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MASTERING WHAT TRANSFORMS

Abstract: Digital technology is disrupting traditional industrial processes, and they are never going back. Amazingly, as economic diversification and cultural evolution progress, a big government approach would increasingly fail to lead to good decisions, which is unfortunate. The secret to positively impacting the lives of millions of people is understanding and internalizing the growth cycle of digital technologies. Newly digitized products develop at an exponential pace instead of a linear one, fooling onlookers at first before going on to disrupt companies and whole industries. Nevertheless, some two decades into the 21st century, it seems that humanity has hit an existential "glass ceiling." This "glass ceiling" feeling expresses a challenge in which the old reality and traditional social orders are no longer relevant, yet we are unable to generate social orders for the new reality of life. The entire human system is changing from closed, local systems to an open, distributed, global system. We must develop "innovative ways of thinking" that will enable us to cope with a life configuration that is beyond personal imagination. Will it succeed in breaking through the glass ceiling? Will it be able to generate new social orders, ones that will provide its amplified ability with a positive expression? We need much better tools to face uncertainty and to train ourselves to master what transforms. Paradoxically, they were already developed in the past century. They have been readily available longer than thirty years, but nobody realized it. Are we ready to dive into them?

Key words: *global challenges, gig-economy, new economic theory, social responsibility, artificial intelligence, responsible science, collective intelligence*

1. INTRODUCTION

Natural living organism does perturb its environment, but ordinarily only up to the level it is perturbed in turn by its own environment both to survive and grow, and no more [1]. Due to its intrinsic self-scaling relativity

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properties, this systems approach can be applied at any system scale: from single quantum system application development to full system governance strategic assessment policies and beyond. It is possible to use the same nonlinear logic approach to guess a convenient basic architecture for Anticipatory Learning System (ALS) [2] to get a realistic modeling of natural behavior to be used in High Reliable Organization (HRO) application development. Unfortunately "There is enough for everybody's need but not for everybody's greed", as Gandhi wormed.

Despite continuous increase of life expectancies and improving level of quality of life, the modern world has generated the set of global problems like: climate change, environmental destruction, financial crises, the widening gap between rich and poor, spreading insecurity, huge food waste, and many more, meaning problems of contemporary society multiplied by a big number.

One of the most highly developed skills in contemporary Western civilization is dissection: the split-up of problems into their smallest possible components. We are good at it. So good that we often forget to put the pieces back together again [3]. Traditional mechanistic, reductionist, materialistic, compartmentalized disciplines and current social theory are inadequate to deal with the multi-dimensional, multi-scale complexity of social events and outcomes, we are experiencing today.

2. THE CURRENT PICTURE

"The contemporary world is not only global, interdependent and rapidly changing, it is also uncertain. While the concept of uncertainty is well-known in physics, and the Heisenberg principle (the basis of quantum physics) can be used to predict values of many processes and systems with very high accuracy, the uncertainties characterizing our world are not well understood." The above lines are the beginning of the Preface by Ivo Šlaus to the book "The Future Has No History" by Momir Đurovic [4], which offers a clear panorama into our immediate future where our very survival will be decided by ourselves, according to our wisdom, if any.

According to Credit Suisse estimates, between 2000 and 2018, emerging markets have more than doubled their share of global wealth from 10% to 24%, but the growth rate has slowed down during the last five years. They now expect emerging economies to regain momentum. The share of global wealth of emerging markets will likely reach 27% by 2023, increasing their share by 0.5 percentage points on average each year.

The richest 1% of the people on Earth owns 50.1% of all its riches. 10 years ago this share was 42%. There are over 42 million millionaires around

the world today, about three and half times more than there were in the year 2000. There are 2043 billionaires in our world as well, the wealths of whom have increased by an average of 24 % during the last year.

The catch-up of emerging economies is also evident in the increasing proportion of global millionaires. While millionaire numbers in emerging economies are still far below the levels in the United States or Europe, they are expected to increase rapidly in the next five years. China, for example, is set to see its number increase by 62% to 5.6 million, retaining second position in the millionaire league table ahead of Japan, the United Kingdom and Germany. India could host 526,000 millionaires in 2023, an increase of more than 53% in the next five years. The number of global millionaires will exceed 55 million in 2023, a rise of almost 13 million compared to today. Most of them thanks to innovation and new technologies.

The Podgorica 2009 Declaration on "The Value of Science for Society" emphasizes the importance of society's trust in science. Most polls demonstrates that public trusts science and public considers researchers to be the most trust-worthy people [4]. Nevertheless, we live in a society absolutely dependent on science and technology and yet have cleverly arranged things so that almost no one understands science and technology. That is a clear prescription for disaster, according to Carl Sagan [5]. Clearly, researchers, the only persons who know, at least potential consequences of their undisclosed research, have a unique responsibility.

All this resulted in humans have been aware for decades that the trajectory of their development needs to change. The question is: to what extent is the complexity of the problems with which humanity is faced is greater than those which its organizational and intellectual resources are capable of handling?

The contemporary institutions tend to be independent, fragmented, and working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment have been, institutionally, separated from those responsible for managing the economy. Thus, there are no easy answers to dealing with coming uncertainties. Ecosystems and societies are not static. Obviously, the real world, interlocked economically and environmentally, will not change; thus, the policies and institutions concerned must. These changes may be slow and gradual, but they may, also, be dramatic and swift.

Unfortunately, it seems we have now passed a point of no return. The average global temperature has already reached approximately 1°C above pre-industrial levels, and the UN has warned that global attempts to ensure

fossil fuel emissions peak by 2020 will most likely fail. Indeed the target will not even be reached by 2030, unless drastic measures are taken.

"It is worth repeating once again that we are the first generation to fully understand climate change and the last generation to be able to do something about it," said WMO Secretary-General Petteri Taalas, in 2018 [6], and added: "We are not on track to meet climate change targets and rein in temperature increases." In other words "Non c'è più tempo" (It: There is No More Time) [7] for talking, we need immediate actions.

Traditionally, the human forces intruded a society for political, economic, and/or ideological reasons. Today the intrusion also involves the consequences of technology and globalization. This is the world we are living in. But it is not all over yet. Consciousness and choice are primary determinants of future outcomes [8]. Among them, perception of the present and anticipation of the future are powerful drivers [9].

The technological transformations that we are witnessing have the potential of producing enormous gains in terms of life quality. The growth in artificial intelligence (AI), virtual reality (VR) and robotics developments have broadened their application possibilities in our daily lives: in work, health, consumption, and recreation to name only a few.

One of the most disruptive ways in which technology is now changing the world of work is the "gig-economy." "Giggers" are freelancers who are hired only for the time required to complete certain tasks. In this employment model, internet based platforms connect providers and consumers of almost any service. Matched services include those provided by lower and higher skilled profiles, from domestic workers to business consultants and computer programmers. The only requirements are computers and Wi-Fi access anywhere in the world: 1) to use an internet based app or platform which matches supply and demand and 2) to complete the tasks offered.

The gig economy is still a minimal percentage of total employment. Nonetheless, its significance is undeniable given that its vast potential is amplifying its rapid global growth. Finding a balance between flexibility and security is therefore impertinent for legislators, companies, and employees. Innovative solutions in public policy are required to ensure that society as a whole can profit inclusively and impacting uncertainties are reduced. There is, however, one contemporary certainty stemming from the gig-economy: the need to solve its inherent dilemmas is now fomenting ingenious regulation and political debates. The interested reader to know more about this topic is referred to [10].

3. THE NEW ECONOMIC THEORY

A multidisciplinary group from the World Academy of Art & Science and the Club of Rome are leading a quest for a new human-centered theory of economics that reflects recent changes resulting from the emergence of a service-based economy, globalization, rising social aspirations and changing values, and is integrated with political, social, ecological, technological, and cultural factors from which it is inseparable. This project will reevaluate fundamental concepts and premises of modern theory with the goal of evolving a truly human-centered economic theory and practice. A change in thinking can lead to a radical change in action. This is the rationale for the project on New Economic Theory (NET) initiated by the World Academy of Art & Science and World University Consortium (WUC) in collaboration with more than a dozen leading institutions for the constitution of the NET Working Group a few years ago [11]. There ideas contribute to promote new actions.

Pope Francis has called in a letter for young economists from around the world to meet in the city of Assisi, Italy between March 26 and 28, 2020 to rethink a new economic doctrine for the world that goes beyond "differences of creed and nationality" and is inspired by "an ideal of fraternity attentive above all to the poor and excluded."

The aim of this event, immediately dubbed "The Economy of Francis," is to build and promote "a different kind of economy: one that brings life not death, one that is inclusive and not exclusive, humane and not dehumanizing, one that cares for the environment and does not despoil it," the pope said in the letter, released by the Vatican on May 11, 2019 [12].

The letter addressed to young economists and entrepreneurs, urges to "reanimate" world economy. Because of this, the pontifex said that there was no better place to inspire a new economy than in Assisi, "which has for centuries eloquently symbolized a humanism of fraternity."

Meanwhile, the head of the Catholic Church, met with economists Robert Johnson, director of the Institute for New Economic Thinking, and a recipient of the Nobel Prize in Economics Joseph Stiglitz discussed the need to promote on a global level, a "social economy" that "looks towards the future with the voice of young people in mind."

Pope Francis is a powerful voice, as he leads 1.3 billion people. Through his six-year period as pontifex, Francis has critiqued capitalism saying it "gives a moral cloak to inequality," has called for respect to other religions and has quoted Simon Bolivar calling for the "Great Homeland" and remembering that Latin America is no ones "backyard."

This new push for a renewed economic doctrine might be resembling of the 1950s and 1960s Liberation Theology, that sparked many changes in the Christian faith, especially in Latin American. This was a synthesis of Christian theology and Marxist socio-economic ideologies that emphasize social concern and actions for the poor and the political liberation of oppressed people. "We need to correct models of growth incapable of guaranteeing respect for the environment, openness to life, concern for the family, social equality, the dignity of workers and the rights of future generations," Francis concluded.

4. WORLD AND EUROPEAN ARTIFICIAL INTELLIGENCE

The race to become the global leader in artificial intelligence (AI) has officially begun. Starting in 2017, Canada, China, Denmark, the EU Commission, Finland, France, India, Italy, Japan, Mexico, the Nordic-Baltic region, Singapore, South Korea, Sweden, Taiwan, the UAE, and the UK have all released strategies to promote the use and development of AI (Fig. 1).

No two strategies are alike, with each focusing on different aspects of AI policy: scientific research, talent development, skills and education, public and private sector adoption, ethics and inclusion, standards and regulations, and data and digital infrastructure[13].

In April 2018, the EU Commission adopted the Communication on Artificial Intelligence: a 20-page document that lays out the EU's approach to AI [14]. The EU Commission aims to: (1) increase the EU's technological

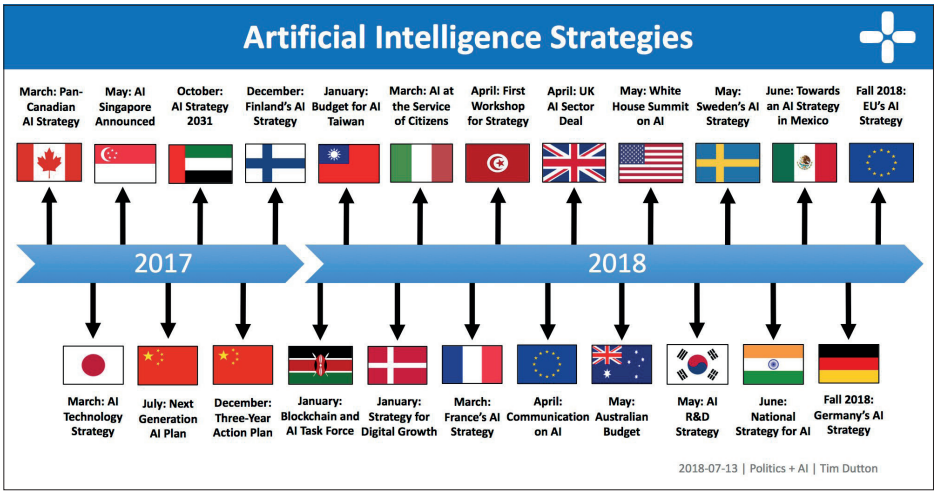

Fig. 1 World Artificial Intelligence National Strategies [13] (see text).

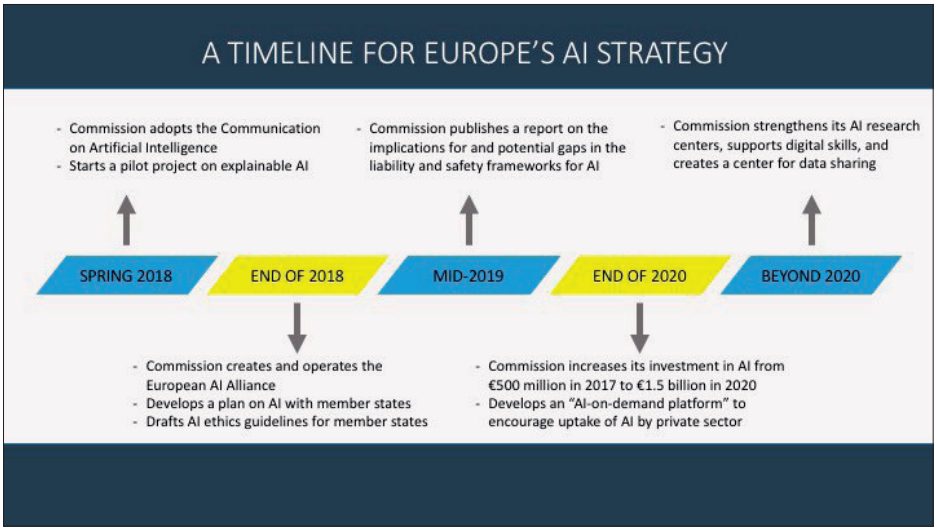

Fig. 2 A Timeline for Europe's AI Strategy [17] (see text).

and industrial capacity and AI uptake by the public and private sectors; (2) prepare Europeans for the socioeconomic changes brought about by AI; and (3) ensure that an appropriate ethical and legal framework is in place. Key initiatives include a commitment to increase the EU's investment in AI from €500 million in 2017 to €1.5 billion by the end of 2020, the creation of the European AI Alliance (which people can now join [15]), and a new set of AI ethics guidelines to address issues such as fairness, safety, and transparency.

A new High-Level Group on Artificial Intelligence will act as the steering group for the European AI Alliance and will prepare the draft ethics guidelines for member states to consider [16].

The Commission started working with member states to develop a coordinated plan on AI in order to ensure legal clarity by issuing a guidance document on the interpretation of the Product Liability Directive" in light of technological developments. Furthermore, the Commission will publish a report on the broader implications for potential gaps in, and orientations, for the liability and safety frameworks for AI, Internet of Things, and robotics by the mid- 2019 (Fig. 2). The goal of the forthcoming plan will be to "maximize the impact of investments at EU and national levels, encourage synergies and cooperation across the EU, exchange best practices and collectively define the way forward to ensure that the EU as a whole can compete globally [17]."

Based on fundamental rights and ethical principles, the EU Guidelines list seven key requirements that AI systems should meet in order to be trustworthy:

— Human agency and oversight
— Technical robustness and safety
— Privacy and Data governance
— Transparency
— Diversity, non-discrimination and fairness
— Societal and environmental well-being
— Accountability.

Aiming to operationalise these requirements, the Guidelines present an assessment list that offers guidance on each requirement's practical implementation. A Robotics and Artificial Intelligence Unit is present (Unit A. 1) [18]. The assessment list will undergo a piloting process to which all interested stakeholders can participate, in order to gather feedback for its improvement. In addition, a forum to exchange best practices for the implementation of "Trustworthy AI was created" [19].

On the 9th of April, 2019, 24 European countries signed a Declaration of cooperation on advancing digitisation of cultural heritage. They will work more closely together to better use state-of-the-art digital technologies in addressing risks that Europe's rich cultural heritage is facing, enhancing its use and visibility, improving citizen engagement, and supporting spillovers in other sectors [20].

Certainly preserving cultural heritage by digital technologies is important, but we guess that preserving human species is more fundamental and that might be a much better use for serious AI.

Significant developments in smart voice and facial recognition could also lead to the next era of user interfaces, a move from touch based primary interfaces to gesture control driven devices. Innovations in the area of healthtech could also significantly alter the way that some parts of the insurance and medical diagnostics industries operate.

5. MASTERING WHAT TRANSFORMS

The quest for "right knowledge" too often reduces to selecting some aspects of knowledge that fit neatly together into a conceptual framework and ignoring or rejecting those that do not. This process of acceptance and rejection may elevate our specialized knowledge of the part but it is likely to overlook profound truths about the whole.

Human thought is the power to link and relate two or more things together. Knowledge is the capacity to see each thing in right relationship to

everything else. For example, a deep understanding of semantics, the utilization of experience-based imagination in novel situations, the ability to identify a problem that should be solved, the ability to communicate and collaborate, and the ability to explore novel information actively and to discuss and incorporate the opinions of others are all abilities that current machine-learning AI technologies seem unable to perform, and these abilities are expected to become more important in the near future. Enhancing these abilities differentiates humans from AI technologies and makes humans perform creative tasks by utilizing AI technologies, which leads to the realization of innovative, human-centered symbiotic systems for a sustainable society with high productivity and less labor [21].

We have the deep awareness that the existence of "The Ungraspable" implies that there are intrinsic limitations to the cultural project of reducing a complex environment to its simple, formal representation, "The Real to Reality" by rationality. In fact, we need to recall that primitive intuitions are embedded in the conceptual framework through which a given culture interprets the nature of reality. In indigenous societies shamans and medicine-men (and women) tuned themselves to spontaneous apprehension through rigorous initiation and training; they derived their mystical vision from them. In mythically oriented societies the world was seen as a cosmic realm of spirits, and in classical cultures it was believed to be governed by a panoply of unseen gods. Chanting their divine names was originally meant to bring the audience to a state of "spiritual intoxication." The Abrahamic monotheistic religions recognised the intuitions of their prophets as conveying fundamental truths about God and the nature of His creation. Eastern cultures have always held that reality extends far beyond the domain of the senses.

On the other hand Western culture takes as real only that which is manifest, literally "to hand." Because what people see is constrained by what they believe they can see and by their own specific language. Everything that is not conveyed to consciousness by their eye and ear, by the five senses and their language in general, is dismissed from the modern Western view of the world. But artwork, in general, is a process of communicating sign, symbol, and ... emotion [22].

Chinese Philosopher Lao Tzu tells us that the "Tao" is the natural order within which human intuition must discern, in order to realize the potential for individual wisdom. This intuitive "knowing of life" cannot be grasped as just a concept, but through the actual living experience of one's everyday being. We can intuitively infer the overall structure of our universes or any arbitrary complex design, but our limited neural or computational

resources prevent us to achieve any deeper understanding of them in all their details at rational level. As individuals, we can explore and understand a limited window only.

Mankind's best conceivable worldview is at most a representation, a partial picture of the real world, an incomplete sketch built on symbols created by and centered on man [23]. By using Gregory Bateson's words, being aware of the "difference that makes a difference," as in his talk to Alfred Korzybski's Institute of General Semantics [24]. The talk was entitled "Form, Substance, and Difference." Form and substance referred to the famous Korzybski maxim "the map is not the territory." This expression first appeared in print in a paper that Alfred Korzybski gave at a meeting of the American Association for the Advancement of Science in New Orleans, Louisiana in 1931. In "Science and Sanity" [25], Korzybski acknowledges his debt to mathematician Eric Temple Bell, whose epigram "the map is not the thing mapped" was published in Numerology [26].

Usually Reality can be supported by many different formalisms or description systems (formal languages, narrative or not, used by rational observers, etc.), but they may not use the same information content or to be endowed with the same information strength and inference power.

We must recall and consider the fact that the definitive differentiation of the fundamental forms of words (noun and verb) in the Greek form of "onoma" and "rhema" was worked out and first established in the most immediate and intimate connection with the conception and interpretation of Being that has been definitive for the entire Western world. This inner bond between these two happenings is accessible to us unimpaired and is explored out in full clarity in Plato's "Sophist."

In fact, nouns and verbs have different grammatical and logical properties. English prefers nouns, other languages (e. g. Hopi) verbs. We tend to say "I had a bad dream" rather than "I dreamt badly." It is part of our objectifying tendency. Sadly, this strips what is being talked about of all vividness. Consider the noun "dream" and the verb "to dream" or "dreaming." In the former we objectify, isolate and look at "dream" as though it were a "thing." Spontaneity, the distinguishing quality of life from form is conveyed by the verb, whereas the noun reifies it into a thing.

Regrettably, in English, some of the most important words that denote or ought to denote activity per se have no seminal verb at all! Examples are: "awareness," "consciousness," "intelligence" and "wisdom." If we can coin "consce" and "intellige" as the verb forms of "consciousness" and "intelligence," we see what a world of difference it makes to say "I consce" or "the creature consces" or "he intelliges." American linguist Benjamin L. Whorf

remarks: "From the form-plus-substance dichotomy ... belong materialism, psycho-physical parallelism ... and dualistic views of universe in general ... Newtonian space, time and matter are no intuitions. They are receipts from culture and language. That is where Newton got them" [27]. Hard to believe, but true!

"Consilience" is the term coined by William Whewell in 1840 [28] and later used by Edward O. Wilson [29] for the integration of knowledge that involves a continuous reframing and remapping of reality to generate a "kaikaku-like" jumping shift of dominant conceptual frames, if needed. Improving the consilience between disciplines of knowledge is a worthwhile philosophical aim. Arguably, it makes reality itself more coherent, getting more and more ready to civilization advancement, according to the famous quotation from Whitehead [30]:

"Civilization advances by extending the number of important operations which we can perform without thinking about them. Operations of thought are like cavalry charges in a battle —they are strictly limited in number, they require fresh horses, and must only be made at decisive moments."

Because of consilience, the strength of evidence for any particular conclusion is related to how many independent methods are supporting the conclusion, as well as how different these methods are. Those techniques with the fewest (or no) shared characteristics provide the strongest consilience and result in the strongest conclusions. This also means that confidence is usually strongest when considering evidence from different fields, because the techniques are usually very different.

It is time to recall Einstein's inspirational quote: "The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift." It is time to start a new era on the deep awareness of the original configuration!

"Information understanding" always demands placing something in a social and cultural context, in a "virtual" boundary. Information understanding cannot exist without its own context and vice-versa. It is like an "Application" (onoma) that interacts within its own operative "Domain" (rhema). Experience is always gained when an Application is developed to interact within a Domain, and a Domain is always developed or investigated by a scouting Application [31], [32].

In terms of ultimate truth, a non-dual dichotomy of this sort has little meaning but it is quite legitimate when one is operating within the classic mode used to discover or to create a world of "immediate appearance" by narration. In other words, to capture the full information content of any elementary symbolic representation, it is necessary to conceive a "quadratic

support space" at least, by a computational linguistic perspective, supported by CICT (Computational Information Conservation Theory) [33].

We use the term information in the brute sense of an application emphasizing "systematic differences." The idea here is simply to get a certain theoretical gestalt off the ground to start from our roots, being deeply aware of the fundamental difference between approximated approximation and exact approximation representations. In the first case, as in sound and utterance for spoken language or in analytical Calculus by the truncation of Taylor series (with the approximated error expressed by the related order of magnitude), we can develop the statistical or stochastic approach with either the Bayesian or the frequentist perspective.

Recently Bayesian and frequentist approaches have been subjected to a historical, cognitive and epistemological analysis, making it possible to not only compare the two competing theories, but to also find a potential solution [34]. Big data, deep mining, big mechanisms, e-Science, or computational simulations are only possible thanks to a new era of hardware and mindware: statistical techniques are the backbone of this revolution. They will propel the initial stage of the incoming Fourth Industrial Revolution [35].

In the second case, as in Geometry or in Arithmetic by arresting the expansion of Geometric series at a desired point (with specific error knowledge expressed by an exact quantity), we can develop a corresponding combinatorial approach [36]. When we discuss about the numerical approach to the reality, we are not acting as mystical Neopythagoreans; instead, we are analyzing how the numerization process is created and how the rules work with these numbers [37].

We are talking about a natural property of the cognitive systems (to deal with oriented quantities) that has been heavily improved with symbolic and algebraic tools at rational level in the past. But traditional, formal symbolic tools are a clever operational compromise that emphasizes main superficial relations only. They overlook the related, deep full relational (one-to-all) ordering of specific arithmetic structures underlying our human representation rational framework. We need to understand much better their relational, complementary articulations by new eyes [37–40]. Only then, we will be able to reach the root of digit and number deep meaning, and be ready to fully reconnect the never disjoined non-dual dichotomy between human being and his/her universe in the unity of Nature [33]. Of course, we can apply our dichotomizing process in a recursive way to achieve any precision we like.

As an operative example, we can start to divide human experience into two irriducible, interacting concepts or parts, "Application" and "Domain".

According to CICT, the full, evolutive information content of any embodied, symbolic representation emerges from the capturing of two fundamental, coupled components: the linear component (unfolded) and the nonlinear one (folded). This is the root, the fundamental cosmic non-dual dichotomy of any human representation. Referring to the transdisciplinary concept [41], we see that for full information conservation any transdisciplinary concept emerges from two pair of fundamental coupled parts. In turn, both Domain and Application can be thought of as being either in "simple mode" (SM, linearly structured, technical, unfolded, etc.) or in "complex mode" (CM, non-linearly structured or unstructured, non-technical, folded, etc.) representation, as defined in Fiorini [42]. The SM Application or Domain represents the world primarily in terms of "immediate appearance", whereas a CM Application or Domain sees it primarily as "underlying process" in itself. CM is primarily inspirational, imaginative, creative, intuitive; feeling rather than facts predominate initially.

"Art", when it is opposed to reductionist "Science 1.0" is "feeling transmission" rather than "data transmission." It does not proceed by data, reason or by laws. It proceeds by feeling, intuition and aesthetic resonance [43]. The SM, by contrast, proceeds by data, reason and by laws, which are themselves underlying forms of rational thought and behavior. Therefore, we can assume, for now, to talk about human brain experience by referring to SM and CM, Application and Domain, according to the Four-Quadrant Scheme (FQS) of Figure 3.

Whatever your goal is, think about whether you are going to need intellect, intuition, emotion or instinct or an aggregation of them, in order to achieve it. Those are the main four natural modalities of our thinking mind. From a common language perspective, taking into consideration the folding and unfolding properties of CICT structured "OpeRational" (OR) representations for the Space-Time Split (STS) [44], one can conceive a better operative understanding of usual terms, with the added possibility of increased information conservation, referring to those four natural modalities of our operative brain. Here, the term "INTUITIVE" (first quadrant, top right) is considered the combination of a major unfolded time representation framed by folded minor space representation. The term "INTELLECTUAL" (second quadrant, top left) is interpreted as the combined representation of major unfolded space and time representations, with minor complementary folded time and space components. The term "EMOTIONAL" (third quadrant, bottom left) can be assumed as the combination of a major unfolded space representation framed by the minor folded time representation. The forth quadrant (bottom right), "INSTINCTIVE" represents the

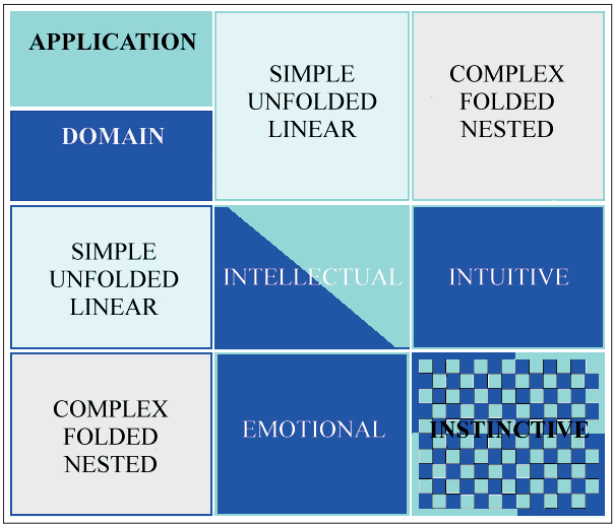

Fig. 3. Living Brain Four-Quadrant Scheme (FQS). The four natural modalities of human mind: Intuitive, Intellectual, Emotional and Instinctive (see text).

combination of major folded space and time components, framed by the combination of minor unfolded space and time components. It can be interpreted as the simple (bidimensional), but realistic representation of the usual modality experienced by any living organism. Moreover, it can help us to better understand and to be deeply aware that our skin is the functional, semipermeable closure of our entire nervous system and brain (they all are generated by the same one of the embryo's three primary germ layers, the "ectoderm"). Their deep, related implications shape our ability to feel ourselves comfortably immersed within our own universe and survive [45].

Following the wisdom of Albert Einstein: "I believe that we do better to try to understand things with the help of concepts we have formed for this purpose—but being conscious every minute that these concepts are our poor inventions which will never enable us to draw final conclusions about the 'nature of ultimate reality' whatever this may mean."

6. CONCLUSION

In formal language communication, an important component of human rationality resides in the diagram of the traditional square of opposition, as formal articulations of logical dependence between connectives [46]. The origin of the square can be traced back to Aristotle making the distinction between two oppositions: contradiction and contrariety. Treating conveniently the binary connectives by four basic transformations, i. e. neutral

element (I, identity), algebraic complement (N, negation) and order reciprocal (R, reciprocation) by a valid treatment of correlative (C, later called dual, D) in an integrated structure known as the Klein four-group [47], would guarantee people to make logically valid classical inferences on propositions to achieve predicative competence and proficiency [31]. But the formal rationality provided by the squares is not spontaneous and, therefore, should not be easy to learn for adults [47].

Nevertheless, any sentient, educated human being consider him/herself to master it completely. This is the main reason why we need reliable and effective training tools like the Elementary Pragmatic Model (EPM) and the Extended EPM (E2PM) [32], to train ourselves continuously and to achieve full logic and predicative proficiency day-by-day.

As the global age seems to bring new possibilities and challenges, we need now to think in much broader terms than ever before by using a collective intelligence approach. Certainly, embracing interdisciplinary and transdisciplinary education is really the way society, together with scientists and scholars, must move on to. But before being able to use those powerful tools wisely and effectively at social level, we need to show to have acquired knowledge excellence and treasure in a very specific area first. To achieve an antifragile behavior, next generation human-made system must have a new fundamental component, able to address and to face the problem of arbitrary multiscale evolutive information ontological uncertainty management (OUM) [31], [32], in an instinctively sustainable way [48]: bottom-up active wisdom [49] by design!

The UN Agenda 2030 — Transforming Our World is a harmonious set of 17 goals and 169 targets, and all of the SDGs have to be fulfilled by 2030. They are the expression of the political will and their realization does demand science, technology and innovation cooperating together at transnational level. Will we succeed?

U. S. President John F. Kennedy wrote: "Problems are manmade — therefore they can be solved by man. And man can be as big as he wants. No problem of human destiny is beyond human beings. Man's reason and spirit have often solved the seemingly unsolvable — and we believe they can do it again."

Our hope is certainly the best solution to proceeding!

REFERENCES

[1] L. H. Gunderson and C. S. Holling, (eds.): *Panarchy: understanding transformations in human and natural systems*. Washington DC, USA: Island Press, 2002.

[2] R. A. Fiorini and G. F. Santacroce: "Economic competitivity in healthcare safety management by biomedical cybernetics ALS." In: *2013 Proc. International Symposium, The Economic Crisis: Time For A Paradigm Shift -Towards a Systems Approach*, Jan. 24–25, 2013, Universitat de València. Valencia, SP.

[3] R. A. Fiorini: "Big Government and Global Governance: Managing Complexity for the New Society," *Eruditio,* vol. 2, No. 5, December 2018, p. 33–55.

[4] Momir Đurovic: The Future Has No History. Podgorica, Montenegro: MASA, 2017.

[5] C. Sagan: *Bringing Science Down to Earth*, 1994, Co-authored with Anne Kalosh, in Hemispheres (October 1994), p. 99; this is similar to statements either mentioned in earlier interviews or published later in the book *The Demon-Haunted World: Science as a Candle in the Dark*, 1995.

[6] WMO: Press Release Number: 29112018, 29 November 2018. Homepage, https://public.wmo.int/en/media/press-release/wmo-climate-statement-past-4-years-warmest-record, accessed on 2019/5/14.

[7] L. Mercalli: *Non c'è più tempo*. Torino, Italy: Einaudi, 2018 (In Italian).

[8] R. F. Baumeister, H. M. Maranges and H. Sjåstad:. "Consciousness of the Future as a Matrix of Maybe: Pragmatic Prospection and the Simulation of Alternative Possibilities," *Psychology of Consciousness, Theory, Research, and Practice,* vol. 5, No. 3, 2018, p. 223–238.

[9] G. Jacobs: "Anticipation as a Deep Driver in the Social Sciences," *The First International Conference on ANTICIPATION*, 5–7 November 2015, Trento, Italy, 2015.

[10] CSRI, Credit Suisse Research Institute: "AI & The Future of Work," Davos Edition, 2019. Homepage, https://www.credit-suisse.com/media/assets/corporate/docs/news-and-expertise/articles/2019/04/ai-the-future-of-work.pdf, accessed on 2019/5/14.

[11] WAAS: "New Economic Theory." Homepage, http://www.neweconomictheory.org/, accessed on 2019/5/14.

[12] CAN, Catholic News Agency: "Pope Francis invites young economists, entrepreneurs to Italy in 2020, May 11, 2019." Homepage, https://www.catholicnewsagency.com/news/pope-francis-invites-young-economists-entrepreneurs-to-italy-in-2020–46257, accessed on 2019/5/14.

[13] T. Dutton: "An Overview of National AI Strategies, July 13, 2018." Homepage, https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd, accessed on 2019/5/14.

[14] EC, European Commission: Communication Artificial Intelligence for Europe, April 25, 2018. Homepage, https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe, accessed on 2019/5/14.

[15] EC, European Commission: The European AI Alliance. Homepage. https://ec.europa.eu/digital-single-market/en/european-ai-alliance, accessed on 2019/5/14.

[16] EC, European Commission: High-Level Expert Group on Artificial Intelligence. Homepage, https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence, accessed on 2019/5/14.

[17] T. Dutton: "A Timeline for Europe's AI Strategy, May 2018." Homepage, https://medium.com/swlh/a-timeline-for-europes-ai-strategy-d2fc9f7bbcf1, accessed on 2019/5/14.
[18] EC, European Commission: Robotics and Artificial Intelligence (Unit A. 1). Homepage, https://ec.europa.eu/digital-single-market/en/content/robotics-and-artificial-intelligence-unit-a1, accessed on 2019/5/14.
[19] EC, European Commission: Ethics Guidelines for Trustworthy AI. Homepage, https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top, accessed on 2019/5/14.
[20] EC, European Commission: EU Member States sign up to cooperate on digitising cultural heritage, April 9, 2019. Homepage, https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-digitising-cultural-heritage, accessed on 2019/5/14.
[21] R. A. Fiorini: R. A. Fiorini, "Human-Centered Symbiotic System Science (HCSSS)," IEEE ICCI*CC 2019, July 23–25, 2019, Politecnico di Milano University, Milano, Italy, (accepted).
[22] W. Nagan and A. M. Haddad: "Aesthetics and Human Rights," Levin College of Law, Florida, USA, 2012. Homepage, http://works.bepress.com/winston_nagan/12/, accessed on 2019/5/14.
[23] T. Deacon: *Incomplete Nature. How Mind Emerged from Matter*. New York, NY, USA: W. Norton & Company, 2011.
[24] G. Bateson: *Steps to an ecology of mind: collected essays in anthropology, psychiatry, evolution and epistemology*. Chicago, IL, USA: University of Chicago Press, 1972, p. 452.
[25] A. Korzybski: "Chapter IV: On Structure." In ed. R. Schuchardt, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics*, p. 58, (1st ed. 1933). CD-ROM ed, Charlotte, SC, USA, 1996,
[26] E. T. Bell: *Numerology: The Magic of Numbers*. Baltimore, ML, USA: Williams and Wilkins, 1933.
[27] B. L. Whorf: *Language, Thought and Reality*. Hoboken, NJ, USA: John Wiley & Sons, 1956, p. 153.
[28] W. Whewell: *The Philosophy of the Inductive Sciences, Founded Upon Their History*,. (two volumes). London, UK: John W. Parker, 1840.
[29] E. O. Wilson: *Consilience: The Unity of Knowledge*. New York, NY, USA: Alfred A. Knopf, 1998.
[30] A. N. Whitehead: *An introduction to mathematics*. London, UK: Williams & Northgate; New York, NY, USA: H. Holt, 1911.
[31] R. A. Fiorini: "Would the big government approach increasingly fail to lead to good decision? A solution proposal" *Kybernetes,* vol. 46, No. 10, 2017, p. 1735–1752.
[32] R. A. Fiorini: "Logic and Order: Ontologic Effective Management for Learning and Creativity." In: ed. J. Horne, *Philosophical Perceptions on Logic and Order*, pp. 283–351. Hershey, PA, USA: IGI Global, 2017.
[33] R. A. Fiorini: "Computational Information Conservation Theory: An Introduction." In: Mas-torakis, N. E, Demiralp, M, Mukhopadhyay, N, Mainardi, F. (eds.) *2014 Proceedings of the 8th International Conference on Applied Mathematics, Simulation, Modelling (ASM '14), Mathematics*

and Computers in Science and Engineering Series, No. 34, NAUN Conferences, pp. 385–394. Florence, Italy: WSEAS Press, November 22–24, 2014. ISSN: 2227–4588, ISBN: 978-960-474-398-8.
[34] J. Vallverdú: *Bayesians Versus Frequentists*. Berlin, Heidelberg, D: Springer, 2016.
[35] K. Schwab: *The Fourth Industrial Revolution: What it Means, How to Respond*. LaVergne, TN, USA: Foreign Affairs, Lightning Source, Inc, 2015.
[36] R. A. Fiorini: "Empowering Cognition by Precisation of Numeric Words" *International Journal of Software Science and Computational Intelligence (IJSSCI),* vol. 9, No. 4, 2017, p. 1–18.
[37] R. A. Fiorini and G. Laguteta: "Discrete tomography data footprint reduction by information conservation," *Fundamenta Informaticae,* vol. 125, No. 3–4, 2013, p. 261–272.
[38] R. A. Fiorini: "How random is your tomographic noise? A number theoretic transform (NTT) approach" *Fundamenta Informaticae vol 135,* No. 1–2, 2014, p. 135–170.
[39] R. A. Fiorini: "Computerized tomography noise reduction by CICT optimized exponential cyclic sequences (OECS) co-domain" *Fundamenta Informaticae,* vol. 141, 2015, p. 115–134.
[40] R. A. Fiorini: "New CICT framework for deep learning and deep thinking Application" *International Journal of Software Science and Computational Intelligence,* vol. 8, No. 2, 2016, p. 1–21.
[41] R. A. Fiorini: "Transdisciplinary Education for Deep Learning, Creativity and Innovation." In: Rome Conference Proceeding, The Second International Conference on Future Education, pp. 94–107. Rome, Italy, November 16–18, 2017. Rome, IT: WAAS, WUC, Roma Tre University, 2018.
[42] R. A. Fiorini: *Strumentazione Biomedica: Sistemi di Supporto Attivo*. Milano, IT: CUSL, Collana Scientifica, 1994, (in Italian).
[43] Z. Radman: "Towards Aesthetics of Science" *(JTLA) Journal of the Faculty of Letters, The University of Tokyo, Aesthetics,* No. 29–30, 2004/5, p. 1–16.
[44] R. A. Fiorini: "GA and CICT for stronger arbitrary multiscale biomedical and bioengineering solutions." In: eds. S. Xambó Descamps, J. M. Parra Serra, and R. González Calvet, Early Proceedings of the AGACSE 2015 Conference, pp. 153–162. Barcelona, SP: Universitat Politècnica de Catalunya, July 29–31, 2015.
[45] R. A. Fiorini: *Sanita' 5.0 — La Visione Evolutiva*. Milano, IT: CUSL, Collana scientifica, 2010, (in Italian).
[46] T. Parson: "The Traditional Square of Opposition," Stanford Encyclopedia of Philosophy, 1997/2017. Homepage, https://plato.stanford.edu/entries/square/, accessed on 2019/5/14.
[47] S. Robert and J. Brisson: "The Klein group, squares of opposition and the explanation of fallacies in reasoning" *Logica Universalis No. 10, 2016, 377–392*.
[48] M. Hytten: "Instinctively Sustainable." White paper on sustainability communications, 2017. Homepage, http://www.mariohytten.com/home, accessed on 2019/5/14.
[49] M. C. Bateson: Composing a Further Life: The Age of Active Wisdom. New York, NY, USA: Vintage, 2011.