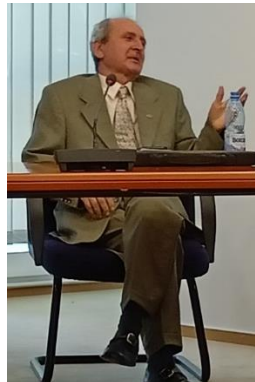


# Developing information and communication technology while artificial intelligence has to properly/sustainably learn from the Earth ecosystem challenges and from humans-machines networks

## -Part 2-



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### **Abstract**

*The paper analyses the context and ways ICT/AI could ease the World sustainable progress and help people to find new answers, while eventually understanding the possible relevance of the time-information relations, as they relatively link the real world with the human perceiving world, based on the observation that time could be also seen as an information about how processes are evolving, while the speed of processes is leading to the same essence of time, meaning the human perception about the way processes in Universe are changing. These could lead to a global view of time implications, at levels scaling from individuals to World, Earth and Universe, starting from their possible perceived links with space and information/entropy. Proposing a “theory of social relativity” as a metaphor, we could analyse the people’s perception on space, time and eventually on information, if we consider the way humans think/action, as depending on the place where they live, their social condition or level of education/information, all leading to different understanding of the way/speed a process, like life, is changing. People could see, in the actual complicate times, the way time is “produced” by dramatical changes/events in the large picture of life or Earth processes (like huge icebergs melting, rivers running dry, barbarian destructions of wars etc.), beyond the personal drama or routines, but then think/action about them, as further we would sooner arrive at the knowledge refining processes, which need timely analyses, because of the World dynamic crises and challenges (first including global warming, Earh resources fading, social unbalances, geopolitical conflicts), in order to avoid the desperate point of the 12-th hour, or make the difference between apogee and survival a priority[17], using properly every day, month and year. Today, the actual trends are more and more based on arbitrary and force, while rules and human values are often forgotten, coming back to a World governed by the law of jungle. Even the management strategies tend to replace the scientific/systemic with heuristic or local optimization approaches. Our analyzed examples started from a MIT study, revealing the main World dangerous trends arisen in the ‘70s, which are still threatening the Earth ecosystem evolution [1]. Considering the threats left out by the MIT study, solutions were proved to be even more difficult to be found, as also presented by [2]. We think that changing paradigm does not mean a revolution, or burning the house to make it proper, but, instead, we have to change and adapt, step by step, our behaviors on thinking/acting to the level of World turbulence/aggressivity, by deeper, documented/realistic analyses, toward optimal/sustainable solutions for the individual or Earth complicate challenges. The picture could change by the crucial implications AI would have to the World future, as presented also by [5], where AI energy consumption could require “colonizing other star systems”. Observing that human control became o probability, instead of a mandatory certitude, we recall the needed balance of AI-HI, a crucial necessity, also presented by [7]. We noticed the recent alarm signals, even from AI prominent CEO/specialists (including Anthropic), warning about the coming vulnerabilities, risks and quite catastrophes the exponential pace of AI could bring, because of the lack of necessary time to analyze all their consequences, we have earlier mentioned and now analyzed from [8] and [10]. Consequently, we have to make rigorous analyses to avoid the menaces to World, as solutions would come from human innovation potential, which could be improved by AI, while HI should insert/increase its efficacy by knowledge refining and reliable control of ICT/AI sustainable development.*

**Keywords:** Limits to Growth, management of AI development/threat, knowledge refining, artificial/human intelligence, time/space/information relations

**JEL Classification:** L63; L86; M15; O31; O33

*“Intelligence is the ability to adapt to change.”*  
-Stephen Hawking

## 1. From remembering the World limits to grow, we try to find time and innovations to grow

In our ever-changing World, facing every day new questions is usually the adults care, but sometimes, or even often in the actual information/technological context, the children rise more “interesting questions”. Recently, a 10 years nephew asked, among other: “*What is time?*” Of course, always children have asked difficult questions and this question is very old in World history, but we believe that trying again to answer it we could address many other questions, which in our days would lead to even more interesting and also useful issues, for life on Earth and humankind present and future.

**It is not the paper aim to recall some scientific phases of the time concept evolutions, but just recalling some of them could lead to a better understanding of the responsibilities of using time, as relevant links between present and future changing processes on Earth, in the actual complex, complicate and dramatical context of World we have to face ...every day.**

From Isaac Newton (before 1700) to Albert Einstein (1905), the *time* concept really changed, even after “*Einstein's theory of general relativity was proven thanks to NASA's Gravity Probe B, which demonstrated that space and time were indeed linked*”[11], as science and technology team made incredible progresses, new controversial hypotheses arose, leading quite into the philosophy areas, discussing how the time is linked with space and speed, or even that the sense of time in the Universe could be forward but also backwards, leading to strange relations between ...past, present and future.

**Perhaps, information and communications technology (ICT) and artificial intelligence (AI) will help us to find new answers, from collecting data and opinions, but mostly to deeper understand the elementary notions of time and information, as they relatively link the real world with the human perceiving world, by yet unknown links.**

**We think that time could be also seen as an information about how processes are evolving, while the speed of processes is leading to the same essence of time, meaning the human perception about the way processes in Universe are changing.**

Now we could come back to new questions, because, if we simply recall some dictionary definitions of time, we soon arrive to the *period* between events or the *pace* of processes evolution, but, perhaps, the young nephew will reply: *What is the difference between time and “period”?* We further could recall the known dilemma of time/eternity a.s.o.

As we have above mentioned, the discussion on these old fundamental questions could be further useful in practice if we agree, approximately, that time could be **a human perception about the way the defined processes evolve**, eventually considering terms as speed or pace to describe them more concrete, but without escaping from the fundamental feature of time, as elementary concept, **difficult or near impossible to define it outside the human perception**, where it almost meet, at **the same level of relativity, the concept of ...information.**

**It is important to recall that the modern definition and reference for time supposes to “detect energy transitions within cesium atoms and keep a more definite measure of time” [11], but, in a way, this confirms the essential perception of time we have mentioned above, as providing a metric/number we (humans) could associate to the way a defined process is evolving.**

In fact, this way we have just arrived at the point where the analyze of time concept, in its most general sense, could lead to a global view of its implications, at levels scaling from

individuals/humankind to World, Earth and Universe, starting from its subtle/transcendent links with space, entropy and...information.

**As a metaphor for a “theory of social relativity”, from this point we could analyze the people perception on space, time and eventually on information, if we consider the way human beings think and action, as depending on the place where they live (North/South), their social condition (rich/poor) or level of acquired education/information, all these leading to different understanding of the way/speed a process, like life, is changing. From a social point of view, we could perceive possible links between space, time, entropy and information, by the relevance/consequences of the evolution/changes along with defined processes we analyze “in time or periods”.**

**Further, we could better understand the time/information importance and relativity, along with the necessity of timely and complex analyses involved in the World sustainable progress processes of optimization and innovation, as depending on both human and technological/material factors, where ICT/AI is prominent.**

**With other words, it is important that everyone of us to see, in the coming complicate times, the way “*time is produced*” by dramatical changes in the large pictures of life or Earth processes (like huge icebergs melting, rivers running dry, a race for the Earth resources fading, barbarian destructions of wars etc.), beyond the personal drama or routines.**

Now we have a starting point to consider the next analyses in the complex and complicate context of World crises and uncertainty, versus the need of finding the optimal ways for humankind/Earth survival and sustainable progress, as we already approached, but which must be continuously refined, using the emergent, but more aggressive and dramatic global context of entropy/incertitude and information we have to face [13][16][18][21].

To be more clear, the deep analyses of the possible perceived links between time, space, entropy/information should consider the relativity of understanding the contain/consequences of these concepts, or the ways the people perceive, think and action about them, as further we could sooner arrive at the refining knowledge processes, but which need timely analyses, because of the World dynamic crises and challenges (first including global warming, climate changes, Earth resources fading, social unbalances, geopolitical conflicts), as we repeatedly pointed [17][32].

Summering here, it is important to notice that a deeper and strategical understanding of using the time, for Earth and every human, could mean to refine knowledge of any process we are in, first including the life, in order to avoid the desperate point of the 12-th hour, or make the difference between apogee and survival a priority [17], using properly every day, month and year.

**We consider that such moments of meditation on uncertainty times should not generate arbitrary decisions, but inherently lead to a realistic approach of refining knowledge and finding the necessary time and innovations for mitigating the real World challenges/crises, including all technical, management or social domains.**

At Earth ecosystem scale, everybody could see and understand that the actual trends are more and more based on arbitrary and force, while rules and human values are forgotten, coming back to a World governed by the law of jungle.

Unfortunately, even the management/policy strategies tend to replace the scientific and systemic with heuristic or local optimization approaches of World crises or individual problems.

The next examples could reveal some of the challenges and ways to solutions, starting from causes that led the World to the context is in, i.e., which tend to limit or even stop the usual progress and growth.

An important MIT study revealed the main World challenges and dangerous trends arisen in the '70s, which, it appears, again, were neglected or at least did not meet the appropriate solutions, as today the situation is, how we have above mentioned, threatening the Earth ecosystem evolution [1]:

*<<The 1970s launched an environmental reckoning across the U.S. Spurred by rising public concern, corporations and national leaders pledged to protect resources, and created new laws and agencies to lead that effort. Amid these discussions, a group of researchers at MIT tackled a far-reaching question: How long can humanity keep growing and consuming at its current rate? Using computer modeling, they came up with an ominous answer: "If the present growth trends in world population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity.">>*

Along with the alarm signal, some reasonable, but undoubtable advices were clearly expressed, in order to face the mentioned emergent scenarios of World threats:

*<<Nonetheless, I believe "The Limits to Growth" got a larger point right: Humans must limit and soon reduce their aggregate production of greenhouse gas emissions. The authors anticipated the potential for the world's economy to shift to cleaner sources of energy, noting that "If man's energy needs are someday supplied by nuclear power instead of fossil fuels, this increase in atmospheric carbon dioxide will eventually cease, one hopes before it has had any measurable ecological or climatological effect.">>*

Considering the complexity of the context and the difficulty of identifying and especially implementing such solutions, the main directions of action were also formulated:

*<<The MIT research team that produced "The Limits to Growth" focused on five basic factors that they claimed determined, and therefore ultimately limited, growth on Earth: population, agricultural production, natural resources, industrial production and pollution.*

The discussion on these fundamental domains was naturally complicate and left for the next decades, to come along with expected experience, but, on our opinion, we have to notice that today it is still more than enough worrying (an overriding challenge worldwide):

*<<Economists tend to be optimistic that we can always find substitutes for resources that are becoming increasingly scarce. "The Limits to Growth" implicitly assumed that such possibilities were limited. Today, scientists and policymakers widely agree that climate change is an overriding challenge worldwide. But the risk isn't running out of resources. Rather, it is warming Earth drastically enough to produce heat waves, wildfires, floods and other impacts on catastrophic scales.>>*

In spite of the revelations and lessons offered by the 50 experienced years, especially considering the recent dramatic World crises trends, the solutions to mitigate the threats pointed by "The Limits to Growth", starting from the issues left out by the MIT study, prove to be even more difficult to be found, as it is also presented by [2]:

*<<The authors of The Limits to Growth could not hope to model all of the possible future constraints on society's ability to continue expanding. For example, it was well known in the early 1970s that a major war, especially a nuclear war, could greatly influence the trajectory of growth in population and industrial output. However, the authors of the report noted that "we have . . . ignored discontinuous events such as wars or epidemics, which might act to bring an end to growth even sooner than our model would indicate. In other words, the model is biased to allow growth to continue longer than it probably can continue in the real world."*

Among the eluded scenarios, before a nuclear war to be previsible, we believe that dramatic World crises should add, after the Covid 19 epidemic, the Russia to Ukraine long war,

without counting the iceberg of actual Iran conflict or the increasing risks of AI unprecedented pace [17][3][6][22].

More than these, as we have above suggested (**a metaphor for a “theory of social relativity”**), the social cohesion remains a critical factor of the World sustainable progress:

*“Elsewhere, I (among many others) have written about the loss of social cohesion that appears to be occurring in many countries, notably the United States. Though it was not modeled in the Limits to Growth study, social cohesion is essential if societies are to respond proactively to threats such as climate change. However, it is difficult to quantify social cohesion, or to forecast trends in it (though ecologist Peter Turchin has made efforts to do both of these things, using data and methods that were unavailable in 1972). In Turchin’s view, declining social cohesion is tied to increasing economic inequality (among other factors).”*

In order to reach social support, the main proposed policies were proposed for the governments, including:

**“Stabilizing population** by setting the birth rate equal to the death rate in 1975, with an average desired family size of two children.

**Implementing radical efficiency in resource usage**, so that resource consumption per unit of industrial output is reduced to one-fourth the 1970 value. This could be achieved by recycling as much material as is physically possible.

**Shifting from encouraging consumption to fostering human development.** Instead of maximizing manufacturing and sales of products, focus economic and priorities and policies on education, health care, and cultural activities.

**Reducing pollution per unit of industrial and agricultural output.** This requires identifying and adopting less-polluting technologies, methods, and materials.”

Unfortunately, the actual stages of the projected directions are less than modest ones, but the situation and Earth ecosystem future could be even worse because of the actual and emergent trends of World dramatic crises and challenges we mentioned above:

*Today, policy options are highly constrained: in order to avert peaks and substantial declines in food and industrial production later this century, so much would have to be done that the policies themselves would be extremely disruptive to society. Over the past decade, the world’s efforts to avert environmental harms have become focused primarily on climate change; resource depletion and overpopulation are now largely ignored. And the fight against global warming is not going well.*

**Concluding on the above context and trends, with simpler words, the proper approach could include, in addition to the mentioned directions, the knowledge refining, scaled and spread at all Earth ecosystem levels by an efficacious and effective communication strategy, using the unprecedented potential of ICT, including AI, with their benefic consequences, but not neglecting their emergent vulnerabilities and risks. As a matter of fact, we repeatedly warned about the potential risks of ICT/AI exponential development, because such speed determines the lack of necessary time to analyze all their consequences [17][24].**

## **2. The humans still need to refine knowledge to survive, while AI grows**

Recalling the time concept evolution, we could meet a useful adult question, coming from the pressure of the unprecedented complexity and incertitude of the actual World crises periods: *What if we ignore, for a while, the usual approach and change paradigm, in a certain domain, day or context?*

Even this approach of changing paradigms is not new and we also proposed this strategy in the arising complexity of optimizing ICT/Earth context and the World sustainable progress, when uncertainty is overwhelming [17][3][6][18][23][22][21].

Changing paradigm does not mean a revolution, or burning the house to make it proper, but, instead, **we have to change and adapt, step by step, our behaviors on thinking and acting to the level of World dynamic, turbulence and aggressivity, by deeper, documented and realistic analyses, toward optimal and sustainable solutions for the individual and Earth ecosystem complex and complicate challenges.**

Because all such optimal and optimistic approach is still not new, we should ask *what is reason the World did not use it yet?*

This way we arrive to one of the most important and difficult problems of humankind: the diverse ways humans think and react, for centuries, to the changes of reality/environment and they still do now, this leading to the difficulty to commonly address the Earth ecosystem main challenges. It is now obvious that we also come back here to the vicious circle we already repeatedly pointed, as people values and principles are very diverse on Earth, although Maslow pyramid is also well known [17][24][29].

Consequently, ***why the World/humankind would almost change now and refine knowledge in the proper way, i.e., deeper understanding the updated reality, vulnerabilities and risks, while thinking and then acting in the optimal and realistic way and time, by the known principle of check, act and balance?***

We still believe that ***in the 12-th hour***, almost everyone should **understand and refine knowledge, seeing it every day, in every Earth place, that choosing between apogee and survival, today means to value all that we have versus all we are about to lose** [17][3][6].

In a concrete manner, **we should refine knowledge about the way we could change the paradigm on what we understand by words like *comfort* or *enough*, but thinking at planetary scale, for the sake of everyone.**

In our days of the actual World crises, some people could ask: *“Who we are and what should we do, on this planet, while not eating, enriching or working, as AI could free us from primitive occupations, jobs or routines, when living alone?”*. **Maybe, this way, more people could realize the responsibility and complexity of life and surviving on Earth, eventually understanding the necessity of living less alone, but as integrated communities of human beings.**

Perhaps AI could help as to have more time, more data and more skills to ease the **capacity to understand the context and to refine this way the updated knowledge on climate, Earth resources, technology, social unbalance, geopolitical threats or (hybrid) wars.**

To confirm our opinions about the necessity to timely analyze and refine the World context and the optimal decisions, the next examples will complete the real picture and the updated priorities for incumbents and ...people.

The way the recent threats to Earth ecosystem could add to the old ones, is also suggested recalling [1], but with updated studies and conclusions, including some from the prestigious report to the Club of Rome, as presented in [4]:

<<This follow-up report to the Club of Rome, entitled “Earth for All: A Survival Guide for Humanity” (Dixson-Declève et al., 2022), relies on a new system dynamics model Earth4All to test future scenarios. The Earth4All model was designed by Jørgen Rand-ers, a co-author of “Limits to Growth”. The book focuses on two scenarios, called “Too Little Too Late” (largely a continuation of current trends in the economic system) and “Giant Leap” (a concerted economic transformation to a resilient civilisation). Comparing the outcomes for these two scenarios, the authors conclude that five turnarounds are needed and can be achieved by 2050: 1) ending poverty; 2) addressing gross inequality; 3) empowering women; 4) making our food system healthy for people and ecosystems; and 5) transitioning to clean energy (pp. 5-7). The authors estimate that the required investment in sustainable energy and food security equals 2% to 4% of global income overall (higher in the near term) with an active role for governments

to marshal and steer these investments. They call for extraordinary interventions to address inequality and propose policies to ensure that no more than 40% of national incomes go to the wealthiest 10% (p. 6).>>

Now, noticing that 'Limits to Growth' issues are a long story to be continued on Earth, it is important to finally observe how the actual picture could be seen through the crucial implications AI could have to the World and humankind future, as presented also by [5]:

*"Artificial Intelligence (AI) has the potential to increase the growth rate of electricity from three percent per year to fifteen percent per year, effectively collapsing multi-millennial expansion timelines into decades. To grow after terrestrial depletion will require capturing more of the sun's output than the earth's cross-sectional area, eventually capturing the entire sun's output (Kardashev Type II civilization). Expansion beyond that threshold requires colonizing other star systems."*

**We could see this dramatic expectation of AI exponential development as the tip of an iceberg, which we also have pointed long time ago while facing the ICT unprecedented fast pace and proliferation, this way understanding that it is crucial to further analyze all its benefic or undesired consequences and identify the necessary refined knowledge and use it for optimization [17][3][6].**

**Actually, we assist, along with AI amazing exponential pace advances, to more and more analyses, studies and consistent reactions at the complexity and real risks of such evolution, for Earth ecosystem and humankind future, where human control became a probability, instead of a mandatory certitude.**

This way, it became clear that the management of AI development, including human intelligence (HI) supervised rigorous control of its applications, is a crucial necessity, although it is far from being a simple problem, as it is also presented by [7]:

*<<Agents: Everybody's got them. But who's managing them? And what happens to the human talent working alongside them—and being asked to show up differently as a result? "The rise of AI doesn't mean we all suddenly devolve our responsibilities for quality control and critical thinking," says Kate Smaje, McKinsey's global leader of technology and AI and coauthor of the recent book Rewired. "That's not the world we live in. There's a premium on those capabilities now." In this episode of McKinsey Talks Talent, Smaje joins Senior Partner Brooke Weddle and Partner Bryan Hancock, along with Global Editorial Director Lucia Rahilly, to discuss what leading through the AI moment means for the relationship between people and technology, including ways of working; costs, benefits, and risks; and the need for open dialogue about the question, "Why AI?">>*

The details of the needed balance between HI and AI, along with necessary human skills to provide the expected benefits of this management, are also pointed:

*<<As you start to **reimagine** your business, you're forced to fundamentally change how you work. Think about our team rooms today. We problem-solve with AI. The problem-solving isn't being done by AI. One of the core mantras of our product teams is "not AI that does it for me, but AI that does it with me." That's why we're spending more time on our rituals, on what we're trying to get done, and on what capabilities our people need. Those capabilities are amplified by tools—but the point is not the tools; it's the capabilities. If you rethink rituals, habits, or workflows in a more corporate context, that's how you unlock value. You've got to redesign those facets of your business for the role technology will play, rather than assume technology creates that change. It doesn't.*

*Brooke Weddle: This is why we keep using the word "reimagine" when we talk about redefining a workflow, a domain, or even an entire organization. Some people might think that sounds exciting, but it's really difficult. In the context of a workflow, how do you get the right cross-disciplinary and cross-functional talent in the room from the start, so you don't "tech enable" a bad process?*

Above is a confirmation that the role of imagination is essential when we design, implement and manage ICT/AI advances, as we also repeatedly presented [12][9][15][19].

In such dynamic and fast changing context, the AI help for identifying strategies and optimal solutions for the sustainable World progress is inseparable of the human control, responsibility and maturity [20][25][26][27][30][31].

Just as another iceberg tip (to be further and timely analyzed!), we should notice the alarm signals recently issued, as a novelty, even from AI prominent CEO and specialists, warning about the imminent, but very soon coming, vulnerabilities, risks and quite catastrophic dangers, for humanity, the exponential pace of AI advances could bring, because of the **lack of necessary time to analyze all their consequences**, we have mentioned above, now presented by [8]:

*<<Three Anthropic researchers went public last night with chilling concerns about out-of-control AI, warning it could destroy humans this decade. Anthropic AI researcher Jacob Coxon wrote on X, after resigning Tuesday to sound the alarm: "The people building AI earnestly believe that it could kill us all by the end of the decade. This is not a marketing stunt. If anything, many executives and senior researchers will couch their phrasing in the press to sound sensible - but I hear the same people express fear privately. No other human activity poses this level of danger.">>*

Although such signals could be considered based on emotion and too pessimistic, they are also like iceberg tips, in a picture full of similar warnings in the last years and coming from prominent personalities, including Stephen Hawking [28], but now coming from inside and high AI industry levels [10]:

*"The CEO of Anthropic said Saturday the artificial-intelligence industry should slow its fast-moving development to give safety measures time to catch up. Without it, Dario Amodei warned AI could be capable within six to 12 months of leading a swarm that could take over the entire internet, among other risks. Amodei also offered a plan in a post on his website to increase checks on the industry, one part of which he said Anthropic is undertaking by itself already. The others would require coordination among the broad industry and with governments around the world, including authoritarian ones."*

**Consequently, after all analyzed context and opinions, we have to use imagination and make timely and rigorous analyses in order to avoid the emergent vicious circle where our future is menaced by the World crises, but the solutions would come from human creation/innovation potential, which could be improved by AI advances, where the human intelligence should insert/increase its realistic potential trough... knowledge refining and reliable control and management of ICT/AI sustainable development.**

### 3. Conclusions

**Our analyses started from the belief that, perhaps, ICT/AI could help people to find new answers, from collecting data and opinions, while eventually to deeper understand the possible relevance of the time-information relations, as they relatively link the real world with the human perceiving world, by yet unknown mechanisms.**

**We think that time could be also seen as an information about how processes are evolving, while the speed of processes is leading to the same essence of time, meaning the human perception about the way processes in Universe are changing.** We have mentioned that the discussion on these old fundamental questions could be further useful in practice if we agree, approximately, that time could be **a human perception about the way the defined processes evolve**, eventually considering terms as speed or pace to describe them more concrete, but without escaping from the fundamental feature of time, as elementary concept,

difficult or near impossible to define it outside the human perception, where it almost meet, at the same level of relativity, the concept of ...information.

It is important to recall that the modern definition and reference for time supposes to *“detect energy transitions within cesium atoms and keep a more definite measure of time”* [11], but, in a way, this confirms the essential perception of time we have mentioned above, as providing a metric/number we (humans) could associate to the way a defined process is evolving.

In fact, this way we have just arrived at the point where the analyze of time concept, in its most general sense, could lead to a global view of its implications, at levels scaling from individuals/humankind to World, Earth and Universe, starting from its subtle/transcendent links with space, entropy and...information.

Proposing a “theory of social relativity” as a metaphor, from this point we could analyze the people perception on space, time and eventually on information, if we consider the way human beings think and action, as depending on the place where they live (North/South), their social condition (rich/poor) or level of acquired education/information, all these leading to different understanding of the way/speed a process, like life, is changing. From a social point of view, we could perceive this way possible links between space, time, entropy and information, by the relevance/consequences of the evolution/changes along with defined processes we analyze “in time or periods”. Further, we could better understand the time/information importance and relativity, along with the necessity of timely and complex analyses involved in the World sustainable progress processes of optimization and innovation, as depending on both human and technological/material factors, where ICT/AI is prominent. It is important that everyone of us to see, in the coming complicate times, the way *time is “produced”* by dramatical changes in the large pictures of life or Earth processes (like huge icebergs melting, rivers running dry, a race for the Earth resources fading, barbarian destructions of wars etc.), beyond the personal drama or routines. The deep analyses of the links between time, space, entropy/information should consider the relativity of understanding the contain/consequences of these concepts, or the ways the people perceive, think and action about them, as further we could sooner arrive at the refining knowledge processes, but which need timely analyses, because of the World dynamic crises and challenges (first including global warming, climate changes, **Earth resources fading**, social unbalances, geopolitical conflicts), as we repeatedly pointed[17][32]. A deeper and strategical understanding of using the time, for Earth and every human, could mean to refine knowledge of any process we are in, first including the life, in order to **avoid the desperate point of the 12-th hour, or make the difference between apogee and survival a priority** [17], using properly every day, month and year. We consider that such moments of meditation on uncertainty times should not generate arbitrary decisions, but inherently lead to a realistic approach of refining knowledge and finding the necessary time and innovations for mitigating the real World challenges/crises, including all technical, management or social domains. At Earth ecosystem scale, everybody could see and understand that the actual trends are more and more based on arbitrary and force, while rules and human values are often forgotten, coming back to a World governed by the law of jungle. Unfortunately, even the management/policy strategies tend to replace the scientific and systemic with heuristic or local optimization approaches of World crises or individual problems.

The analyzed examples, started from a MIT study, revealed the main World challenges and dangerous trends arisen in the ‘70s, which are still threatening the Earth ecosystem evolution [1]. In spite of the revelations and lessons offered by the 50 experienced years, especially considering the recent dramatic World crises trends, the solutions to mitigate the

threats pointed by “*The Limits to Growth*”, starting from the issues left out by the MIT study, prove to be even more difficult to be found, as it is also presented by [2]. Among the eluded scenarios, before a nuclear war to be previsible, we believe that dramatic World crises should add, after the Covid 19 *epidemic*, the Russia to Ukraine long war, without counting the iceberg of actual Iran conflict or the increasing risks of AI unprecedented pace [17][3][6][22]. More than these, as we have above suggested (as a metaphor for a “theory of social relativity”), **the social cohesion remains a critical factor of the World sustainable progress, in order to reach social support, as the main proposed policies were proposed for the governments.**

**We concluded, on the above context and trends, that the proper approach could include, in addition to the mentioned directions, the knowledge refining, scaled and spread at all Earth ecosystem levels by an efficacious and effective communication strategy, using the unprecedented potential of ICT, including AI, with their benefic consequences, but not neglecting their emergent vulnerabilities and risks. As a matter of fact, we repeatedly warned about the potential risks of ICT/AI exponential development, because such speed determines the lack of necessary time to analyze all their consequences [17][3][6][24].**

Recalling our approach of changing paradigms, as a strategy in the arising complexity of optimizing ICT/Earth context and the World sustainable progress, when uncertainty is overwhelming [22][21], we pointed that changing paradigm does not mean a revolution, or burning the house to make it proper, but, instead, **we have to change and adapt, step by step, our behaviors on thinking and acting to the level of World dynamic, turbulence and aggressivity, by deeper, documented and realistic analyses, toward optimal and sustainable solutions for the individual and Earth ecosystem complex and complicate challenges.** Because all such optimal and optimistic approach is still not new, we should continue to ask *what is reason the World did not use it yet?* It is now obvious that we also come back here to the vicious circle we already repeatedly pointed, as people values and principles are very diverse on Earth, although Maslow pyramid is also well known [24][29]. Consequently, ***why the World/humankind would almost change now and refine knowledge in the proper way, i.e., deeper understanding the updated reality, vulnerabilities and risks, while thinking and then acting in the optimal and realistic way and time, by the known principle of check, act and balance?*** We still believe that *in the 12-th hour*, almost everyone should understand and refine knowledge, seeing it every day, in every Earth place, that **choosing between apogee and survival, today means to value all that we have versus all we are about to lose [17][6][3].** In a concrete manner, we should refine knowledge about the way we could change the paradigm about we understand by words like *comfort* or *enough*, but thinking at planetary scale, for the sake of everyone. **Maybe, this way, more people could realize the responsibility and complexity of life and surviving on Earth, eventually understanding the necessity of living less alone, but as integrated communities of human beings.**

**Perhaps AI could help as to have more time, more data and more skills to ease the capacity to understand the context and to refine this way the updated knowledge on climate, Earth resources, technology, social unbalance, geopolitical threats or (hybrid) wars.**

To confirm our opinions about the necessity to timely analyze and refine the World context and the optimal decisions, the analyzed examples completed the real picture and the updated priorities for incumbents and ...people as presented in [4]. Noticing that ‘Limits to Growth’ issues are a long story to be continued on Earth, it is important to finally observe how the actual picture could be seen through the crucial implications of AI would have to the World and humankind future, as presented also by [5], where AI energy consumption “*expansion beyond that threshold requires colonizing other star systems*”. **We could see this dramatic**

expectation of AI exponential development as the tip of an iceberg, which we also have pointed long time ago while facing the ICT unprecedented fast pace and proliferation, this way understanding that it is crucial to further analyze all its benefic or undesired consequences and identify the necessary refined knowledge and use it for optimization [17]. Actually, we assist, along with AI amazing exponential pace advances, to more and more analyses, studies and consistent reactions at the complexity and real risks of such evolution, for Earth ecosystem and humankind future, where human control became o **probability, instead of a mandatory certitude**. It became clear that the management of AI development, including human supervised rigorous control of its applications, is a crucial necessity, although it is far for being a simple problem, as it is also presented by [7], recalling the needed balance between HI and AI, along with necessary human skills to provide the expected benefits of this management, with a confirmation that the role of imagination is essential when we design, implement and manage ICT/AI advances, as we also repeatedly presented [12][9][15][19].

In such dynamic and fast changing context, the AI help for identifying strategies and optimal solutions for the sustainable World progress is inseparable of the human control, responsibility and maturity. As another iceberg tip (to be further and timely analyzed!), we should notice the alarm signals recently issued, as a novelty, even from AI prominent CEO and specialists (including *Anthropic*), warning about the imminent, but very soon coming, vulnerabilities, risks and quite catastrophic dangers, for humanity, the exponential pace of AI advances could bring, because of the **lack of necessary time to analyze all their consequences**, we have mentioned above and analyzed from [8]. Although such signals could be considered based on emotion and too pessimistic, they are also like iceberg tips, in a picture full of similar warnings in the last years and coming from prominent personalities, including Stephen Hawking, but now coming from inside and high AI industry levels, as also we analyzed from [10], where we noticed, as part of the solutions, once again, the necessity of large cooperation/coordination to join “*industry ... with governments around the world*”.

**Finally, after all analyzed context and opinions, we have to use imagination and make timely and rigorous analyses in order to avoid the emergent vicious circle where our future is menaced by the World crises, but the solutions would come from human creation/innovation potential, which could be improved by AI advances, where the human intelligence should insert/increase its realistic potential trough knowledge refining and reliable control and management of ICT/AI sustainable development.**

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