

Information and Communication Technology is Supporting People to Refine Knowledge Because a Safe Balance of Artificial and Human Intelligence Could Leverage the Search for the Right Tracks of World Evolution

-Part 1-



Prof. Eng. Ph.D. Victor GREU

Abstract

The paper analyses the essence and the role of knowledge refining (KR) concept, we earlier promoted, in the new context of World uncertainties and crises, where the differences between words and reality became sometimes unmeasurable or lacking metrics (sometimes, “metaphors or icebergs” hiding fake/irresponsibility, instead of credible subtlety/inference), in spite of the technology advances, including AI, while HI, education and wisdom are facing unprecedented challenges of real Earth ecosystem, in a struggle which is still expected to find the ways to surviving, mitigating the aggressive factors with amazing speed and explosive consequences, first considering the global warming, Earth resources fading, irresponsible geopolitical actions, social unbalances or even the dangerous misuse of the technology. KR would be an approach where people need to be habituated with understanding the reality deeper and beyond appearances (like social media spots containing fake “metaphors or icebergs”), as traditional values of human honesty, transparency, right thinking and fair play are more and more neglected or even substituted by speed and force of chaotic/subjective actions almost everywhere on Earth. For such a crucial step, the ICT/AI role is essential, but only if keeping the rational balance with HI and the mentioned values, while human creative imagination and wisdom will be the key to this goal, by check, balance and action iterations. This balance should give priority, in the mentioned context, to the fight against emerging Earth ecosystem threats and also to the humankind existential needs, versus, for just an example, to entertainment/games or gadgets. Perhaps, we still have enough human talents and imagination for creating artistic works, so AI applications and (ro)bots should support first, among others, e-health, industry/economy efficiency, Earth resources use/discovery optimization or education processes all over the World, leveraging the appropriate KR. By some relevant examples, our analyses illustrated issues of the concrete content, potential and mechanisms of AI/HI balance, starting from the observation that KR, a term that we already pointed in previous papers, as human thinking goal, today could be seen often as generally linked with AI, focusing mainly on large amounts of data, in horizontal applications in industry, language or image recognition and fortunately on e-health, but less linked with World or humankind needs of searching for sustainable progress and survival new paradigms, where only HI performs, with rational approaches supported by all refined scientific, technological and human creation resources. This way, we analysed the need for AI-governance and updated rules/standards to the fast-changing ICT/AI and World context, as it is also expressed by some references. From these AI analyses results, we believe it is worth to observe the superficial level of utility/innovation versus safety for citizens/organizations and notice the crucial implications of “ethical AI” issues, but especially the tip of a

huge (but credible) “iceberg” we have to be worried about, “a new global arms race”, as it is clear that, along with the global consequences of military conflicts (including hybrid war) and adding to prior geopolitical trends, all these premises could lead to new crises we have to mitigate, also by using the AI-HI balance support (“keeping humans in the loop”). Even with the desired AI/HI balance, continuing and deepening such analyses, it is possible to find, eventually, more challenges and dilemmas, but this is not a reason to give up. The essential contributions of human factor in AI-HI balance achievements, as moral value and a factor vital to the success, also resulted. We would add that both ingredients are mostly missing, yet, from the AI features, consequently emphasizing the crucial role of human creativity in defining wisdom and realistic side of the targeted balance. It also resulted the search for KR and the link with (along with perennial values of) Aristotelian concept of phronesis (practical wisdom), where we can see the explicit idea of using KR to leverage the right/optimal decisions in the complicate context of Earth ecosystem crises (the right thing to do in particular circumstances). We notice that, approaching KR and the concept of phronesis, actionable scientific knowledge could be obtained and further used by organizations/individuals in difficult processes of decision, i.e., just the reality we are going to face more and more in our turbulent World. Still, the World realities and potential Earth ecosystem challenges, crises and threats are complicate and under a dynamic uncertainty, while people actions are sometimes more unpredictable, generating new worries while fighting the actual ones, i.e., we have to continue and deeper analyse the today known and the tomorrow unknown, in order to find the sustainable progress new ways to follow, by KR.

Keywords: knowledge refining, artificial general intelligence, human intelligence, AI-governance, QuantumBlack AI, Aristotelian concept of phronesis, knowledge-based society

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

*Knowing yourself is the beginning of all wisdom.”
— Aristotle*

1. Artificial intelligence is everywhere, but where incumbents and people decisions are heading for?

In the recent years, we could see the increasing frequency of “**metaphors or icebergs**” in a complex World of incertitudes and crises, as the differences between words and reality became sometimes unmeasurable or lacking metrics (or even **hiding fake/irresponsibility, instead of credible subtlety/inference**), in spite of the technology advances, including artificial intelligence (AI), while human intelligence (HI), education and wisdom are facing unprecedented challenges of real Earth ecosystem, but, still expected to find the way to surviving.

All these appear contrary to the recent decades, where information and communication technology (ICT) became the main driving factor of the human society by the complex consequences of ICT services, products and applications when supporting the Information Society (IS) on the way towards the Knowledge Based Society (KBS), as we also repeatedly observed [3][6][18][11], **proposing the timely analyse and use of knowledge refining (KR) concept, due its increased/updated practical value for the dynamic World we live in and also for every person [6]:**

”On these premises the concept of refined knowledge is a realistic approach to characterize the essence of the knowledge as a process, so its content and value are subject to update and depending on the new context, which generally include a new level of global progress.”

The dynamic meaning of knowledge and the complex processes of refining it have a crucial importance in the complicate struggle of humankind to adapt to the aggressive factors

which generate the World challenges and crises with unprecedented speed and explosive consequences, first considering the global warming (climate changes), Earth resources fading, irresponsible geopolitical turbulences/actions, social unbalances or even the unexpected/dangerous misuse of the technologies advances [9][11][25][24][23][17][19][5].

The role of ICT is really essential, due to its potential and proliferation at Earth scale, but, step by step, we observe the indirect ways this role is completed by lending models of proven optimization, efficacy and efficiency, from ICT advanced applications and development to other areas of human activity, including even humankind behaviour and thinking, where AI could be the most promising example, as **its advances depend more and more on studying and surpassing HI limits [3], opening this way what we consider that will be the crucial engine of World sustainable progress: the safe balance of AI and HI.**

Still, it could take decades and centuries to artificial general intelligence (AGI), a rival of HI, but then the crucial problem of AI/HI balance would be even more actual, although, perhaps, for reasons slightly different, as if we survive to actual threats, some other challenges could add, while the essential need for World development remains, along with the increased hope that this balance could be a main leverage toward sustainable progress, as it is also presented by [2]:

“Artificial general intelligence (AGI) is a theoretical AI system with capabilities that rival those of a human. Many researchers believe we are still decades, if not centuries, away from achieving AGI...The timing of AGI’s emergence is uncertain. But when it does arrive—and it likely will at some point—it’s going to be a very big deal for every aspect of our lives, businesses, and societies. Executives can begin working now to better understand the path to machines achieving human-level intelligence and making the transition to a more automated world...AGI is still decades away, at the very least. But AI is here to stay—and it is advancing extremely quickly. Smart leaders can think about how to respond to the real progress that’s happening, as well as how to prepare for the automated future.”

Under this (maybe surprising) vision of AI/HI balance, the humankind aim would be to maintain the right track of sustainable progress and survival, mitigating the dangerous consequences of mentioned actual and future World challenges and crises (manifested more aggressive and threatening each day), by optimizing the complex processes in the nearly chaotic and complicate evolutions of Earth ecosystem [9][11].

Such optimistic approach of the pessimistic image of future, considering Descartes methodical doubt (*Cartesian doubt* and the importance of *type and source of knowledge*), supposes, in our opinion, to learn from every data, information and knowledge (not forgetting the history!), at every level, from individuals, to organizations and countries, refining knowledge on dynamic criteria, algorithms and models, understanding and extrapolating also from the way AI is now progressing on large amounts of data and soon knowledge, i.e., **understanding why „metaphors and icebergs” must be relevant/credible words (not reality mystifications!) and balance is the key, in the incertitude of data, criteria and philosophical opinions we could see more and more as a World possible chaos [9][10][15][19][20].**

Perhaps, we could soon agree that, above all humankind needs (as a possible new Maslow pyramid), we will perceive the stringent aim of balance and stability, for all

development, security, social and...political levels of Earth ecosystem, which could be, metaphorically, expressed by...AI and HI balance.

Under such large premises, the significance and crucial importance of **AI/HI balance could become** a nearly „impossible mission”, but just due to such World vision/chaos, **also a mandatory one**, which is anyway worth to timely analyse.

We believe that, observing the actual challenges, an essential step and reason toward a realistic knowledge refining (KR) would be a practical approach, where people need to be habituated with understanding the reality deeper and beyond appearances, for example, of social media spots containing **fake “metaphors and icebergs”**, in a complex and complicated World of incertitudes and crises, while **traditional values of human honesty, transparency, right thinking and fair play are more and more neglected or even substituted by speed and force of chaotic/arbitrary/subjective actions almost everywhere on Earth.**

For implementing such a crucial step, the ICT role is essential due to its huge potential, including AI advances (machine learning - ML, deep learning – DL, AGI etc.), but only if keeping the rational balance with HI and mentioned human values, while human creative imagination and wisdom will be the key to this goal, **on the way of developing ICT/AI by check, balance and action iterations. This balance should prioritize, in the context of unprecedented threats of global warming, social unbalances, geopolitical conflicts or resources fading (to mention just the prominent ones), the fight against these emerging Earth ecosystem dangers and also the humankind existential needs accomplishment, versus, for just an example, entertainment, games or gadgets. Perhaps, we still have enough human talents and imagination for creating artistic works, so AI applications and (ro)bots should support first, among others, e-health, industry/economy efficiency, Earth resources use/discovery optimization or education processes all over the World, leveraging the appropriate KR [13][14][25].**

The concrete content, potential and mechanisms which AI/HI balance could imply is obviously a long and winding road of refining steps our World and people could walk, as our next analyses would illustrate by relevant examples.

Considering the above context, it is not a surprise that **knowledge refining**, a term that we already pointed in [3][6], as human thinking goal, today could be observed very often as generally linked with AI techniques advances (ML and DL for natural language, video creation etc.), focusing mainly on large amounts of data analyses, in horizontal applications in industry, language or image recognition and fortunately on e-health), but less linked with World or humankind needs of looking for sustainable progress and survival new approaches/paradigms/strategies, i.e., **deeper analyses for conceptual decisions, where only HI performs**, under unprecedented dangers which could not be mitigated without refined and rational approaches supported by all updated/refined scientific, technological and human creation resources, reflected in useful knowledge everywhere on Earth [17][18][20][16].

A relevant actual AI application for *Language Models*, reflecting and confirming the above mentioned approaching of knowledge refining term, is presented by [1]:

“We introduce the Extract-Refine-Retrieve-Read (ERRR) framework, a novel approach designed to bridge the pre-retrieval information gap in Retrieval-Augmented Generation (RAG) systems through query optimization tailored to meet the specific knowledge requirements of Large Language Models (LLMs). Unlike conventional query optimization techniques used

in RAG, the ERRR framework begins by extracting parametric knowledge from LLMs, followed by using a specialized query optimizer for refining these queries. This process ensures the retrieval of only the most pertinent information essential for generating accurate responses. Moreover, to enhance flexibility and reduce computational costs, we propose a trainable scheme for our pipeline that utilizes a smaller, tunable model as the query optimizer, which is refined through knowledge distillation from a larger teacher model.”

It is important to notice that our analyses goals on **knowledge refining (KR)** point beyond optimizing the ICT development by harmonizing AI-HI teaming and balance, but, generally on Earth, supporting the organizations and humankind to efficaciously and efficiently face the World unprecedented, dynamic and dangerous challenges, crises and threats, by building new paradigms of sustainable progress [11][16], while using all above mentioned Earth ecosystem resources, i.e., **an extrapolation of what machine learning and other AI advanced techniques are trying today to achieve, by leveraging KR processes**, on World sustainable progress and humankind needs areas, applications or objectives, where, perhaps, relevant examples could include the global warming, peace and e-health. More than the extrapolation, **these credible “metaphors” could extend the benefits of the analyses even over other human principles, paradigms and values on ethics, philosophy or politics/geopolitics areas. KR would happen, in fact, at every person level, in the above complex and aggressive World context, in order to take the best rational decision based on updated knowledge, including new social or philosophical behaviour (like ecological consuming and acting) which could increase the unity and force of humankind against all odds, by the real impact on updated democracy rules.**

Such optimistic purposes could be leveraged while integrating more and more updated wisdom from people around the Earth, by ICT potential to connect and harmonize positive opinions, as crowdsourcing already proved as possible [13] [14] [25], **against people’s unkindness which are obvious increasing by dramatic selfishness and isolationism tendency linked with World crises (where Earth resources fading is first), as these could return humankind to ancestral surviving instincts.**

Although, generally, the laws, rules and regulations seem to be more and more criticized and even neglected in many areas of our turbulent World, we believe, among others, that, still, the rational approaches and the rules could save the Earth and humankind, if we begin every analyse and decision process by thinking at the nearest applicable rule and then considering changes and eventually new paradigms.

In order to keep these chances, we all, including incumbents, have to support the *AI-governance* and update rules to the fast changing ICT/AI and World context, as it is expressed also by [4]:

„Despite AI’s wild-fire spread across sectors, AI governance and regulation is still in its nascent stages. This creates massive gaps in AI oversight and society’s ability to determine two key things: who benefits from this reality-altering technology, and who is responsible for its outputs and outcomes...AI governance can occur anywhere from the firm to the international level. Because AI technologies and developers—including multinational corporations—transcend national borders, international governance of AI is crucial. Among the international bodies undertaking AI governance initiatives are the United Nations, which has established a 39-member advisory body—including tech executives, academic experts, and government

officials from a range of countries—to address global AI governance. Group of Seven (G7) announced the Hiroshima AI Process in October 2023, establishing international guiding principles and a voluntary code of conduct for AI developers.”

The content/factors of AI-HI balance could have a diversity of forms, but the actual more frequently met are still situated at the superficial level of utility/innovation versus safety for citizens or organizations:

<<Countries possess regulatory power, but they grapple with difficult tradeoffs between ensuring AI’s safety for their citizens and facilitating an environment that encourages AI innovation—and the global advantages it offers. Political leaders charged with regulating AI often lack a sufficient, let alone a nuanced, understanding of AI, its risks, and its benefits. Professional, industry and trade associations are tasked with monitoring member conformity with normative and coercive expectations, yet we lack normative institutions of this type that focus exclusively on AI. In the latter case, many technology institutions heartily endorse the “ethical AI goal,” but have yet to achieve consensus on how to practically ensure or operationalize this goal.>>

We can observe that, although not very deeper, an emerging level we still have to consider is the “*ethical AI*” issue, as it fortunately opens the way of a real World challenge, by *innovation and geopolitical* implications:

“AI requires a nuanced policy agenda that not only prevents harmful proliferation but also allows for innovation and geopolitical advantage—ideally without inadvertently triggering a new global arms race. Navigating this rocky terrain is rendered even more treacherous by major tech firms, who continue to dominate the AI space and complicate governance efforts.”

Here we have to notice, this time a real one, tip of a huge “iceberg” we have to be worried about, a new global arms race, as it is clear that, along with the global consequences of military conflicts (including hybrid war) and adding to prior geopolitical trends, all these premises could lead to other dangerous World crises we have to mitigate, also by using the AI-HI balance support.

More than regulations, perhaps the World will need reasons and ways before make them in a sustainable manner, as the domain is not only susceptible to subjectivity and bias, but mainly very complex, complicate and dynamic, as ICT/AI and Earth ecosystem are too.

That is why, we consider that a technical approach for regulation is the best way to proceed and the standardization, although very difficult and slow, must be developed, as the next example also confirm [5]:

<<AI systems and applications are being unleashed across sectors without formalized accountability, impact assessment, or regulatory oversight of key ethical issues. As the authors of a 2024 Computer article point out, this makes voluntary standards and independent scrutiny all the more imperative. The article, “Artificial Intelligence For the Benefit of Everyone,” reports on a 2023–2024 review of the IEEE Standards Association’s specific, measurable, achievable, relevant, and time-bound (SMART) criteria to evaluate the ethics of AI systems in four key areas: accountability, algorithmic bias, transparency, and privacy.>>

Again, we can observe that AI ethics are viewed as a systemic approach and their main components are further analyzed:

“The accountability area is aimed at keeping humans in the loop and on the hook for AI systems and their decisions, actions, errors, and outcomes. Over the past three years,

accountability has been the subject of national and sector-specific regulatory actions, from the European Union's Artificial Intelligence Act to the U.S. Blueprint for an AI Bill of Rights."

We have to notice first that the most important part is "keeping humans in the loop", because, from this condition, the responsibility, in all AI phases, as concept, design, implementation and updating, will come:

<<As the article's authors note, the regulatory discourse and stakeholder positions on accountability provide a clearer picture on societal and legal expectations, including on the purpose of AI use in society. It also highlights the need for

"defining high-risk use environments, risk mitigation, and prevention measures; determining how to allocate responsibility to different actors in the AI lifecycle—including developers, deployers, and end users;

greater emphasis on safety, health, and human rights;

and integration of sustainability considerations throughout the AI lifecycle.">>

As a matter of fact, **integration and sustainability are, perhaps, the most difficult to achieve ingredients/features of the aimed World progress we all need to achieve under these hard actual context premises, even with ICT/AI support, even with the desired AI/HI balance, as, continuing and deepening such analyses, it is possible to find, eventually, more challenges and dilemmas, but this is not a reason to give up.**

2. From refining AI technics to recalling the Aristotelian concept of phronesis (practical wisdom)

Knowledge refining (KR) to improve AI technics is a complex and dynamic process, where we already could notice some impressive advances, especially for complicate applications like autonomous driving or e-health diagnostic, which seem to be in the direction of our paper above mentioned aim, to point a AI/HI balance for supporting sustainable progress in the World and humankind most difficult decisions and analyses.

Even future AI advances, like AGI and *QuantumBlack (AI hybrid intelligence)*, which are, still, targets and hopes to be reached, could become reality only by the harmonized evolution of AI/HI balance, as recently is expressed by [7]:

"QuantumBlack, AI by McKinsey, helps harness the power of hybrid intelligence to create unimagined opportunities in a constantly changing world. Transform faster. Innovate smarter. Anticipate the future. At QuantumBlack, we unlock the power of artificial intelligence (AI) to help organizations reinvent themselves from the ground up—and accelerate sustainable and inclusive growth. We do this by harnessing the foresight and precision of data and technology with the creativity and understanding of people. The result? Hybrid intelligence, a source of competitive advantage that transforms how companies think, operate, and disrupt. Our approach is relentlessly focused on real-world impact. QuantumBlack was born and proven in Formula 1, where teams live and breathe data. As the AI consulting arm of McKinsey, we blend powerful AI and cutting-edge solutions with deep strategic thinking and domain expertise to help our clients innovate and develop new opportunities."

Here we have to notice the clear confirmation for the necessity of AI-HI balance, by **pointing the crucial role of human unsurpassed imagination and collected wisdom,**

*(harnessing the foresight and precision of data and technology with **the creativity and understanding of people**).*

These features fortunately confirm our approaches on KR, including [3] [6], but also the viability of ancient Aristotle wisdom, as it will be further presented.

Still, for the cruel World reality and forecast, these actual AI results are far from being enough consistent, as, generally, the KR potential would be a new paradigm with much higher goals/advances, based on a systemic approach of AI and HI balance, everywhere directed to mitigate the World negative course, as we have detailed from the beginning.

More than these, looking to the relation between KR and AI/HI balance, we have to remember first the traditional role of scientific/logical/rational thinking and consequently of modern education, which could be naturally/intensively be leveraged by ICT/AI products, services and applications, especially in order to mitigate the manifest decrease of this role, which is produced by inherent negative consequences of social media explosion/abuses or by ICT entertainment/gadgets which tend to relax rigorous education and behaviour, all these being among the context factors which in fact could contribute to the premises of World emerging challenges and crises (climate etc.), as the future responsible citizens would not have necessary thinking and abilities to change for a better human society, as IS/KBS should be.

With simple words, KR should contain both the deep updated understanding of World challenges/tendencies and the useful available (scientific, technical, economical, health, philosophical etc.) knowledge, necessary to provide the sustainable progress in IS/KBS and survival of Earth ecosystem [25] [15] [20].

As a matter of fact, in one of our previous papers [26], the approached themes led to quote, as motto, Aristotle (*Knowing yourself is the beginning of all wisdom*), but, this time, our documentation for the updated issue of KR led to an impressing and more than relevant reference where the “*Aristotelian concept of phronesis*”[8] is just **the missing puzzle in the actual context**, as more than this, it led to **the proper lesson for our days**, linking, as general approach, after centuries, the both mentioned sides. It is interesting that, in a way, these could be viewed as (credible)“**metaphors**”, similar, perhaps, to the perpetual value/actuality of our Romanian great writer Ion Luca Caragiale works/view on Romanian politicians and generally on human weaknesses (more than 100 years ago!).

We believe that the reasons and even the principle ways of such interesting approach of KR are not quite new, at least from the theory and human practice point of view, but **today these have to be reconsidered**, as it is also confirmed, with detailed arguments, by [8]:

<<In traditional research that aims to explore, describe and explain phenomena, practitioners have limited impact on what is researched and how it is done. They are the end-users of scientific research, responsible for translating knowledge into practice. In this chapter, we focus on a research design that directly involves practitioners in the inquiry process with the goal of advancing both theoretical and practical knowledge. In such a collaborative form of research, practitioners no longer have to ‘wait in a line’ for scientific results to be transformed into applied research and implemented, nor do they have to get research translated into ‘lay language’ (Strumińska-Kutra, 2018). The goal of such pragmatically oriented inquiry is to advance the workability of human praxis; hence, participation, here, is ‘not just a moral value’ but a factor vital to the success of an inquiry (Greenwood, 2007)>>

Now we could notice the pointing of **the essential contributions/ingredients of human factor in the aimed AI-HI balance achievements: moral value and a factor vital to the success.** We would add that both ingredients are mostly missing, yet, from the AI features, consequently emphasizing the crucial role of human creativity in defining wisdom and realistic side of the targeted balance for World sustainable progress. Further, the search for KR and the link with *Aristotelian concept of phronesis (practical wisdom)* are detailed:

“The aim of this chapter is to demonstrate the potential of collaborative inquiry for research, specifically for exploring and refining organisational values. Designing and conducting this type of research is a form of values work as it enriches the ongoing knowledge and reflection processes that infuse an organisation with values-related actions (Askeland et al., 2020; Espedal, 2019). We argue that this potential can be amplified through an explicit reference to the Aristotelian concept of phronesis (practical wisdom), which is understood as knowledge about the right thing to do in particular circumstances (Bachmann et al., 2018).”

More than understanding the arguments for perennial values of *Aristotelian concept of phronesis*, we can see here the explicit idea of using KR to leverage the identification of the right decisions, i.e., the way to optimal solutions, in the complex and complicate context of emerging Earth ecosystem crises (*the right thing to do in particular circumstances*) and also that our above references to philosophy could now be better understood and justified, just due to the “*particular circumstances*” of the credible/cognitive <<iceberg>> we have to face today and tomorrow!

In order to identify the concrete mechanism of human wisdom infusion into AI-HI balance context, the implication of *research participants* is clearly pointed as “*improving practice of values and refining values*”:

“How can the concept of phronesis facilitate research that is oriented towards expanding knowledge about values, improving practice of values and refining values in organisational settings? We argue that phronesis, when used to inform research design, facilitates a continuous exploration of and reflection over values among research participants. Using such an approach is appropriate when the aim of the research is to create actionable scientific knowledge. This knowledge strives both to advance the causes of the scientific community and to meet the practical demands of individuals like professionals, organisational members and leaders; social settings like organisations and communities; or processes like policy formation, decision-making and planning.”

Finally, we notice that, **approaching KR and the concept of phronesis, actionable scientific knowledge could be obtained and further used by organizations and individuals in difficult processes of decision, i.e., just the reality we are going to face more and more in our turbulent World.**

Here we could observe that the important part of *research participants* could be linked, sometimes, with crowdsourcing, a concept that we also approached and studied, as a similar way of implying HI in the optimization complex processes and leverage the knowledge updates from the available large human expertise [6][13][14].

Unfortunately, the World realities and potential Earth ecosystem challenges, crises and threats are more complicate and under a dynamic uncertainty, while people actions are sometimes more unpredictable, generating new worries while fighting the

actual ones, i.e., we have to continue and deeper analyse the today known and the tomorrow unknown, in order to find the sustainable progress new ways to follow, by KR.

3. Conclusions

Our analysis starts from observing the increasing frequency of “**metaphors or icebergs**” in a complex World of incertitudes and crises, as the differences between words and reality became sometimes unmeasurable or lacking metrics (or even **hiding fake/irresponsibility, instead of subtlety/inference**), in spite of the technology advances, including artificial intelligence (AI), while human intelligence (HI), education and wisdom are facing unprecedented challenges of real Earth ecosystem in a struggle which is still expected to find the way to surviving. We also repeatedly [3] [6] [18] [11] **proposed the timely analyse and use of knowledge refining (KR) concept, due its increased/updated practical value for the dynamic World we live in and also for every person** [6]: *“a realistic approach to characterize the essence of the knowledge as a process, so its content and value are subject to update and depending on the new context, which generally include a new level of global progress.”*

We have considered at start that the dynamic meaning of knowledge and the complex processes of refining it have a crucial importance in the complicate struggle of humankind to adapt to the aggressive factors which generate the World challenges and crises with unprecedented speed and explosive consequences, first considering the global warming (climate changes), Earth resources fading, irresponsible geopolitical turbulences/actions, social unbalances or even the unexpected/dangerous misuse of the technologies advances [9][11][25][24][23][17][19][5].

Beyond ICT mentioned role in IS/KBS, we observe the indirect ways this role is completed by lending models of proven optimization, efficacy and efficiency, from ICT advanced applications and development to other areas of human activity, including even humankind behaviour and thinking, where AI could be the most promising example, as **its advances depend more and more on studying and surpassing HI limits, opening this way what we consider that will be the crucial engine of World sustainable progress: the safe balance of AI and HI.**

Because it could take decades and centuries to artificial general intelligence (AGI), a rival of HI, as confirmed analysing [2], then the crucial problem of AI/HI balance would be even more actual, although, perhaps, for reasons slightly different, as if we survive to actual threats, some other challenges could add, while the essential need for World development remains, along with the increased hope that this balance could be a main leverage toward sustainable progress. Considering this vision of AI/HI balance, the humankind aim would be to maintain the right track of sustainable progress and survival, mitigating the dangerous consequences of mentioned actual and future World challenges and crises (manifested more aggressive and threatening each day), by optimizing the complex processes in the nearly chaotic and complicate evolutions of Earth ecosystem [9][11]. Further, such optimistic approach of the pessimistic image of future, considering, as usually, Descartes methodical doubt (*Cartesian doubt* and the importance of *type and source of knowledge*), supposes, in our opinion, to learn from every data, information and knowledge (**not forgetting**

the history!), at every level, from individuals, to organizations and countries, refining knowledge on dynamic criteria, algorithms and models, understanding and extrapolating also from the ways AI is now progressing on large amounts of data and soon knowledge, i.e., **understanding why „metaphors and icebergs” must be relevant/credible words (not reality mystifications!) and balance is the key, in the incertitude of data, criteria and philosophical opinions we could see more and more as a World possible chaos [9][10][15][19][20].**

Consequently, perhaps, **we could soon agree that, above all humankind needs (as a possible new Maslow pyramid), we will perceive the stringent aim of balance and stability, for all development, security, social and...political levels of Earth ecosystem, which could be, metaphorically, expressed by...AI and HI balance.** With such large premises, the significance and crucial importance of **AI/HI balance could become** a nearly „impossible mission”, but just due to such World vision/chaos, **also a mandatory one**, which is anyway worth to timely analyse. Observing the actual challenges, an essential step and reason toward a realistic KR would be a practical approach, where people need to be habituated with understanding the reality deeper and beyond appearances, for example, of social media spots containing **fake “metaphors or icebergs”**, in a complex and complicated World of incertitudes and crises, while **traditional values of human honesty, transparency, right thinking and fair play are more and more neglected or even substituted by speed and force of chaotic/arbitrary/subjective actions almost everywhere on Earth.** For such a crucial step, the ICT role is essential due to its huge potential, including AI advances (ML, DL, AGI etc.), but only if **keeping the rational balance with HI and mentioned human values, while human creative imagination and wisdom will be the key to this goal, on the way of developing ICT/AI by check, balance and action iterations. This balance should prioritize, in the context of unprecedented threats of global warming, social unbalances, geopolitical conflicts or resources fading (to mention just the prominent ones), the fight against these emerging Earth ecosystem dangers and also the humankind existential needs accomplishment, versus, for just an example, entertainment, games or gadgets. Maybe, we still have enough human talents and imagination for creating artistic works, so AI applications and (ro)bots should support first, among others, e-health, industry/economy efficiency, Earth resources use/discovery optimization, or education processes all over the World, leveraging the appropriate KR [13][14][25].**

By some relevant examples, our analyses illustrated issues of concrete content, potential and mechanisms of AI/HI balance, starting from the observation that knowledge refining, a term that we already pointed in [3][6], as human thinking goal, today could be seen often [1][7] as generally linked with AI techniques advances (ML and DL for natural language, video creation etc.), focusing mainly on large amounts of data analyses, in horizontal applications in industry, language or image recognition and fortunately on e-health, but less linked with World or humankind needs of searching for sustainable progress and survival new approaches/paradigms/strategies (i.e., deeper analyses for conceptual decisions, where only HI performs), under unprecedented dangers which could not be mitigated without refined and rational approaches, supported by all updated/refined scientific, technological and human creation resources, reflected in useful knowledge everywhere on Earth [17][18][20][16].

Our analyses goals on **knowledge refining** (KR) pointed beyond optimizing the ICT development by harmonizing AI-HI teaming and balance, but, generally on Earth, to supporting the organizations and humankind to efficaciously and efficiently face the World unprecedented, dynamic and dangerous challenges, crises and threats, by building new paradigms of sustainable progress [11][16], while using all above mentioned Earth ecosystem resources, i.e., an extrapolation of what ML and other AI advanced techniques are trying today to achieve, by leveraging KR processes, on World sustainable progress and humankind needs areas, applications or objectives, where, perhaps, relevant examples could include the global warming, peace and e-health. More than the extrapolation, **these credible “metaphors” could extend the benefits of the analyses even over other human principles, paradigms and values on ethics, philosophy or politics/geopolitics areas. KR would happen, in fact, at every person level, in the above complex and aggressive World context, in order to take the best rational decision based on updated knowledge, including new social or philosophical behaviour (like ecological consuming and acting), which could increase the unity and force of humankind against all odds, by the real impact on updated democracy rules. These purposes could be leveraged while integrating more and more updated wisdom from people around the Earth, by ICT potential to connect and harmonize positive opinions, as crowdsourcing already proved as possible [13] [14] [25], against people’s unkindness which are obvious increasing by dramatic selfishness and isolationism tendency linked with World crises (where Earth resources fading is first), as these could return humankind to ancestral surviving instincts.**

Observing, generally, that the laws, rules and regulations seem to be more and more criticized and even neglected in many areas of our turbulent World, we believe, among others, that, still, **the rational approaches and the rules could save the Earth and humankind, if we begin every analyse and decision process by thinking at the nearest applicable rule and then considering changes and eventually new paradigms.** This way, we analysed the need for *AI-governance* and updated rules/standards to the fast changing ICT/AI and World context, as it is also expressed by [4][5]. As these AI analyses results, we believe it is worth to notice the superficial level of utility/innovation versus safety for citizens or organizations and the crucial implications of “*ethical AI*” issues (“*safety, health, and human rights*”), but especially **the tip of a huge (but credible) “iceberg” we have to be worried about, “a new global arms race”, as it is clear that, along with the global consequences of military conflicts (including hybrid war) and adding to prior geopolitical trends, all these premises could lead to other dangerous World crises we have to mitigate, also by using the AI-HI balance support (“keeping humans in the loop”).** *Integration and sustainability* are, perhaps, **the most difficult to achieve ingredients/features of the aimed World progress we all need to achieve under these hard actual context premises, even with ICT/AI support, even with the desired AI/HI balance, as, continuing and deepening such analyses, it is possible to find, eventually, more challenges and dilemmas, but this is not a reason to give up.**

About future AI advances, like *QuantumBlack (AI hybrid intelligence)*, which are, still, targets and hopes to be reached, we found that they could become reality only by the harmonized evolution of AI/HI balance, as resulted from analysing [7]. It also came along the clear confirmation for the necessity of AI-HI balance, by **pointing the crucial role of human unsurpassed imagination and collected wisdom** (*harnessing the foresight and precision of*

data and technology with the creativity and understanding of people), as our approaches on KR, including [3][6], also did. We consider that KR should contain both the deep updated understanding of World challenges/tendencies and the useful available (scientific, technical, economical, health, philosophical etc.) knowledge, necessary to provide the sustainable progress and survival of Earth ecosystem [25] [15] [20]. As a matter of fact, in one of our previous papers [26], the approached themes led to quote, as motto, Aristotle (*Knowing yourself is the beginning of all wisdom*), but, this time, our documentation for the updated issue of KR led to an impressing and more than relevant reference where the “*Aristotelian concept of phronesis*”[8] is just **the missing puzzle in the actual context**, and more than this, it led to **the proper lesson for our days**, linking, as general approach, after centuries, the both mentioned sides. The reasons and even the principle ways of such interesting approach of KR are not quite new, at least from the theory and human practice point of view, but **today these have to be reconsidered**, as it is also confirmed, with detailed arguments, from analysing [8]. This way, it resulted the essential contributions/ingredients of human factor in the aimed AI-HI balance achievements, as *moral value* and *a factor vital to the success*. We would add that both ingredients are mostly missing, yet, from the AI features, consequently emphasizing the crucial role of human creativity in defining wisdom and realistic side of the targeted balance for World sustainable progress. It also resulted the search for KR and the link with (along with perennial values of) *Aristotelian concept of phronesis (practical wisdom)*, where **we can see the explicit idea of using KR to leverage the identification of the right decisions, i.e., the way to optimal solutions, in the complex and complicate context of emerging Earth ecosystem crises (the right thing to do in particular circumstances)**. We also see that **our above references to philosophy could now be better understood and justified, just due to the “particular circumstances”, i.e., a credible/cognitive <<iceberg>> we have to face today and tomorrow!**

Finally, we notice that, **approaching KR and the concept of phronesis, actionable scientific knowledge could be obtained and further used by organizations and individuals in difficult processes of decision, i.e., just the reality we are going to face more and more in our turbulent World.**

Unfortunately, the World realities and potential Earth ecosystem challenges, crises and threats are more complicate and under a dynamic uncertainty, while people actions are sometimes more unpredictable, generating new worries while fighting the actual ones, i.e., we have to continue and deeper analyse the today known and the tomorrow unknown, in order to find the sustainable progress new ways to follow, by KR.

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