

Analogue Humans Facing Increasing Threats in a Digital Mass Global Future: Modelling Policy Exchange Responses in the EU Space to Achieve Sustainable Integrative Development

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Abstract

Drawing from previous work by Gilder on issues of computerization and governance (1987) and the revolutionary analogue to digital transition (2013), this essay first considers the “Great Reset” currently underway in the European Union via the “digital transformation pyramid” (digitization, digitalization and digital transformation) leading to “Industry 4.0”. Within the EU, the role and function of the Digital Transformation Council – DTC is considered, as is the need to develop and maintain what SOSN and Hodge have called the “holy trinity of people – process – technology” in the face of five drivers of technological transformation. While a focus on end-customers of technology (such as the DTC provides) should promote democratic decision processes, it does not guarantee them. This is because while fostering economic gains, the combination of technological determinism and subsequent decision processes might not “be taking into account the solutions regarding their choices and their level of civic education, which can be manipulated only towards a pragmatic and mercantile goal.” In the words of Carayannis *et al.* (2012), this conception of EU policymakers is poised between the “knowledge economy” and the “knowledge society”, and a more expansive conception is required.

The authors then consider the 17 goals of the SDGs in the EU space as seen through, first, the Threat-Exchange-Integration social organizers of Kenneth Boulding (1970; 1978), grounded within the eight major revolutionary technologies as described by Richard Carrier (2015), then, second, to how, a “deep switch” of the development paradigm, as articulated by Serban (2013), can be (perhaps) obtained, via concepts of well-being and resilience. Finally, consideration of a modified “ecologically sensitive” Quintuple Helix of Carayannis *et al.* (2012), (which “emphasizes in the new evolutionary configuration the need for a so-called socio-ecological transition of society and economy in view of the new evolutions and expectations of the 21st century”) will be contemplated.

Keywords: Kenneth E. Boulding (TIE Model), Richard Carrier, Elias Carayannis (Quintuple Helix Model), SDGs, European Union, European Green Deal, Digital Transformation Pyramid, Knowledge economy, Knowledge society

Motto: "Technology [is] the knack of so arranging the world that we don't have to experience it." (Max Frisch, 1957)¹

The Grand Transition from Analogue to Digital Processes in our Lifeworld²

The miniaturization technology developed and deployed by the Cold-War space race was probably not only a part of the anticipatory theories expressed by Alvin Toffler,³ but it was also deeply involved in most black utopias (dystopias), such as George Orwell's novel - "1984".⁴ It is not clear whether these were actually the roots in area of the digitalization of the innovation process. Nevertheless, it is clear that the formalization of such processes conducted to deeper and deeper technological, social and political revolutions.⁵ The digitalization process in itself, apart from the digital transformation which is much more complex, has also its own interconnections: not only with the modernization or commodification of human knowledge, but also as a part of human-robot collaboration, which is another important trend in robotics, in the logic of changes within modern and postmodern societies.

Finally, the "mythologization" of a super power capabilities of human kind is closely related to this transformation from simple technical digitalization to a social economic pyramid: *digitization, digitalization and digital transformation*.⁶ These processes are generally seen as an apotheosis of the so-called Great Reset, which is a complex process of transformation inside advanced societies, with high levels of economic performance and competitiveness, favouring progress and globalization.

According to Gupta (2020), the so-called digital transformation pyramid, which has digitization as a first stage of the entire complex process, refers to specifically only to creating "*a digital*

¹ Frisch, M. (1994). *Homo Faber: A report*. San Diego: Harcourt.

² The larger communicative grounding of this analysis is provided by Jürgen Habermas. As noted by Paul Lakeland (Preserving The Lifeworld, Restoring the Public Sphere, Renewing Higher Education, *Cross Currents*, Winter 93, 43[4]: 488-502), highly technical subjects (i.e., "the system") have a worrisome way of collapsing the scope of the public sphere, and Habermas was wise to point this out:

<<He describes the pathology of life in late capitalist societies as the "colonization of the lifeworld by the system," and vests the hope of movement toward a newly humane and democratic society in the "transformation of the public sphere." The former phrase expresses the conviction that distinctly human patterns of communication and interaction, which are in principle open and even emancipatory, are under threat, progressively squeezed to the margins of communal life by the more instrumental or manipulative model of interactions appropriate to technology or to impersonal systems. By "the public sphere," Habermas means first the empirically discerned historical phenomenon of a community of discourse in which rational discussion of matters of social and political import took place, and influenced the formation of public policy. Secondly, he uses the term to point toward the (perhaps counterfactual) possibility of creating something today that would serve to protect the lifeworld from the depredations of the system or, more simply expressed, to preserve democracy in late capitalist society. (pp. 491-92)>>

³ Toffler, A. (2020). *Future shock*. New York: Random House. See also: Toffler, A. (1980). *The third wave*. New York: Bantam.

⁴ Orwell, G. (2021). *Nineteen eighty-four*. London: Macmillan.

⁵ See: Gilder, E. (1987). An enigmatic embrace: Problems of regulating the effects of new communication technologies in the Soviet Union. ERIC Document ED 289 187, November; and, Gilder, E. (2013). Technological drivers of (r)evolutionary change in modern societies and how developing countries might productively respond to them via intentional, thoughtful 'leapfrogging.' *Proceedings of the 7th-2013 Huon Conference, PNG University of Technology, Lae, November 13-14 [2013]* Lae: The Papua New Guinea University of Technology (pp. 218-26).

⁶ Gupta, M. S. (2020). What is digitization, digitalization, and digital Transformation? Arc Advisory Group (24 March). Retrieved: <https://www.arcweb.com/blog/what-digitization-digitalization-digital-transformation> (14/4/2021). For effects of this digital transformation on the corporate sector, see: Prause, J. (2016). Digitization vs. digitalization – Wordplay or World View?" About SAP SE / SAP News Center / Corporate (11 May). Retrieved: <https://news.sap.com/2016/05/digitization-vs-digitalization-wordplay-or-world-view/> (14/04/2021).

representation of physical objects or attributes". From another perspective, the digitization as *foundational* in various types of situation *"constitutes the connection between the physical world and software"*. In practice, this means that digitization is largely considered to be a significant *"enabler for all the processes that provide business value because of the need for consumable data"* [emphases added].

Secondly, digitalization is implemented for its capacity *"in enabling or improving processes by leveraging digital technologies and digitized data"*. The main importance of digitalization is focused on increasing the productivity and efficiency, with a view to reduce costs. In consequence, the digitalization, to a broader extent, is considered to improve *"the existing business process or processes, but doesn't change or transform them"* [emphases added].

Finally, digital transformation is a relevant stage of the process initiated by most advanced public and private organization., due to its complexity and the pushing up towards a so-called *"business transformation enabled by digitalization"*. Hence, digital transformation is related to an entire *"changing of business processes, enabled or forced by digitalization technologies"* [emphases added].

To better understand digital transformation as a process, the quoted author mentions, as basic phase, *"the convergence of IT/OT where the intersection and overlap of IT skills within the OT domain has created the need for a more uniform governance due to Cybersecurity concerns, data flow requirements, and skills"*[emphases added]. Digital transformation also means *"a shift from local control of physical processes to remote monitoring and control of those same processes"*. One major role is integrating the supply chain for greater efficiency and response example, and this is related specifically to the integration of a customer sales volumes feeding though to a company's raw material vendors [emphases added].

One last important component to be taken into consideration is the evolution of Digital Transformation in the so-called "Industry 4.0". Contrarily, a combination of Digital Transformation and Digitalization is considered within EU policies to be a potential source of controversies or confusion.

The EU Policy Response to the New Digital Life-Scape of Life and Work, from Machines to Algorithms

In order to avoid inherent discrepancies, in European Union, as study case, we could mention the emergence of the Digital Transformation Council – DTC.⁷ This was designed as an end-user only community, where technology suppliers are not allowed to participate; a place *"to Connect, Collaborate, Learn, and Share with peers who are digitizing and transforming their organizations"* [emphasis added]. The need for digital transformation for industrial organizations and also for cities is seen to be able to continue to accelerate and evolve for some time. It means that it is pushing every organization or municipality for the need to innovate, to change, and therefore, to adapt.

A good starting point would be, according to the author, to understand "the critical dimensions of the problem, because this can serve as the basis for planning"⁸. For more details, let's see as a matter of example that the mission of DTC would be to enable industry, energy, and public

⁷ Arc Advisory Group. (n.d.). Digital Transformation Council (End Users Only). Retrieved: <https://www.arcweb.com/digital-transformation-council> (14/04/2021).

⁸ Arc Advisory Group. (n.d.). Digital Transformation Council for Smart Cities. Retrieved: <https://www.arcweb.com/digital-transformation-council-smart-cities> (15/04/2021).

sector professionals driving or impacted by digital transformation "to keep abreast of the many emerging technologies and business trends, to learn from others on similar journeys, and to leverage these trends and technologies to achieve transformational growth"⁹.

As practical activities closely related to the three large fields of implementation – industry, infrastructure and smart cities -, the Advisory Group ARC is involved in conducting research, organizes meetings, provides venues, etc. The main target would be that Council members are expected to share information and regularly participate in a number of surveys, and will receive priority access to survey results.

According to Bloomberg (2018)¹⁰, it is interesting to remark that digitalization has the role to re-direct to digitization. According to the Gartner glossary he quotes, "the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business." It means that Digitization represents in fact only the process of changing from analogue to digital form.

Observers of this phenomena remark that enough ambiguity remains about the use of the terms of 'Digitization' and 'Digitalization'. According to such statistics, we could reveal a great deal about how such terms are understood and used today. It is important to try to have a contribution to this issue, but this could be apparently realised confronting with the degree of satisfaction of customers. There are even some executives who recognised that there is still a confusion between Digitization and Digitalization.

In our days, the digital transformation, as a major orientation and public policy of the European Union, largely financed according to the new decision of Brussels, is considered part of an alignment to the trends already expressed and put into practice by other advanced societies and competitive economies. At a smaller scale, digital transformation is seen mainly as a tool for business companies to remain competitive, viable, and successful in an increasingly digitalised marketplace.

According to SOSN and Hodge¹¹, such a transformation seems "inevitable and necessary", but various companies or various eco-systems are differently impacted by such transformation. In the present, there are various views and obviously controversies about the role and ways to implement digital transformation. According to them, for example, it is real that digitalization is considered mainly associated with technology, however, "successful transformation" should be based "on the holy trinity of people – process – technology".

A potential source of disagreement is related to the fact that "technology translates to software" all new results of innovation supported through the value-adding human work. The critics of such an extension of transformation of eco-system tend to see the current evolution, mainly the data driven insights, as an imposed solution mainly determined by a pragmatic perspective provided by the ideologues of the digital transformation process. This is the limiting ideology of the "knowledge economy", elaborated as follows.

⁹ Arc Advisory Group. (n.d.). Digital Transformation Council.

¹⁰ Bloomberg, J. (2018). Digitization, Digitalization, and digital transformation: Confuse them at your peril. *Forbes* (29 April). Retrieved: <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=41d9adde2f2c> (14/04/2021).

¹¹ SSON & Hodge, B. (n.d.). The 4 drivers of digital transformation. Retrieved: <https://www.ssonetwork.com/rpa/articles/the-4-drivers-of-digital-transformation> (14/04/2021); Tiersky, H. (2017). The 5 key drivers of digital transformation today. *Navigating Digital Transformation*, CIO (25 May). Retrieved: <https://www.cio.com/article/3198121/whats-now-in-digital-transformation.html> (14/04/2021).

Who or What Drives the Change Process? Technological Determinism vs. Political Choice

The current recommended 'solutions', as presented by Giacomo Parato, are indeed "delivered by applications that support the process via a user experience"¹². The main potential risks of such an assumption of the evolution of the process would be related to the consumerist choices or pressures coming directly from customers. Such a so-called apparent "democratization" of the process presents as a main inconvenience the fact that the future "work force" will be obliged to be fully "digitally aligned to the enterprise reality"¹³.

As a first remark, this implies that this human work force would be deeply determined and oriented by the entire automation process. More than this, Parato considers that it would be fatal that automation would become a kind of general and compulsory responsibility (task). In other words the automation stage of the digital transformation would be a kind of natural continuation of the "Kaizen" philosophy, related to the permanent improvement of all dimensions of the managerial process in a company.¹⁴ Nevertheless, we could remark that between these permanent searches for innovative solutions through "innovative thinking" is not at all at least theoretically related to social innovation in view of involving a larger concept of well-beingness of people and of sustainability on mid and long term.

According to Parato, the so-called "recruiting new talent" process is in a uni-dimensional way connected to the shift towards digital reinvention of business, without taking too much into account other factors related to critical thinking, mindfulness or resilience. The main justification to support the speed-up of the expansion of digital transformation would be closely related to the customers' will. Practically, as in the words of Herbert Marcuse¹⁵, companies would be under the pressure to submit their internal innovation transformation according to the exploited requirements or "invented needs" of customers. A potential of such an evolution of the entire process would be the lack of interconnection between the technical expertise of certain employees with entrepreneurial culture supposedly coming from start-ups' experiences.

What we could see as a first intermediary conclusion is the fact that the focus has tended to be on the profitable results of the digitalization and, implicitly, only on an increasingly disruptive innovation picture, without taking into account longer term, broader consequences.

A second debated successful driver in view of digital transformation is directly linked to the need of re-evaluation of the whole process. In practical terms, it is suggested a needed orientation in view "to drive a seamless and integrated workflow end-to-end". It means that a mere optimization of various versions of the current process would not be enough satisfactory. Therefore, it implies the already mention "need to rethink our focus".

This could be translated to a call for an even more disrupting vision on the entire process than the research to only optimizing certain current components.

Thirdly, the envisaged "smarter processes" would be fated to combine "increasingly intelligent and competent technology" with the stake of an "optimized human resources" potential.

¹² SSON & Hodge.

¹³ *Ibid.*

¹⁴ See: Graphic Products, Inc. (2008). *KAIZEN: The Japanese philosophy*. Beaverton [OR] USA: Author. Retrieved: <https://www.site.uottawa.ca/~nelkadri/Engineering%20management/Kaizen-Guide-DLP300.pdf> (14/04/2021).

¹⁵ Marcuse, H. (1964). *One-Dimensional man: Studies in the ideology of advanced industrial society*. Boston: Beacon.

The deepening of “cognitive technology”, aimed to more and more simulate the human decision-making process, already seems to lead the current transformation in a triumph of machine learning. As a key-implication would be that such a redefining of products in view of the future “digitalized economy” would finally lead to a “decentralized knowledge” and consequently to a deep transformation for the structure of the work force. For the current stage, this trend is already clearly designed but the concrete ways of redefining various social and professional roles are still missing.

The fourth potential driver is an opportunity around “data”. Indeed, we face a kind of a big opportunity in structuring completely new “digital supply chain”. Apparently, the most complicated dimension of such a process would be strictly connected to the involvement of all stakeholders in favour of such a deep automation advance.

Within such a process of transformation, involving more and more machine learning and also advanced analytics, the major challenge would be however take into account the subjective human factor, but also the rigidity of data provided by machines. The main requirement would be to try to support a realistic balance between the decision-making roles of humans in relation with the use particular data sets.

In conclusion, the economic competitiveness of companies would have to be more and more dependent not only of “the traditional levers of change”, but more and more to the collecting and using process of data conducting to “increasing automated solutions”. Such a main focus on customers probably would be a key to economic success, but it may not be taking into account the solutions regarding their choices and their level of civic education, which can be manipulated only towards a pragmatic and mercantile goal. There is a need for what has been dubbed the “knowledge society”.

Techno-Digital Ecosystems and Sustainable Development Management

Under current conditions, in order to interconnect with the complexity of the concept of sustainability or sustainable development, the most significant evolution that we can notice is related to the transition from the old value chains, which were linear, to the already defined ecosystems, as digital ones. For new large industrial concerns, in particular, the consolidation of these digital ecosystems¹⁶ is of paramount importance from the point of view of what they pursue in terms of competitiveness, i.e., market dominance.

However, on closer examination, this trend, more exactly the continuation of its deepening, is still a rather limited knowledge of the power of digital ecosystems, how they are created, how they can operate and how companies can approach these digital ecosystems. After all, the complexity lies in generating a practical framework for the already established organizations, operating in practice, and the new entrepreneurs, so that they can better value the paradigm of digital ecosystems.

Most recently, we are dealing with a competition that manifests itself between ecosystems themselves rather than between companies taken individually. Thus, management researchers have highlighted and made available a special methodology that includes a three-component approach, which can be used and which contains the characterization of the framework as

¹⁶ See: Valdez-de-Leon, O. (2019). How to develop a digital ecosystem: A practical framework. *Technology Innovation Management Review* 9 (8) August: 43-54. Retrieved: https://timreview.ca/sites/default/files/article_PDF/TIMReview_August2019-%20Final%20-%20D.pdf (14/04/2021).

such, a review and refinement of this framework and in the latter a redefining of the framework as a whole.

Much of the debate is essentially focused on the stimulation of the innovation process. In other words, the aim is to create communities in view of enabling the exchange of ideas and strengthen collaboration¹⁷. This will provide the opportunity for relevant feedback from the community on the positioning and orientation of ecosystems in the market. The mentioned framework would be significant because it can serve as a reference for a list of new economic opportunities, which will ultimately ensure the so-called long-term viability of these ecosystems. Smaller companies are also gradually joining this framework in order to be embodied in these digital ecosystems because they aim to facilitate the creation of added value and obviously this in turn is seen by entrepreneurs as an opportunity to participate in view of the benefits of the new emerged paradigm.

Yet, from the point of view of the SDGs, sustainability is most often associated with environmental attributes, the preservation of the environment and of its qualities at the highest standards. Furthermore, SDGs consider objectives that connect rather to a so-called "societal sustainability"¹⁸. This assumes that entrepreneurs, when engaging in the process of digitization, should take into account the importance of understanding and transposing these objectives of a sustainable development at societal level. In other words, small and medium-sized enterprises, for example, should focus on sustainable digitalisation, i.e., also targeting the support and the facilitation ways to transition to a simultaneously "green and digital economy". It could eventually become a key force for those truly innovative SMEs that engage and genuinely benefit from the new business ecosystems that are being created. In the long run, it is very important to mention that the overall goal of a truly sustainable digitalisation would ultimately lie in the so-called "European digital sovereignty"¹⁹ - strengthening the uniqueness, the capacity for personalized digital development that the business environment in the Union European can put into practice.

In this regard, the so-called three pillars of digital sustainability are taken into account, namely sustainable B2B Digitalization, a second level would be strongly connected to Greener Technology and ultimately to the Circular Economy and thirdly the formulation of policies and a regulatory framework that is fully in favour of facilitating innovation.

¹⁷ DigiProcess. (2021). Process industry digitalization requires new forms of ecosystem collaboration. 19 January. Retrieved: <https://digiprocess.eu/2021/01/19/process-industry-digitalization-requires-new-forms-of-ecosystem-collaboration/> (14/04/2021).

¹⁸ "The outcome of the contributions of all complementary aspects of sustainability: economic viability, ecological stewardship, social equity, and psychological balance". What is Societal Sustainability. In Carvalho, L.C. (2018). *Handbook of research on entrepreneurial ecosystems and social dynamics in a globalized world*. Hershey [PA, USA]: IGI Global. Retrieved: <https://www.igi-global.com/dictionary/social-innovation-entrepreneurship-and-sustainability/61940> (18/04/2021).

¹⁹ See: European Digital SME Alliance. (n.d.). Sustainable digitalisation: Strengthening digital sovereignty by enabling the twin transition of Europe's economy. Retrieved: <https://www.digitalsme.eu/what-is-sustainable-digitalisation/> (14/04/2021) and "Position Paper". Retrieved: https://www.digitalsme.eu/digital/uploads/Position-paper-Sustainable-Digital-Transformation_FINAL.pdf (14/04/2021).

Getting to the Roots of Humane Sustainable Development

There is a more recent but extremely strong and relevant link with the European Green Deal, the guiding and financing document related to obtaining an eco-friendly European Union. Of course, in fact, these are percentages related to the reduction of carbon dioxide emission and reforestation, which are envisaged and predictable in the case of the Green Deal, in particular, but beyond these objectives and stakes, sustainability involves and even requires the creation and consolidation of a new structure or *political order*.

First of all, this implies that the control of natural resources rests to the maximum extent possible with the local community which are dependent on such resources. This would imply, in fact, that without a responsibility of the decision makers and members of these local communities, smaller or larger, it is difficult, if not impossible, to reframing and coordinating these transformations in relation to the more extensive objectives of the SDGs and subsequently of the Green Deal. From this point of view, Sustainable Development could be considered a vast remedial operation, or, as Mihai Serban has called a “new union” with nature, a *deep switch of the development paradigm*²⁰.

As it is known, medium and long term planning is possible, even until the EU policy Horizon of 2030²¹, but educating an elite or even more of an entire community in order to achieve sustainability on all levels proves to be a complicated and risky operation. The recent past, which has been, according to the “Club of Rome” Report published in the 1970s²², massively oriented towards waste and consumerism, cannot encourage too much a “re-education” of the conceptions regarding sustainability and resilience²³.

In addition, the objectives subsumed to sustainability, whether it is mindfulness, resilience, revised social and emotional intelligence or even bolder concepts, such as targeting a collective happiness, have gone beyond the usual statistics. Rethinking the GDP structure and generally measuring the quality of life, from the point of view of targeting more advanced stakes, is still the prerogative of a few states. Such states, whether they are from Northern Europe or Asia, are not so much related to artificial intelligence or primarily to the use of its applications by digitalization, but to components of culture, of mentalities, habits and examples of good practices from the past.

Indeed, it is confirmed that Sustainable Development is connected by many authors / observers to the concepts of freedom and democracy, within a so-called Universal Social Protection framework²⁴. This social framework has the potential role to prescribe penalties or recommend corrections, when deliberately or unintentionally harm is directed against the sustainable development of another community or nation. In other words, the control exercised over the use and management of natural resources is not only a concept, a vision that should

²⁰ Serban, M. E. (2013). *Bioeconomia: Noua unire cu natura*. Editura Universitara. Retrieved: <https://bioeconomie.ro/shop/bioeconomia-noua-unire-cu-natura/> (14/04/2021).

²¹ See: Bichisao, G., Diaz, M.M. & Pizzi, E. (2019). *Horizon 2030: Looking ahead to challenges and opportunities*. European Investment Bank/Deloitte. Retrieved: https://www.eib.org/attachments/strategies/horizon_2030_en.pdf (14/04/2021).

²² See: Colombo, U. (2000). The Club of Rome and sustainable development. Retrieved: donellameadows.org/archives/the-club-of-rome-and-sustainable-development/ (14/04/2021).

²³ See: Judge, A. (2018). Club of Rome reports and bifurcations: A 50-year overview. 18 April (Draft). Retrieved: <https://laetusinpraesens.org/links/clubrome.php> (14/04/2021).

²⁴ See: ILO. (2019) Universal Social Protection: Key concepts and international framework. (April). Retrieved: <https://www.social-protection.org/gimi/RessourcePDF.action?id=55517> (14/04/2021).

be at the centre of a complex and complete Sustainable Development, but also remains potentially decisive in relation to selecting a certain path of economic and social development.

The problem that is now seemingly more pressing, in the last decade in particular, with the problems of rampant population growth, climate change, food waste or the food crisis that has occurred or could deepen, strengthens the need to revisit important vectors such as freedom and democracy in close relation to Sustainable Development.

Basically, in many ways, especially with Trump's era in the United States, we have seen a blurring of differences in decision-making and leadership styles between states that have democratic decision styles and those that do not, such as Russia, Turkey, China, Iran and so on. After all, the excess of pragmatism and the obsessive orientation towards a mercantile, ultra-consumerist and even morally petty vision are also related to the decoupling, not only terminologically, but also conceptually, of Sustainable Development in relation to points of view connected to other areas, related to spiritual choices, conceptions, visions or "extrasensory" perceptions, not once put in disagreement with a personal development that would actually serve the final purpose of deepening sustainability.

Thus, practically, the predictions in the area of fiction, such as the ones in the novels of Aldous Huxley (*Brave New World Revisited*)²⁵ and George Orwell (*Nineteen Eighty-Four*), now seem (against the background of accelerated automation and the place occupied by artificial intelligence in the horizon of general and daily concerns), accepted conventional wisdom by policymakers, and passively accepted as fact by many citizens.

The psychological trust connection between digitalization, sustainability and well-beingness

Meanwhile, not only digitalization, but also the model of sustainable development, have become somewhat directly or indirectly associated with the ongoing globalization process. According to Toivonen²⁶, by the term globalization, we would refer, specifically, to the set of pressures that are likely to promote "a shift towards deregulation and flexibility of the worldwide labour market". Obviously, there are major differences between the main meanings and orientations related to the consequences of the globalization process in various geo-economic areas and societies. Thus, in Western neo-liberal societies the concept of free choice is perceived as having "positive psychological effects". This translates, in practice, into an extension of the capacity for autonomy and freedom and in turn these are associated with an increase in subjective well-being.²⁷

In other parts of the world, such as the specific case of Japan, the rise of individualism as a dominant social trait at least until recently has been interpreted by Uchida and Oishi as "the opposite of harmoniousness with others." In other words, the deepening of individual autonomy has in that context rather individualistic connotations, even of social alienation that would implicitly reverberate on the models of well-beingness inherited from the next generations.

²⁵ Huxley, A. (2017). *Brave new world revisited*. New York: Harper & Brothers [1962]. E-book edition by A. Haines (29 June). Retrieved: <https://www.fadedpage.com/showbook.php?pid=20170658> (18/04/2021).

²⁶ Uchida, Yukiko & Oishi, Shigehiro. (2016). The Happiness of Individuals and the Collective. *Japanese Psychological Research*. 58. 125-141. 10.1111/jpr.12103.

²⁷ Fischer, R., & Boer, D. (2011). What is more important for national well-being: Money or autonomy? A meta-analysis of well-being, burnout, and anxiety across 63 societies. *Journal of Personality and Social Psychology*, 101(1), 164–184. <https://doi.org/10.1037/a0023663>

On the other hand, from any perspective of mentality or tradition we would examine, it is extremely important to take into account the so-called macro-level factors, for example *social capital* within the community. According to Poulin and Haase, this social capital, built on trust, remains significant, in particular with regard to ensuring the well-being of members of society, even the elderly.²⁸ As the authors state:

<<Thus, a basic sense of trust is not only fundamental in early childhood (Bowlby, 1969, 1988) but also appears to benefit well-being across the adult life span (see also Poulin, 2013). Importantly, there was no indication that these well-being benefits were smaller for older adults (on the contrary, see Study 1). Moreover, the bidirectional association between trust and well-being shows that not only is trust a resource for well-being, but well-being also serves as a resource for adaptive interpersonal functioning (Fredrickson, 2001).(p. 619)>>

Therefore, sustainability does not deserve to be considered simply as a concept in itself, associated only with the state of biodiversity, ecosystem balances and the degree of prosperity. The famous example of how it is calculated the GNH - Gross National Happiness Index in the state of Bhutan²⁹, considered an original *exemplar* for the world, was highly associated with a deliberate process cultivated by decreasing the insufficiencies of a not-yet happy people. There are various ongoing debates about the meaning given to the state of well-beingness, promoted as a goal for a nation. At the same time, conversely, the other aspect with a determining role of differentiation relates to the degree of subjective (psychological) integration, which can be measured in any situation in relation to the background of the ensured economic conditions.

Beyond the areas or examples studied around the globe, this index of happiness is largely relative to conferring “a meaning or purpose of life”. This “purpose of life” proves to be interpretable and flexible according to societal mentalities, especially those that, collectively, are associated with the degree of resilience as a whole rather than sustainable development considered in itself as an accepted collective engine of a society's progress.

Finally, in order to deepen the connection between sustainable development and understanding what some authors call “sustainable happiness”, specialists in many scientific fields have recently become involved: biologists, sociologists, economists, political scientists, psychologists, etc.

This evolution towards a massive change in the vision of human and civilizational development is in any case intensely linked to the degradation of the ecosystem, climate change and the excessive consumerism to which we referred earlier. In other words, a profound change in the understanding of sustainability cannot be decoupled in relation to the deepening of growing

²⁸ Poulin, M. J. & Hasse, C.M. (2015). Growing to trust: Evidence that trust increases and sustains well-being across the life span. *Social Psychological and Personality Science* 6(6): 614-21, DOI: 10.1177/1948550615574301.

²⁹ “In 2011, the UN unanimously adopted a General Assembly resolution, introduced by Bhutan with support from 68 member states, calling for a “holistic approach to development” aimed at promoting sustainable happiness and wellbeing. This was followed in April 2012 by a UN High-Level Meeting on “Happiness and Wellbeing: Defining a New Economic Paradigm” designed to bring world leaders, experts and civil society and spiritual leaders together to develop a new economic paradigm based on sustainability and wellbeing. This builds on the Government of Bhutan’s pioneering work to develop the GNH Index. . . . The Gross National Happiness Index is a single number index developed from the 33 indicators categorised under nine domains. The Centre for Bhutan Studies constructed the GNH Index using robust multidimensional methodology known as Alkire-Foster method”. Bhutan’s Gross National Happiness Index. Oxford Poverty & Human Development Initiative. Retrieved: <https://ophi.org.uk/policy/gross-national-happiness-index/#:~:text=The%20Gross%20National%20Happiness%20Index%20is%20a%20single%20number%20index,known%20as%20Alkire%20Foster%20method> (18/04/2021).

social inequalities, including inequalities between nations themselves. In this context, the intensive promotion of digitalisation as a solution to multiple extant problems and as an opportunity subject to sustainable development would not in itself become a solution for restoring societal relations on a more stable and consistent basis, much less for changing a historical governance style.

Considered separately, as a prevalent key technological optimization process, it appears that digitalization is not able to meet the expectations of a real and consistent harmonization of the relationship between socio-economic sustainability, resilience and well-beingness, as a generic form used to refer to collective happiness.

Evolution of Conceptual Models for EU Policymakers (from Triple Helix to Quintuple Helix) as a transformative case-study direction

Most observers who have studied the possible relationships and interconnections between sustainable development, innovation through digitalization and resilience have found a historical evolution over time. This process of conceptual growth is inevitably linked to the pressures of climate change and the demands of environmental protection.

Carayannis and colleagues (2012),³⁰ have developed models to analyse the dynamics of management and innovation, ranging from a Triple Helix (as a conceptualization of university-industry-government relations [Etzkowitz and Leydesdorff, 2000]), to the Quadruple Helix (which added “media-based and culture-based public” and “civil society” to the mix [Carayannis and Campbell 2009]) to the Quintuple Helix (which adds to the Quadruple Helix a concern with “(and perspective) of the ‘natural environments of society’”, and “stresses the necessary socioecological transition of society and economy in the twenty-first century” (Carayannis and Campbell 2010, p. 59). Each Helix provides a foundation for later iterations, the circles of control, influence and concern of the former are thus extended and elaborated by the later.³¹ The “knowledge economy” envisioned by the Triple Helix thus becomes the Quadruple Helix envisioning a “knowledge society” and “knowledge democracy”, and the Quintuple Helix envisions an “ecologically sensitive” holistic conception of sustainable development. Carayannis *et al.* (2012) state:

“The *Quintuple Helix* is a model which grasps and specializes on the sum of the social (societal) interactions and the academic exchanges in a state (nation-state) in order to promote and visualize a *cooperation system* of knowledge, know-how, and innovation for more sustainable development (see Carayannis and Campbell 2010, p. 62). The specialty of the *Quintuple Helix Model* can thus be described in the following way:

“The Quintuple Helix Model is interdisciplinary and transdisciplinary at the same time: the complexity of the five-helix structure implies that a full analytical understanding of all helices requires the continuous involvement of the whole disciplinary spectrum, ranging from the natural sciences (because of the natural environment) to the social sciences and humanities (because of society, democracy and the economy)’ (Carayannis and Campbell 2010, p. 62)

³⁰ Carayannis, E. G., Barth, T. D., & Campbell D. F. J. (2012). The quintuple helix innovation model: Global warming as a challenge and driver for innovation, *Journal of Innovation and Entrepreneurship* 1: 1-12, <https://innovation-entrepreneurship.springeropen.com/track/pdf/10.1186/2192-5372-1-2.pdf> (14/04/2021).

³¹ See: Chittenden, C. (2021). The circles of control, influence and concern. Talking About (blog). Talking About Pty Ltd. Retrieved: <http://www.talkingabout.com.au/3ControlInfluenceConcern> (16/04/2021).

Thus, the goal of the *Helix-Conception* is accomplished through the resource of knowledge which produces additional value for society in order to lead in the field of sustainable development. The pivotal question of the *Quintuple Helix* defines itself in the following way:

‘How do knowledge, innovation and the environment (natural environment) relate to each other?’ (Carayannis and Campbell 2010, p. 42) (pp. 4-5)>>

Our judgment is that these management and innovation models of Carayannis *et al.* have much to commend them; they are important contributions to the literature, particularly in their description of “mode 3 knowledge”, building upon Gibbons *et al.* (1994)³² earlier concepts of Mode 1 (traditional ‘linear’ research methods) and Mode 2 (new ‘lateral’ research methods) knowledge:

<<‘The concept of mode 3 is more inclined to emphasize the coexistence and coevolution of different knowledge and innovation modes. Mode 3 even accentuates such pluralism and diversity of knowledge and innovation modes as being necessary for advancing societies and economies. This pluralism supports the processes of a mutual cross-learning from the different knowledge modes. Between mode 1 and mode 2 manifold creative arrangements and configurations are possible, linking together basic research and problem-solving’ (Carayannis and Campbell 2010, p. 57). Mode 3 ‘encourages interdisciplinary thinking and transdisciplinary application of interdisciplinary knowledge’ as well as ‘allows and emphasizes the coexistence and coevolution of different knowledge and innovation paradigms’ (see Carayannis and Campbell 2010, pp. 51–52).>>

Therefore, we hope our added dimensions to the Quintuple Helix model (both to its foundation via the Kenneth Boulding/Richard Currier triangle and to its operational application via our placing of the 17 SDGs within it) are seen as both complimentary and complementary to these Helix models and their authors.

Analysing the Conceptual Geography of the SDGs via an Integrated Multi-Level Model of Social Organizers

The concept of ‘sustainable development’ is one of the key pillars on which the entire United Nations vision for the Sustainable Development Goals is largely built.³³ The 17 goals are:

- GOAL 1: No Poverty
- GOAL 2: Zero Hunger
- GOAL 3: Good Health and Well-being
- GOAL 4: Quality Education
- GOAL 5: Gender Equality
- GOAL 6: Clean Water and Sanitation
- GOAL 7: Affordable and Clean Energy
- GOAL 8: Decent Work and Economic Growth
- GOAL 9: Industry, Innovation and Infrastructure
- GOAL 10: Reduced Inequality
- GOAL 11: Sustainable Cities and Communities
- GOAL 12: Responsible Consumption and Production
- GOAL 13: Climate Action
- GOAL 14: Life Below Water
- GOAL 15: Life on Land

³² Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge. The dynamics of science and research in contemporary societies*. London: Sage.

³³ United Nations. (n.d.). The 17 goals. Department of Economic and Social Affairs/Sustainable Development. Retrieved: <https://sdgs.un.org/goals> (14/04/2021).

GOAL 16: Peace and Justice Strong Institutions
GOAL 17: Partnerships to achieve the Goal

Considering the wide range of the above-mentioned SDGs, the authors posit we can come to understand the august challenges of implementation better if we can see clearly how they can be placed with extant social forces, or organizers, in the words of Boulding. As Gilder and Pal note³⁴, in his *A Primer on Social Dynamics: History as Dialectics and Development*,³⁵ Boulding introduced his “‘Threat/Integrity/Exchange[’]” schema, which argues that human behaviour is structured by concerns of harm (threat), concerns of tribe/family/friend relations (Integrity) and concerns of individuals seeking to ‘rationally’ optimise profits and lower costs (exchange). In Boulding’s view, only a balanced vision of combined human motivation, tilted towards Integrity [integration], is ecologically sustainable” (p. 317).

Then, we note the eight developmental “metamorphoses” posited by Currier (2015)³⁶ which, he states, “One by one, each of these technologies has initiated a major transformation, or metamorphosis, in human life and society” (ix) They are: A. Spears and [digging] Sticks, B. Fire; C. Clothing and Shelter, D. Symbolic Communication, E. Agriculture, F. Interaction, G. Precision Machinery; and, H. Digital Information. Each one of these technology/metamorphosis, he argues, has “revolutionized the structure of our bodies, expanded the capabilities of our minds, and given birth to human societies of unparalleled size and power” (ix-x).

³⁴ Gilder, E. & Pal, D. K. (2015). Climate change – Probable Socio-Economic Systems (SES) implications and impacts in the Anthropocene epoch. *International Conference Knowledge-Based Organization*, Vol. XXI, No 2 (pp. 308-17; 317, fn 16).

³⁵ Boulding, K. (1970). *A primer on social dynamics: History as dialectics and development*. New York: Free Press. (Later expanded and modified in his later book, *Ecodynamics. A new theory of societal evolution*. Beverly Hills: Sage Publications, 1978.)

³⁶ Currier, R. (2015). *Unbound: How eight technologies made us human, transformed society, and brought our world to the brink*. New York: Arcade.

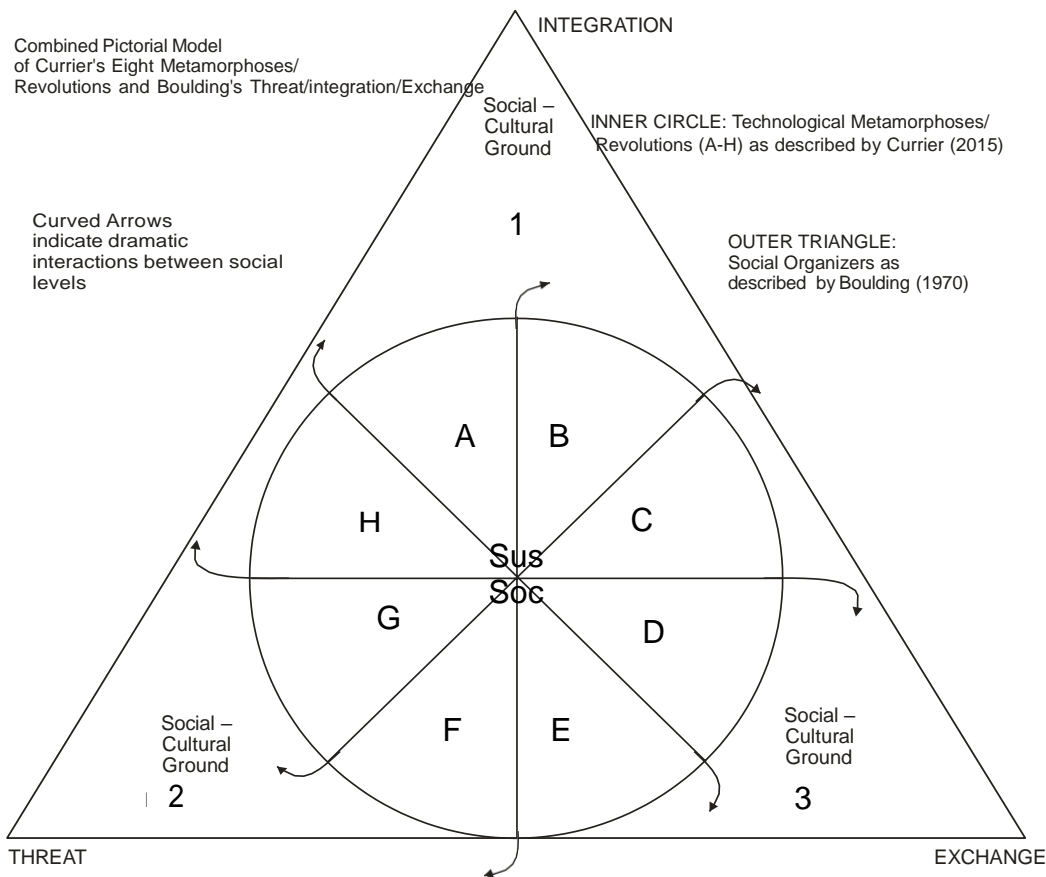


Figure 1: Grounding SDGs/Quintuple Helix Innovation model to Base-line SDGs (adapted from Gilder, 2003³⁷)

This model, which combines the social organizers of Boulding (1970; 1978) to the revolutionary metamorphoses of Currier (2015), seek to provide a realistic foundation to the otherwise commendably complete Quintuple Helix model provided by Carayannis *et al.* (2012).³⁸ The base interactions are noted as:

GOAL 1: No Poverty

GOAL 2: Zero Hunger

GOAL 3: Good Health and Well-being

These SDGs mark the provision of the bare essentials of life, without which achieving the other SDGs is impossible. As Boulding noted, threat, integration and exchange are the three social behaviours that serve to organize societies at whatever level of development they might be. SDG 1 is placed at the integration point, because “poverty” can take many forms,

³⁷ Gilder, E. (2003). Understanding the symbolic order of myths: Applying a dramatic structural-image model for analyzing the social function of wondertales. *Visions and revisions: Festschrift for Dumitru Ciocoi-Pop*. Sibiu [RO]: “Lucian Blaga” University Press of Sibiu (pp. 113-122).

³⁸ We note Carayannis *et al.*'s (2012) view that the Quintuple Helix offers to:

<<<“include natural environment as a new subsystem for knowledge and innovation models, so that ‘nature’ becomes established as a central and equivalent component of and for knowledge production and innovation. The natural environment is for the process of knowledge production, and the creation of a new innovation is particularly important because it serves for the preservation, survival, and vitalization of humanity, and the possible making of new green technologies; and humankind, after all, should learn more from nature (especially in times of climate change)” (p. 5)>>>

Yet, we believe our additions to the model actually accounts for consideration of how the natural and SES forces pragmatically operate.

physical/psychologically, social and spiritual. SDG 2 is placed at the threat end of the triangle, because being without food and water (“hunger”) is an immediate threat to anyone’s existence. SDG 3 is placed at the exchange end of the triangle because achieving “good health and well-being” requires the active participation of each person (e.g., the personal exchange of bad health behaviours for good ones) to be achievable, alongside any social structural fostering supports provided.

The achievement of a Sustainable Society (Sus Soc) is placed, in our model, at the centre of a dynamic spinning wheel, with the revolutions of Carrier being the spokes. Obviously, what would count as a sustainable society would differ with each epoch of development, and the admixture of threats, integrations, and exchange would likewise vary in each.

Our Boulding/Currier schema (figure 1) is thus placed at the ‘sustainable development’ centre of Carayannis, Barth, and Campbell’s Quintuple Helix Model (figure 2), thereby grounding its highly abstract and ahistorical explanatory power to what we would posit to be realistic, concrete and specific social organizers and historical anthropological epochs. (This placement is confirmed by the shared SDG 3, 2, 1 spatial ground within each model.) To this, we then add our operational placement of the remaining 17 SDGs into the interactive Quintuple Helix, as shown below.

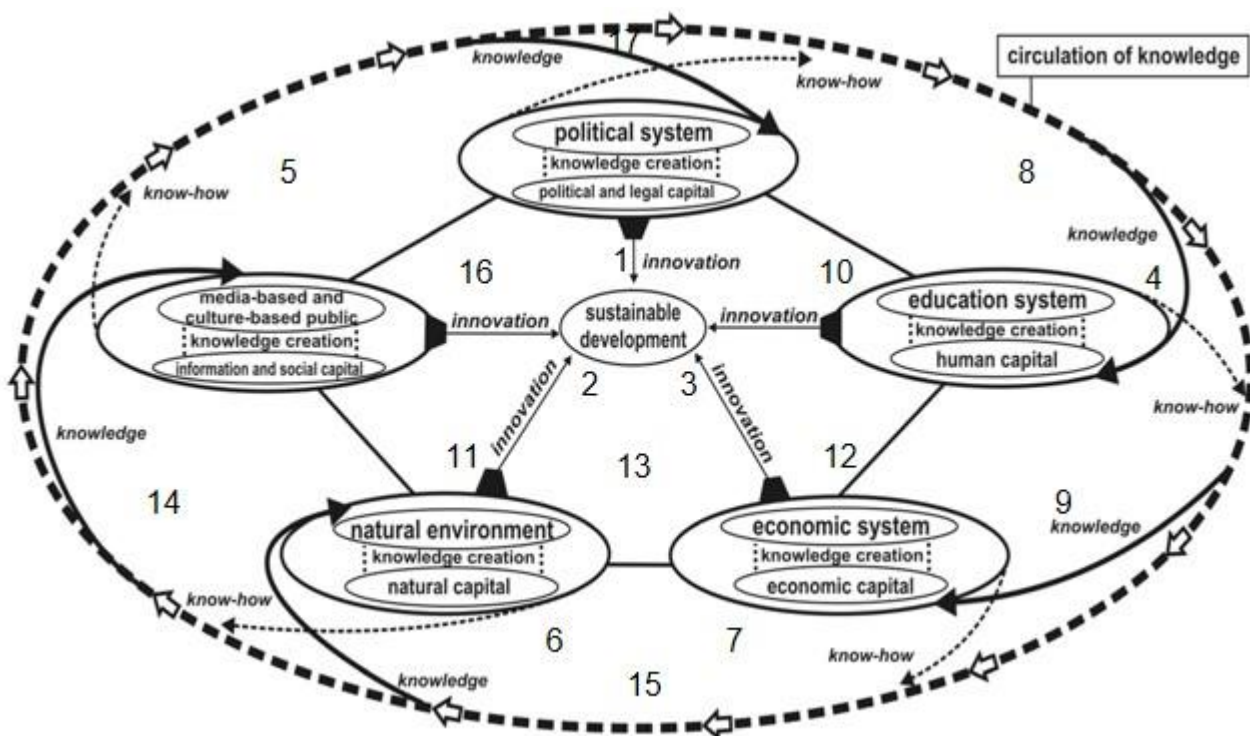


Figure 2: Modified Quintuple Helix Functions Model of Carayannis *et al* (2012, p. 7) with SDGs Incorporated

We elaborate the interactions of the SDGs with the Quintuple Helix model as follows:

- Top Interaction -- SDG 17
Partnerships to achieve the Goal (political/legal nature)

- *Bottom Interaction -- SDG 6*
Clean Water and Sanitation, 15 Life on Land, 7 Affordable and Clean Energy (Economic System and Natural Environment interactions)
- *Upper Outer Ring Interaction*
-- SDGs (L-R) 5 Gender Equality, 8 Decent Work and Economic Growth, 4 Quality Education (spans media/public/knowledge creation, political/legal, and education/human capital system)
- *Lower Outer Ring Interaction*
-- SDGs (L-R) 14 Life Below Water , 9 Industry, Innovation and Infrastructure (interactions among natural Environment, economic system, education system)
- *Upper Inner Ring Interaction -*
- SDGs (L-R) 16 Peace and Justice Strong Institutions, 10 Reduced Inequality (spans media/public/knowledge creation, political/legal, and education/human capital system)
- *Lower Inner Ring Interaction*
-- SDGs (L-R): 11 Sustainable Cities and Communities, 13 Climate Action, 12 Responsible Consumption and Production (spans media/public/knowledge creation, natural systems, economic systems, education/human capital system).

These interpretive placements of the SDGs vis-à-vis the ecological subsystems are tentative, but hopefully encourage grounded, innovative thinking that can lead us to analyse and create resilient citizens and societies.

Relationship between Transformative Digitalization and Education in Favour of Resilience

As implicated above, there are the problems related to sustainable development, especially through the circular economy, the problem of tremendous waste and inefficiency, which was forecasted from the beginning, which reigns with a subsequent social alienation. This occurs because the manic pace in which technology transformations are happening, thanks to digitalization, which leads to a new set of problems that that innovation or human intelligence have difficulty dealing with in real time. (These weaknesses have been clearly exposed in the crisis of the present Pandemic³⁹.) In addition, loneliness and lack of human contact are also a danger not to be neglected because, as proved during the pandemic times, it may occur in parallel less visible consequences, but an epidemic of anxiety and depression could become even more dangerous than the effects of contamination with the well-known virus. So 'resilience' is becoming a research topic of pressing theoretical and practical importance.⁴⁰

Yet, it is important to remember that since 2009, European Commission has already identified the terms of the so-called socio-ecological transition, as a challenge for the future road for development. As a current example, when discussing the post-pandemic recovery, economic sustainability is already directly and necessarily correlated with the reduction of carbon emissions implied by the EU Green Deal, including the expected levels of achievement, greening, level of regeneration and remediation of environmental damage.

Our modified Quintuple Helix should thus concretely support the generation of a 'win-win' situation in which all the components, that initially might seem separate from each other come

³⁹ See: Vohn, C. & Dungaciu, D. (Coor.) (2021). *În Luptă cu noi, cu virusul și cu crizele lumii: Jurnal academic în pandemie*. Retrieved: <https://l.ispri.ro/index.php?route=product/search&search=In%20Lupta> (18/04/2021).

⁴⁰ See: C. Bryce, P. Ring, S. Ashby & J. K. Wardman. (2020). Resilience in the face of uncertainty: early lessons from the COVID-19 pandemic. COVID-19 Special Issue. *Journal of Risk Research* 23 (7-8): 880-887.

together in an integrative way: ecology, knowledge and innovation, generating synergies between economy and society, and then assist in the practical expression of the principles of democracy. Global warming, for example, is no longer just a matter of ecological concern, but also an opportunity for our modified Quintuple Helix innovation model to be taken over and applied in a decisive way.

For example, education for sustainable development should go hand in hand with the release of access to increasingly sophisticated technologies to counterbalance at least to some extent not only the fears but also the medium and long term impact that an artificial acceleration of technological innovations will have, if the component of resilience and respect for the environment are not taken seriously and fully into account.⁴¹

Conversely, optimists can claim that scientists can offer multiple benefits in return for so-called “development for informational sharing”⁴². There is a chance that wisely balanced decisions will not only make life more bearable, more comfortable, to find solutions to certain problems, otherwise very difficult to manage, but that the Internet will be “more integrated but less visible” than it is today felt, perceived or imagined.

In other words, the danger would be that certain negative utopias would be fulfilled in the sense that digitalization and the inter-connection with other less luminous components of global development could not be managed in a rhythmic and appropriate way, i.e. the risk would refer to the fact that computer sciences, data processing, open space, automation, all this increased consecration of time and resources in favour of the artificial intelligence, to become a new opium, “a new religion”. At some point, this would potentially and dangerously remove the component of confrontation with the need for authenticity, harmonization and globally predictable and sustainable evolution. This is even more valid for vulnerable states or groups or for those who by various methods are either prey to manipulations, conspiracy theories, or are, on the contrary, fascinated by the conquests that the replacement of human presence can bring as alternative solutions through artificial intelligence, through digitalization. As the just-released *Global Trends 2040: A More Contested World*,⁴³ states:

<<Technology will offer the potential to mitigate problems, such as climate change and disease, and to create new challenges, such as job displacement. Technologies are being invented, used, spread, and then discarded at ever increasing speeds around the world, and new centers of innovation are emerging. During the next two decades, the pace and reach of technological developments are likely to increase ever faster, transforming a range of human experiences and capabilities while also creating new tensions and disruptions within and between societies, industries, and states. State and nonstate rivals will vie for leadership and dominance in science and technology with potentially cascading risks and implications for economic, military, and societal security. (p. 7)>>

It is to be hoped, therefore, that we will not be subject to the monological will of isolated scientists pushing pet technological solutions to pressing real symptoms of deeper systemic problems, but rather hold a thorough social reflection and informed dialogue with fellow citizens upon them. By so doing, we can give policymakers the possibility of articulating optimal life paths for states and societies beyond simplistic current or future ideological or post-ideological manipulations.

⁴¹ We note that Carayannis *et al.* (2012) ably analyses how education can function in doing just this.

⁴² See: Meyer, S. (2018). The impact of digital life on society: A sociological perspective on digitalization and its effects (Excerpt). Retrieved: <https://www.grin.com/document/453828> (14/04/2021).

⁴³ National Intelligence Council [USA]. (2021). *Global trends 2040: A more contested world*. (March, NIC 2021-02339). Retrieved: https://www.dni.gov/files/ODNI/documents/assessments/GlobalTrends_2040.pdf (18/04/2021).

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