal species, the genetic manipulation of embryos, cloning, or the genetic manipulation of the germ cell line (that is, a manipulation that can be transmitted to offspring) with therapeutic or enhancement purposes. In addition, the development of the technologies of the so-called "synthetic biology" opens the way to the design of species of living beings (or parts of them) that have never existed in nature. The ethical debate about these techniques already available (or likely to be available soon) often revolves around the concept of human dignity: the dignity that should be attributed, for example, to the embryo or to the human genetic endowment; or how cloning[2] or selection of offspring affects human dignity (Savulescu & Kahane, 2009; Veit et al. 2021).

Regarding the field of artificial intelligence, in 2017 the European Parliament sent a request to the European Commission, to consider the implications of "applying electronic personality to cases where robots make autonomous decisions"[3], which was ultimately rejected. However, the attempt to create robots that are artificial "companions" of human beings is on the table, as well as the moral status that would correspond to advanced forms of artificial intelligence (Bryson, 2010; Boden, 2016; Boden et al. 2017). More globally, some authors estimate that artificial intelligence systems will control an increasing part of our lives, and that this should not be done without endowing them with some kind of moral sense: "Advanced artificial intelligence confronts us with the greatest of challenges. It is now, at its dawn, the time to define the ethical rules that will supervise the machines that already govern us, and that will govern us" (Latorre, 2019, p. 172).

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[2] UNESCO promoted a Declaration (1997) in which it considers human cloning for reproductive purposes contrary to human dignity; however, a few years later, the proposal for a treaty that would prohibit cloning for reproductive purposes failed in the UN General Assembly, resulting in a Declaration that was not even approved unanimously (Langlois 2017).

[3] European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics, n. 59, f. Although such request contemplated a possible long-term situation, and did not refer to the possibility of robots being subjects of rights or dignity, but to the issue of legal responsibility attributable to the damage caused by said machines, it is still a symptom of an argument that does not seem likely to subside.

The problems in the foundation of the concept of human dignity can be summed up in two questions that must be clarified: a) the question of its foundation or root from where its content is derived; and b) the issue of demarcation, i.e., to whom dignity is applicable. We will start with the first one.

In Modernity, and especially since Kant, the dignity of the human being lies in his moral autonomy, his reason-based freedom of choice. However, this is problematic for at least three reasons: firstly, because it would leave those human beings who do not enjoy rational autonomy out of dignity; secondly, because autonomy is subject to degrees, while dignity is an inalienable property; and thirdly because it does not respond in fact to the original intuition.

Part of the original idea of dignity is the fact that human beings are unique, not interchangeable: their dignity is what makes human beings priceless[4]. Therefore, dignity is not subject to degrees since it is not commensurable.

Modernity's appeal to the autonomy of the human being does not simply refer to a bare fact: the ability to choose intelligently. In reality, the appeal to autonomy is rooted in the appreciation that the human being must determine his life for himself: he has this possibility and this necessity[5]. In addition, the reason for it is not simple intelligence, but it is endowed with an axiological dimension ("do good and avoid evil") that gives it a moral character, even when said character can be rejected[6]. As a result, the life of the human being is a biography, it constitutes a unique work with a defined author. Each human life, in this sense, is like a unique work of art. In other words, autonomy is not reduced to the simple possibility of exercising free will, but what makes it worth of respect is the

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[4] See the second formulation of the Categorical Imperative in Kant's *Foundations of metaphysics of morals*.

[5] "I have not given myself life, but, on the contrary, I find myself in it without wanting to, without having previously consulted me or asked my permission. But that which, without counting on me, is given to me -namely, my life-, is not given to me ready-made. What is given to me when life is given to me is the inexorable need to have to do something, under penalty of ceasing to live. (...) Life is, then, always having, like it or not, to do something. The life that has been given to me, turns out that I have to make it myself". (Ortega y Gasset 1981: 55-56).

[6] It is arguable that this moral character can be totally and completely rejected in practice. In any case, this rejection would entail an enormous effort, which would rather be a proof of the universality of the moral feeling in the human being.

possibility of doing good in a creative and original way. Autonomy is not only a freedom from, but a freedom for.

However, autonomy is a characteristic that, even in its full interpretation, does not exhaust the content of human dignity. And this is so because human life is not only made up of activities, but it is also made up of passivity. Human life is also conditioned and to some extent determined by many factors beyond the individual's control. Human dignity also resides in the ability to face the lack of autonomy in a creative and original way: "A woman is dying of cancer. She is terrified of dying, and in intense pain, but she shows great fortitude. She is more concerned about the welfare of her care givers than about herself. She greets pain, fear, and death with a smile. Whatever dignity is, she has it and displays it." (Foster 2012, p. 2045).

Thirdly, humans are needy. Due to this, humans project themselves into the future by virtue of hope, that is, their ability to expect the good. For S. Weil, there lies precisely his dignity, his sacredness (Weil 2000, p. 18). For this reason, human dignity remains intact even in the most inhuman conditions, even in a state of alienation that prevents the minimum exercise of autonomy.

Fourthly, humans are biographical: their reality cannot be defined by what they are at a given moment, but rather encompasses their whole life trajectory. Due to the nature of their personal project, their dignity lies in their lives as a whole: their present, their past and what can be expected of their future are all valuable.

In the fifth place, humans are social beings, devoted to a friendly relationship with their fellows. The flourishing of humans cannot take place without friendly relations: it is a psychological fact, but not only psychological. Human dignity also lies in the individual's a priori ability to treat others in a friendly way and thus also participate in their flourishing. Consequently, the dignity of humans is a good shared with those in relation to whom their lives are build. The dignity of a human individual is not possible without the dignity of other human beings. Therefore, dignity is a universal attribute that reaches all human beings.

As for the second question, referring to whom human dignity concerns, it can be answered partially from the last observation about its inherently social character.

We have just described the content of the concept of "dignity of the human being" based on its a priori capacities for autonomy of action, creative assumption of its passivity, capacity for hope, biographical and

social character. However, this description does not exhaust the idea of dignity. Actually, the idea of a being with "dignity" is not a natural class, it is not something that responds to an essence and that, as such, can be defined based on a series of characteristics. In fact, the attempts to define the dignity of the human being from some empirical traits have always been partial and controversial since these traits have been taken as a substitute for the idea of dignity. For this reason, we postulate that the concept of "dignity" of the human being is a primary concept and, as such, cannot be defined from other concepts, but rather the reverse: other concepts are derived from it. Yes, it can be described from its consequences or its ways of manifesting, as we have briefly tried to do. It is possible, logically, to deny the validity of this first idea, but in such a case, it seems that it would be necessary to place oneself outside the humanist project initiated in Modernity.

However, European Modernity is a time of strong geographical and economic expansion. During that time, not much attention was paid to the limits of the planet's resources. This will be the next point of our reflection.

3. BIO-PHYSICAL LIMITS

It is now well established that the environmental crisis we are suffering has an anthropogenic origin. The increase in greenhouse gases is causing the increase in temperatures and the climate changes that we know. But, in addition, we observe an unprecedented consumption of natural resources that are depleting the available reserves, and at the same time, we learn that deforestation and the production of waste of all kinds are unsustainable. Nature itself is showing symptoms of unprecedented exhaustion caused by human beings.

How did we get here? Since ancient times, we have multiple examples that show us a surprising predatory capacity of ancient societies, which in some cases even led to the disappearance of some of those civilizations (cf. Diamond, 2006; Brailovsky, 2016a).

On other occasions, the impact of environmental damage (deforestation, extinction of species, profound changes in specific ecosystems) was more local and did not produce such visible effects. But both cases show how the Nietzschean 'will to power' has given rise to this hubris of the use of natural resources without measure.

To this excess that has been the mark of humanity, we must add the increased capacity to cause damage that technology fosters.

Indeed, in the fifteenth and sixteenth centuries, a series of global events occurred that favored the profound change of stage that we have experienced: the broadening of horizons due to long-distance navigation (Sachs, 2021), colonialism, the abundant labor obtained by means of the slavery, and finally the technological advances leading to the Industrial Revolution.

But the most serious thing is that, to the multiplier effect of the technological revolution of modernity, we must add the idea of progress. At a time when it began to act on a global scale, "the West conceived the great ideal of modernity: unlimited progress built on the basis of an industrial process that produces consumer goods on a large scale and at the expense of systematic exploitation of the Earth, considered as a trunk of resources", as rightly says L. Boff (2013). Along the same lines, Jorge Riechmann (2015) enumerates the cultural roots of the *western hubris*, that old tendency to excess, that in modernity takes on special importance as it justifies the process of industrialization and the emergence of the capitalist economy.

It is true that initially, the environmental effects of industrialization were not a concern: the effects of pollution, deforestation or contamination were not yet seen.

But there were other aspects that are less forgivable, such as the deep and painful changes suffered by a large part of the population in the industrialization process. Although rural societies suffered from great insecurity and precariousness, the industrial age caused an exodus from the countryside to the cities with awful results: overcrowding, inhuman working conditions, etc. (Cf. Brailovsky, 2016a). The industrialization process was not a victimless improvement in productivity. Polanyi (1944) provides strong examples of the effects of industrialization and the emergence of market dynamics on peasant populations.

Until the 1970s[7], nobody seemed to realize that there were limits to growth, and that we were about to reach them. Today, the illusion that the Earth is an unlimited resource is no longer acceptable.

Faced with this, one of the collective temptations that we have and that the spirit of modernity instills in us is that 'technology will solve our problems' — we will return to this later, when we discuss technology as salvation in the third section.

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[7] In 1972, the Club of Rome's report "The limits of growth" was published.

Many examples show us the falseness of this solution by technology.

For example, thinking that global warming can be mitigated by a cloud of salts that absorb solar radiation is a nonsense that introduces enormous dangers, as well as unexpected climate changes in various regions of the planet (Klein, 2014).

Or the well-known case of the substitution of chlorofluorocarbons (CFCs) for other substances in refrigeration, to prevent the depletion of the ozone layer. This was seen as a success, as if we could change things through the appropriate technology. But the change brought unexpected consequences: the gases that replaced CFCs were hydrofluorocarbons (HFCs), which, it turns out, can have a much more powerful greenhouse effect than CO_2. Or, finally, the use of wind turbines as a substitute for other energy sources: they cannot be thought to be unlimited either: rare earths are used in their manufacture, which are logically scarce. The same happens with batteries, which use lithium, a metal of which there's obviously no unlimited supply...

Faced with this situation, what should we do? On the one hand, it is true that excess has been part of human activity in many aspects since ancient times. But technology has so amplified its negative effects on the planet, that we can no longer escape these facts: that the planetary limits are something real, and that in some cases we are reaching them.

And the worst thing is that modernity has armed us with a cultural paradigm that has seen limits as something negative or has not acknowledged them at all. We are forced to define a new paradigm, that takes into account the limitations that we have verified, a paradigm probably based on the best alternatives that are already on the table. In each new ethical debate, we cannot help but consider the fact that reality has limits, and therefore we must ask ourselves, with every new technology, if what we are creating is scalable and reproducible at a global level.

This goes against the current in western societies. Both the basic cultural paradigm and the human hubris pull our societies in the opposite direction. A culture that pays attention to limits must review the idea of progress, which has been one of the main slogans since Modernity. We dedicate the following section to this idea.

4. TECHNOLOGY: BETWEEN BANALITY AND TRANSCENDENCE

In a utilitarian approach, technological developments are questioned based on their consequences, namely, if their experimentation, application,

expansion, and growth will lead to improvements in the conditions and quality of life of individuals or rather will be a source of discomfort or injustice; if they will help to maintain and promote certain rights or if they will contribute to their regression. These questions are nothing more than the basis of techno-ethics and come up against a fundamental problem: that the innovative and disruptive nature of technology makes it impossible, in most cases, to foresee both the uses and the long-term consequences of each new technical invention. In other words, technology, due to its anticipatory and unpredictable nature, almost completely deactivates the ethical question from a utilitarian or consequentialist perspective.

A clear example of this is the development of smartphones. It is 15 years since the appearance of the first IPhone in 2007. Its expansion has been global, becoming a key technology for anyone's day-to-day life, becoming for many a "portable home" (Miller, 2021). But it was not until a few years ago that we began to realize how the use of mobile phones with screens, a use that is universal and without age limits, has undesirable consequences. It has a high addictive component and increases mental pathologies in children and teenagers. We can now claim that the addictive use of the smartphone is associated with an "aberrant structural maturation of important regions for cognitive control and emotional regulation" (Hirjak, 2022).

This shortcoming of the techno-ethical analysis has been usually acknowledged and for this, the precautionary principle has historically been applied. Calling upon this principle in the face of pharmacological discoveries or military technology developments is common. The principle is more easily applicable in the field of research ethics, where one can find a series of established protocols that, after years of study, define sufficiently clearly (although not without border debates) what can or cannot be applied.

This principle must be applied where the utilitarian approach does not shed any light. But this is not always possible. We should realize that, in cases where we ignore the consequences, we can only ask about the motivations, or about the ultimate meaning of such developments. But is the motivation for a technological development clearly explicit, is it verifiable or even auditable? There is a series of technical advances, neither apparently harmful nor clearly innocuous, located in a grey area — among which we could include, for example, the smartphone and the development of touch screens —, for which the ultimate reason is not clear. What

developments are we talking about? Of all those who do not easily answer the question of why, i.e., of its ultimate meaning. If such developments are not ethically auditable through their consequences — due to ignorance of them — and do not clearly respond to a reason — even if they have an immediate purpose —, should we let them direct technical progress? Or do we have somewhere to lean on for critical analysis?

PROGRESS AS THE DRIVE AND ULTIMATE MOTIVATION

Let's look at an example of one of the most fascinating developments: the possibility of human life on other planets. The SpaceX project of tycoon Elon Musk has as its goal the space transportation service with the ultimate purpose of colonizing Mars. The purpose is clear, but its consequences, for an ethical analysis, are unforeseeable. For that reason, we should also explore the 'why': its ultimate motivations. Elon Musk, when asked about what moves him regarding this project, replies the following: "Life can't just be about solving problems, it has to be about things that inspire you... That move your heart. That when you wake up in the morning, you're excited about the future"[8]. Is "excitement about the future" a legitimate motivation? What future? How is this outlined? What exactly is he referring to? "I am excited about the future" is not very different from "I have fun doing it", "it keeps me busy" or "I feel like it". The fascination for the future, for 'advancing', is presented as having sufficient legitimacy to activate unprecedented developments. Advancing progress remains the only answer to the "why" of multiple technology projects. In other words, "progress" turns out to be the ultimate goal that justifies technological action today, regardless of whether we can say anything about its consequences.

But then: either we admit we don't really know what we are referring to with "the future" or "progress", and then we are giving a banal, irresponsible justification for our actions, or we are referring to a transcendent "Future" or "Progress", thus giving a religious motivation, expressing

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[8] Elon Musk's declarations can be found quoted here: "Elon Musk's Starship Update", by Austin DeSisto (February 11, 2022): https://everydayastronaut.com/elon-musks-starship-update-february-2022/. They are part of his speech in a Space X update published in: https://www.youtube.com/watch?v=3N7L8Xhkzqo&ab_channel=SpaceX [retrieved 13 October 2022]

a religious belief. We can affirm that the type of response: "This represents a great advance for humanity", paraphrasing Armstrong's famous exclamation when stepping on the Moon, is nothing more than an affirmation of the great modern myth: the advance of progress. A myth that, despite its mobilizing power, cannot sustain a critical examination of its content9.

Progress has been judged repeatedly over the last century as a redemptive myth, as a justification for the immanent search for salvation. It is worth pausing for a moment to recall the conflicting theses on progress by K. Löwith (2007) and H. Blumenberg (2008). Löwith argues that progress is indebted to Christian eschatology. Christianity, unlike classical thought, introduced the world to the possibility of thinking of history as a process of realization, as a before and after specific historical events, and with a promise of future culmination. This outline, which is an outline of salvation, is found in a secular form in modernity. Modernity understands history as an incremental development, even controllable, and progress as the promise that allows to justify the situation at any intermediate point. Progress therefore plays the same role as divine providence, being the explanation of both the good and the bad that happens to us, and it becomes a destiny, an uncontrollable fatality (Löwith, 2007). Blumenberg, despite crying out against this thesis of Löwithian secularization and even being a champion in the defense of progress as the motor of modernity, recognizes that the birth of the idea of progress is a reaction to medieval theological absolutism, to the need for men to flee from the uncontrollability of their future and that, therefore, although it is not of the same "substance" as divine providence, it exercises its same "functions" (Blumenberg 2008, p. 72). And not only that, but also Blumenberg, despite constructing his entire argument against Löwith, admits that progress becomes uncontrollable, and that the way progress has developed itself throughout the 20th century does not really respond to our needs.

In light of the above, it is normal for the classic concept of progress to generate boredom, disaffection and tiredness (Blumenberg, 2008, p. 460). This inevitability of progress, the impossibility to control it and

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9 O. Marquard affirms that modernity has promised the disappearance of all myths. But from an anthropological reading, one could claim myths are not false but a human tool to bear the truth. The danger, then, does not lie in the myth itself, but in the monomyth: the only explanation. The plurality of myths is good, the monomyth is harmful. The modern monomyth *par excellence* is the myth of progress (Marquard 1981, p. 108).

its religious character (as progress is a creed, a belief with no specific content) are the elements that best explain the idea of progress as an excuse, as a senseless driving force for technology.

TECHNOLOGICAL DEVELOPMENT AND THE QUESTION OF MEANING

Thus, we claim that every technological development that cannot ethically vouch for its consequences (because they are unforeseeable), must be questioned in its motivations. We also claim that "advance" or "progress" are not valid motivations: they lack any real content. Rather, they are the secularization of the idea of salvation; they express an eschatological drive. This is the case when "progress" is the sole answer to the "why" of a technological development. Salvation is a clearly religious term, and its meaning is to be found in a context of transcendence. Its secularization or translation to the immanent field is the search for happiness or the search for liberation (more and better freedom). But is technological development a vector for greater happiness or freedom? This is something we will look at in section 4 of this article.

The search for progress responds to an eschatological drive, especially when it becomes an end in itself. There is not much difference between saying: "the kingdom of God is near, convert" and "in 2030 you will have nothing, and you will be happy" as the World Economic Forum claimed in 2016[10]. Both are statements on the ground of faith and promise. Any new technological development must answer a question about its purpose or meaning, and if the answer is limited to the simple thrust of progress, to push forward any given technological development is an unjustified, irresponsible action. Not all progress is an improvement and therefore the techno-ethical debate must, on the one hand, be aware of the links between progress and the promise of salvation, and on the other, find a way to articulate and define "axes of meaning" in the motivations of technological developments that enable an extension of the precautionary principle and even, where appropriate, limit certain technological advances.

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[10] World Economic Forum. *8 predictions for the world in 2030*. (November 12, 2016) https://www.weforum.org/agenda/2016/11/8-predictions-for-the-world-in-2030/. Quoted from the video published by the World Economic Forum: https://www.facebook.com/watch/?v=10153920524981479 [retrieved 13 October 2022].

5. WHAT COUNTS IS WHAT LIES BEYOND OUR POWER: TECHNOLOGY AND HAPPINESS

Happiness and agency.

Today, when it comes to scientifically measuring the level of happiness, two basic viewpoints are considered: the Hedonic and Eudaimonic approaches. The former considers the pursuit of physical and emotional pleasure, enjoyment, and comfort as the key to well-being, whereas the second approach considers that well-being can be fulfilled by seeking to use and develop the best in oneself in accordance with one's own values (Cf. Giuntoli, 2010, p. 1658). The first approach seems to be easily measurable, since it works by aggregating the moments of pleasure experienced through a given period, thus resulting in an "amount of objective happiness", while the second approach can be measured through global judgments of life, as life satisfaction, that are made when an individual evaluates their life taken as a whole (Diener, 2009, p. 3).

But which of the two approaches can predict happiness better? What makes people happy? Of the two, scholars tend to favor the second one (Kesebir and Diener, 2009, p. 66):

> "Decades of research reveals, however, that happiness emanates not from the ceaseless pursuit of pleasure, but from striving for and making progress towards goals derived from one's most-prized values. Feelings of meaning, purpose, and fulfillment typically trump pleasure as predictors of happiness."

Such a pursuit-of-happiness program is consistent with a few of the ideas we have already gone over through the present paper. The project of striving for life goals and achievements calls for autonomy of the individual. Anyone deprived of their autonomy will hardly be able to aspire to such happiness. In fact, the reason why we want people in vulnerable situations to regain their autonomy is precisely that they can freely pursue happiness according to their own values (that is the implicit idea of Nussbaum's capability approach and of Rawls' veil of ignorance).

Moreover, such concept of happiness is usually worded in a way that allows for a variety of goals and achievements: precisely as if life consisted in a series of stages one is set to reach, possibly through the overcoming of obstacles and the solving of problems along the way. This is the idea of progress. This is how one reaches the feelings of meaning, purpose, and fulfillment.

Theories of happiness have always moved along the axis of external/ internal locus (especially since the old study by Rotter 1966, or the one by Langer and Rodin 1976): happiness is something that you create, not something that happens to you. The present conception of happiness, with its confidence in autonomy and personal progress, clearly leans towards the internal locus. Even the Hedonic approach to happiness is normally announced as a pursuit of pleasure, thus underlining the agency of the individual.

THE FUNCTION OF TECHNOLOGY IS TO ENHANCE THE AGENCY

Technology has four essential functions, according to Rosa (2020, p. 15-17). In the first place, it makes the world visible; like when we use a telescope or a microscope to see what was hitherto invisible. Secondly, technology is for making the world physically reachable or accessible, like when man first landed on the moon. In the third place, technology makes the world manageable, meaning that through technology we can induce transformations and processes that would not have happened by themselves without our technical intervention. Here examples are numberless: from the invention of cheese to air conditioning; from artificial reproduction to the aircraft. The last function of technology is to put the world at our service. Heidegger once said that technology calls upon the world as a resource or "standing reserve" (Heidegger, 1977, p. 18) and that technology had led all people to believe that the world is at their service. A similar idea seems to be expressed in the commonplace statement of man's true nature: while all other animal species must change physically and evolve to adapt to the environment, homo sapiens transforms the environment through technology: technology defines what humans are; technology is what makes humans unique[11]. Brought to its last consequences, such an idea means that technology is the way to enhance our agency, our control over the world. At the light of the above-mentioned conceptions of happiness, it is no wonder that we take technology and the technological progress as the key to well-being (also, this conception of technology implies that the world is nothing but a

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[11] "Human uniqueness resides primarily in our brains. It is expressed in the culture built upon our intelligence and the power it gives us to manipulate the world" (Jay Gould, 1981, p. 324).

means to express ourselves technologically, that the world is simply at our service).

The works of Rosa (2019; 2020) have been constructed on the hypothesis that this could be tragically wrong. By circulating the concept of resonance, Rosa has put forth the idea that there is a wrong way of relating to the world, and a right way to do it. Simply put, when we relate to the world in a way by which resonance is hardly possible, we are in the wrong, while, if we approach the world in a way that would allow for resonance, we are in the right. Resonance is a "dynamic interaction between the subject and the world, a relation of fluidity and contact that is processual in nature" (Rosa, 2019, p. 27), and is best expressed by simple examples: we may go to a concert in the best concert hall, equipped with the best possible sound system, to hear the best band of musicians, with the best possible company, in the best possible seat and still not to feel any enjoyment whatsoever from the music. With the ticket we have paid for the controlled environment in which the experience of the enjoyment of music can happen. But the enjoyment of music, i.e., (musical) resonance is never guaranteed.

RESONANCE: HAPPINESS DOES NOT DEPEND ON THE INDIVIDUAL'S AGENCY

Resonance is the experience of joy at the face of the world. It is the accomplished way of both passively experiencing the world and actively appropriating it or adapting it (Rosa, 2019, p. 26). It can be felt, in different degrees of intensity, through day-to-day activities like breathing or eating, to most ecstatic, and out of the ordinary experiences, like the aesthetic pleasures derived from art or the contemplation of the beauty of the world, or all forms of religious ecstasy or peak-experiences. Phenomenologically, Rosa (2020, p. 32-39) divides Resonance into four different moments, of which the last one, uncontrollability, is the defining one, and the most relevant one in the context of the discussion on techno-ethics. Uncontrollability simply means that we may go to a concert in the best possible conditions and still not enjoy the music at all. It means that joy at the face of the world cannot be technically produced. Thus, while technology enables us to enhance our agency upon the world (by making it visible, accessible, manageable, and useful), it is totally helpless for what really matters: joy (or resonance).

To expect to reach resonance through making the world controllable is a tragic error, since resonance is defined by its uncontrollability. The more we try to control the world, to put it at our service, the more it escapes us. Technology springs from what the old philosophers called will to power. And resonance, according to Rosa, lies precisely beyond our power.

But what makes Rosa's works so interesting in our context is the fact that resonance is still possible amid a full-fledged technological world (2020, p. 37). The concept of "uncontrollability" ('Unverfügbarkeit' is the original German term) is reversible. It implies that detachment, or contemplation, or any other vital attitude we would want to oppose to the technological mindset, or to any of the current conceptions of happiness that so heavily lean towards the side of control, would never guarantee resonance either. Therefore, a techno-ethical theory based on Rosa's concept of uncontrollability would not necessarily advocate for the suppression of technology or the technological mindset. It is more of a call upon awareness of what technology, and agency in general, can provide for us and, especially, what it cannot. The morals we should extract from Rosa's work is an increase of techno-skepticism, an invitation to water-down our faith in technology. It implies that, even if Modernity has not been able to put forth a principle by which humans should limit themselves and their power, the awareness of the intrinsic limitation of technology (in terms of happiness) can by itself moderate our aspirations and actions.

6. CONCLUSIONS

In this work, four issues that fundamentally affect the ethical judgment of technoscience have been reviewed. Ethical reflection must answer these questions when applied to techno-scientific developments to avoid a useless sectionalization (with its overlaps and confusion) and the problems that come from not questioning the foundations of technology. They are the question of human dignity, of biophysical limits, of the meaning of progress and of happiness.

Regarding human dignity, we believe that it should be taken as the starting point of ethical judgment. In addition, it cannot be reduced to one empirical aspect or another, such as autonomy, but other aspects must also be considered in a way that accounts for its original intuition.

This intuition involves the unique value of each person, in his active and passive reality, in his hope, in his biographical and social reality.

Regarding the biophysical limits of nature, ethics must ask about the effects that new technological developments, applications, and devices will have in the long term on natural resources and the environment, considering a scenario of universalization of said developments.

The new technological developments must also be questioned about their meaning. Not every novelty constitutes progress: whenever a new development is justified solely by its character of progress or novelty but is not capable of justifying its contributions in the field of human dignity, it must be questionable. This challenges us to define correct axes of meaning in technological motivations and to expand the precautionary principle, to, if necessary, limit certain advances.

Finally, the happiness of human beings is not achieved by technical means. Happiness can be described as an attunement or "resonance" with reality. Resonance is uncontrollable, not manipulable by technical means. Technological developments, therefore, should not be valued as a good in themselves, but are always subject to ambiguity regarding human happiness.

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