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PIERO FORMICA

Transformative Enterprises, Wellbeing and Education in the Knowledge Economy

One Health

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One Health: Transformative Enterprises, Wellbeing and Education in the Knowledge Economy

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United Kingdom – North America – Japan – India – Malaysia – China

Emerald Publishing Limited
Howard House, Wagon Lane, Bingley BD16 1WA, UK

First edition 2023

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-80382-784-1 (Print)
ISBN: 978-1-80382-783-4 (Online)
ISBN: 978-1-80382-785-8 (Epub)

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Certificate Number 1985
ISO 14001

INVESTOR IN PEOPLE

To improve is to change; to be perfect is to change often.
Winston Churchill
To the path creators who transform our lives for the better.

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About the Contributors

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Alan Barrell has worked in Health Care as a frontline Medical Scientist, in Medical Research, and more recently as Chairman and Chief Executive of large multi-national companies and smaller technology start-ups. His international experience includes the establishment and Chairmanship of a subsidiary in China of a British technology company. He teaches in universities in the UK, Europe, North America and Asia with professorships in European and Chinese universities. He has raised and managed a Venture Capital Fund, is a Business Angel Investor and Trustee of charities. He has been honoured with The Queen's Award for Enterprise Promotion in the UK and with membership as Knight First Class of the Order of the White Rose of Finland for services to Education. He is a member of the Advisory Board of China Insight Foundation and of MedCity London and a director of CFCC – China Future Creative Class – a company based in Shenyang and Cambridge. Alan promotes the vision of 'A World Without Borders'. His career experience has prepared him well to be Executive Chairman at Cambridge Learning Gateway.

Leif Edvinsson made a career at the Swedish insurance company Skandia. In the 1990s he developed his theories about the hidden value of intellectual capital of Skandia and developed a management model for this value. In 1997 he published the book *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*, with Michael Malone.

In 2001, he was appointed a professor at the University of Lund in Sweden. He also works as consultant for the Swedish government on knowledge and innovation. In 1998, Edvinsson was the recipient of the prestigious Brain of the Year award. Bill Gates and Paul McCartney were also nominated that year.

Piero Formica began his career as an Economist at the OECD's Economic Prospects Division in Paris. Founder of the International Entrepreneurship Academy Network, he was a Professor of Economics with a particular focus on innovation and entrepreneurship at the Jönköping International Business School, Jönköping University, Sweden. Winner of the Innovation Luminary Award 2017 and the IVI Award for Achievements and Inspirations 2022, Formica is a Thought Leader and Senior Research Fellow with the Innovation Value Institute (IVI) of Maynooth University in Ireland. He is a Professor at the Contamination Lab of the University of Padua, an Advisor of the Cambridge Learning Gateway and a member of the New Club of Paris. Professor Formica has extensively published in the fields of knowledge economics, entrepreneurship and innovation. *ECONAISSANCE: The Reimagined School and the Culture of Entrepreneurialism* (Emerald Group Publishing, 2020), *NATURE'S VOICE: Health and Humanities* (bioGraph, 2020) and *IDEATORS: Their Words and Voices* (Emerald Group Publishing, 2022) are his most recent essays.

Fabio Maria Montagnino is the Head of Innovation and Entrepreneurship at The Cyprus Institute. He is a polymath with an academic background in the physics of biological systems and computational science, and scientific activity in the field of solar energy and sustainable built environment. Since about 30 years he's been promoting open and impactful innovation through the generation of science-based start-ups, technology scouting and knowledge transfer actions in Europe and the Mediterranean regions, where he has been leading a large number of transnational projects and actions.

Gareth Presch is a global healthcare thought leader and the Founder and CEO of the World Health Innovation Summit and World Health Service. He is the Expert Lead on SDG3/4 for the UNGSII Foundation 25+5 SDG Cities Leadership Platform, Founder of the Global Social Prescribing Alliance, Visiting Lecturer Fujitsu – Global Knowledge Institute, Advisor for the Global Mission Social Benefit Programs – Global Fund for Sustainable Development (GFSD), and a Member of Pope Francis's Vatican COVID-19 Commission Group 2 Looking to the Future.

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creativity programme. He has published in *R&D Management*, the *Irish Journal of Management*, *International Journal of Innovation Management*; *London Strategy Review* and regularly speaks at international conferences on the subject of managing creativity and innovation.

Oliver Schwabe is an applied researcher on Innovation Diffusion in Ecosystems. He is the Chair of the Open European Network for Enterprise Innovation, and associated with the Department of Civil Engineering, Architecture and Georesources of the University of Lisbon (IST). He is the Fellow for Knowledge Products and Services at the Global Innovation Thinktank Entovation International and continuously supports a portfolio of high potential start-ups in their maturation process. Oliver has published over two dozen refereed journal and conference articles and developed and delivered multiple online and hybrid courses for US- and UK-based universities across a spectrum of themes such as Entrepreneurship, Strategy, Knowledge, Innovation and Change Management. Oliver holds a PhD from Cranfield University (UK) with a focus on the use of geometry for forecasting long-term uncertainty in small/scarce data environments. Deeply believing that the Arts are an integral part of the Innovation Journey, Oliver furthermore continuously refines and orchestrates a play-in-a-day Shakespearean event on the 'Innovation Journey' that is performed irregularly at selected locations across the world.

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Foreword

The Transformative Enterprise as a Living Organism

Leif Edvinsson

The original concept of Enterprise is said to be the gathering of risk-takers or entrepreneurs to undertake a mission. Once upon a time, it might have been the enterprise project to import from Asia to Europe. Implicitly it highlights both the risks and opportunities. The deeper meaning of the word 'enterprise' is to take the opportunity space in-between; in French, 'entre prendre' means to take the space in-between.

As a verb, Enterprising also has much connectivity to corporate navigation dynamics. As a concept, I was innovating, cultivating and applying it as a dynamic concept in the Skandia Future Center – a lab for futurising. I have described some of this in my book on *Corporate Longitude*, 2002. Skandia Future Center was designed as an Organisational Lab to address how to nourish the Organisation as a living cell with continuous renewal and innovation. This is also what Shell applied and described in the book *The Living Enterprise* by Arie de Guys. It amplifies the need for continuous renewal. Therefore, we developed the Leadership and Future Literacy tool of the Skandia Navigator. It was aimed at an analogy with 'leading the ship'. In the Skandia Navigator, the bottom line is renewal and innovation. Not the traditional one-dimensional financial profit perspective. The Skandia Navigator is a five-dimensional Gyro or GPS for dynamic leadership and the development of intellectual capital. It turned out to be applicable both in Enterprising and Health Care.

Today, we might also address the health dimensions in enterprise navigation, especially related to the human capital dimensions. Are those values hidden, implicit, emerging or eroding as intangible assets? The living organism has many insights to offer for our Futurising. The emerging metrics and related navigational actions from the Navigator will show up in financial accounting metrics. Such data might only perceive the living organism as an object, such as an asset or liability. Enterprising is a dynamic organisational space. If not addressing correctly the opportunity space, there emerge as a liability space for the next generation. Might be this the roots of the growing fear by, among others, the eco-environment activists?

The in-between space might also be seen as soft culture, a soil of intangibility. In this space, the leadership is navigating the sustainable value-creating dimensions. For this, you need graphical geo maps or data mining maps, and you must quickly learn how to read those new IA (Intangible Assets) maps. If you miss this knowledge navigation, you will be stranded, and the organism will not survive. A new SDG (Sustainability Development Goal) Leadership Literacy is emerging.

Cultivate your immune defence proactively, like a gardener or health practitioner. Find your IC (Intellectual Capital) DNA and take an entrepreneurial charge to upgrade it continuously. The old theory of the firm with Italian roots is

cracking or even might be obsolete. Now it is perhaps the networked enterprise, for example, in the shape of a DAO (Distributed Autonomous Organism). Social media is building on the Relational Capital but across distance, culture and age discrimination. The recent rapid evolution of Spotify might be an example of the dynamic Relational Capital. Millions of people gather to exchange music and knowledge on a volunteer basis rapidly.

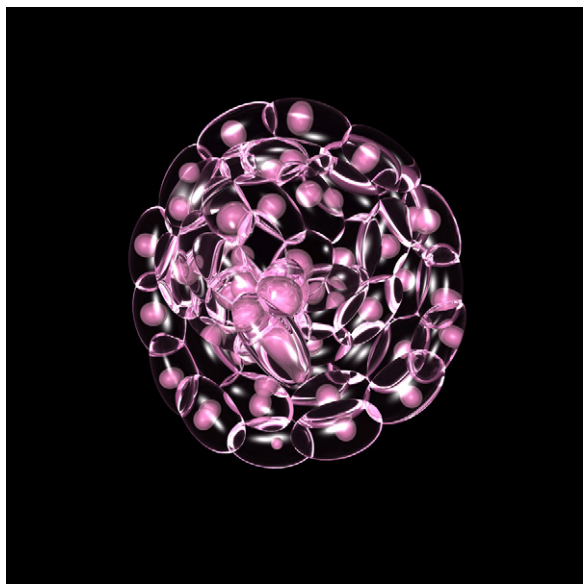
The Transformative Enterprise will go through several iterations. Those might be described as life cycle curves. Late Prof Jay Forrester at MIT described both production processes, enterprising as well as nations in such terms. His epos is, among others, described in the book *World Dynamics*. The above-mentioned approaches might be combined into maps such as NIC (National Intellectual Capital and Intangible Assets). The German Ministry of Economics pioneered such navigation with its Wissensbilanz in early 2000. It was inspired by our work in Skandia with Intellectual Capital reporting in the early 1990s. The Cabinet in London recently launched a review of *Hidden Values* in the UK. See references by pioneering work of Ron Young Knowledge Associates, Cambridge. In December 2021, the Government of the United Kingdom published *The Rose Book: Guidance on Knowledge Asset Management in Government*. The UK government also published in April 2021 a report called 'Getting smarter; a strategy for knowledge and innovation assets in the public sector known as "The Macintosh Report"'. Globally this is amplified by the WICI (World Intellectual Capital Initiative), which was grown out of pioneering work of MITI (Ministry of International Trade and Industry) (wici-global.org). Several knowledge pioneers are also grouped on the subject, among others, The New Club of Paris. Gradually the stakeholders start to see the intangible values beyond classical accounting. The stock exchange has already addressed the appreciation of these intangibles. The global trade flow goes from Trade of Goods to Trade on Service and now onto Trade on Intangibles.

Our next exploration of human curiosity goes out into Space. But also into the Brain. We have Cape Kennedy to launch rockets for Mars. However, where do we find similar platforms for our Brain ventures? Our old institutions are at risk. We already see this in cracking banks, Schools and Society infrastructure. Perhaps a kind of Organisational Complacency? Is our civilised Western society beyond its peak? New forms will emerge for knowledge sharing beyond libraries. It might be labelled Social Media. It is another gathering and community progressing. It will amplify the skill for not only literacy but also oracy, most likely in hybrid progress with neuroscience and quantum prototyping. As a recent target for Elon Musk's innovation initiatives, Twitter might be along with such evolution. It also bridges with the architectural dimensions. How do we design the City, the Enterprise and Society? Can a City be listed on the Stock Market like in China? How can a Soccer Team adopt a City? For Cultural Sustainability like the SDG targets, Professor Alan Dilani, who has conceived the Salutogenic Enterprising, has specialised in Salutogenic Architecture with the prototyping Academy for Health and Architecture. How will the architecture impact your health and shape enjoyment of life? A special dimension of this is the efforts to highlight the maps of Positive Cartography. It emerged in research in Utrecht in Holland with the

LEF Future Center. Now it is a global community in progress with the prototyping. (www.positivecartography.com).

Our Futurising has to be less of traditional forecasting and more of Fore-Search. As such, it must be based on Anticipative Intelligence. With its work with Future Literacy Labs, UNESCO is pioneering this strategy by Riel Miller. This is a knowledge navigation quest onto organising for Wisdom Flows. That is now also being prototyped by Oracy Labs, spaces online or in real life. The purpose is to reach a more profound understanding dialogue with youngsters as Voices of the Future. A recent effort is also in applying such thought processing pedagogics to Peace Building. We also prototyped a cross-generational and cross-cultural approach in Skandia Future Center. We called it 3G to amplify that the future of work is across three generations.

The Transformative Enterprise can then be involved in Future Literacy and Knowledge Navigation. One such initiative comes from Gareth Presch, who launched WHIS – the World Health Innovative Summit; it might be on the prototyping of neuroscience to the models of SDG for Future Democracy. The prototyping of Society 5.0 is also already in progress in Japan by knowledge pioneers such as Professor Noboru Konno. Might the outcome be the living systems for harmonised cross-collaboration across borders and generations? The metaphor of a living cell might be applied. Showing a stem cell in the progress of being.... The cells is just five days after fertilization but is not yet not differentiated and poised as stem cells to become anything! The well-being of stem cells in the



Quantum Age? Is this similar to Metaverse progressing? Is this an inspirational view of the future's sustainable, transformative, healthy enterprising?

"Stem Cell Mandala", 2008, Mara G. Haseltine

Happy Futurising.

References

de Geus, A. *The living enterprise*. https://www.amazon.com/Living-Company-Arie-Geus/

Dilani, A. https://www.amazon.com/Building-Health/dp/1675215316

Edvinsson, L. *Corporate longitude*. https://www.amazon.com/Corporate-Longitude-navigate-knowledge-economy/dp/0273656279

Edvinsson, L. (2013). IC a 20 years perspective. *Journal of Intellectual Capital*, *14*(1), 163–172.

Forrester, J. https://monoskop.org/File:Forrester_Jay_W_World_Dynamics_2nd_ed_1973.pdf

Konno, N. (2021). Intellectual capital in Society 5.0 by the lens of the knowledge creation theory. *Journal of Intellectual Capital*, *22*(3), 478–505. doi:10.1108/JIC-02-2020-0060

Landes, D. S., Mokyr, J., & Baumol, W. J. (2012). *The invention of enterprise: Entrepreneurship from ancient Mesopotamia to modern times*. Princeton, NJ: Princeton University Press.

Kune, H., Köning, A., Dvir, R., & Maturana, C. https://positivecartography.com/

Mercier-Laurent, E., & Leif, E. https://www.amazon.com/World-Cooking-Solving-Global-Challenges-ebook/dp/B08JPW7PNF

Miller, R. https://www.routledge.com/Transforming-the-Future-Open-Access-Anticipation-in-the-21st-Century/Miller/p/book/9781138485877#

Presch, G. et al. The world health innovation summit as platform. https://books.google.com/books/about/Intellectual_Capital_in_the_Digital_Econ.html?hl=sv&id=dYvVDwAAQBAJ

Yeh-Yun, L. National intellectual capital. https://link.springer.com/book/10.1007/978-1-4419-7377-1

Young, R. http://www.knowledge-associates.com/

Zohar, D. https://www.amazon.com/Zero-Distance-Management-Quantum-Age-ebook/dp/B09NFK2DGX

http://new-club-of-paris.org/national-intellectual-capital-2019-yearbook/

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1042398/CCS1121744212-001_SECURE_Rose_Book_Web_Accessible.pdf

Onward and Upward

On the Journey Heading Towards a Grand Transformation

Piero Formica

> When you leave for Ithaca, may your journey be long and full of adventures and knowledge.
>
> . . . . . .
>
> May there be many a summer morning, and may ports for the first time seen bring you great joy.
>
> . . . . . .
>
> Ithaca has already given you a fine voyage; without Ithaca you would never have parted.
>
> . . . . . .
>
> . . .you have grown wise and lived an intense life, and that's the meaning of Ithaca.
>
> (Konstantinos P. Kavafis, *Ithaca*)

Transformation is a long, eventful journey, demanding persistence over time, discontinuity in behaviour and frequent changes. It is a journey to Ithaca, as recounted by the Greek poet Constantine Cavafy (1863–1933). Greek mythology tests the barrier between men, the gods and nature by resorting to transformation, which often involves profound and definitive change. Successive waves of shock during the 2000s uprooted businesses and jobs. In order to be reborn, both have to transform themselves in the footsteps of Deucalion and his wife Pyrrha, who, after the flood caused by Zeus, revived humankind by throwing stones behind them as they walked. The stones of Deucalion grew into men, and those of Pyrrha became women. Humanity was thus born anew.

With its thought leaders whose exploratory mindset enables them to turn an occasion or incident into a transformative experience, the Innovation Value Institute, a multidisciplinary research institute based at the University of Maynooth, is committed to digital transformation intertwined with two other transformations: ecological and behavioural. This triad constitutes a Grand Transformation conducive to entrepreneurial transformation and, hence, the emergence of transformative enterprises.

Debating the concept of transformative enterprise is nothing new; it is a dive into the great sea of entrepreneurial history. Among the scholars of this history, we recall the authors (Landes, Mokyr, & Baumol, 2012) of a must-read book, *The Invention of Enterprise*.

In archaic trade, entrepreneurial individuals played a key role, the 'truck and barter', as Adam Smith said. Medieval Italian *commenda* and *compagnia* and the

Arabic *muqarada* practice administered money or inventories from their backers. The Renaissance bottega (today, translated as co-working space) nurtured talents. New techniques and artistic forms came to light; artists were competing and ready to work together. With the Industrial Revolution, the transformation of the enterprise took place with Frederick Taylor's (1856–1915) scientific management and Fordism, and the system of mass production pioneered in the early twentieth century by the Ford Motor Company. Though the maturity of industrialisation still based on atoms, the enterprise revolves around shareholder primacy and profit maximisation in the wake of Milton Friedman. With the blossoming of the bits – more generally, of the digital economy – and the emergence of the ecological conundrum, we are faced with a new transformation. It is a return to the future: the Renaissance workshop reappears as an entrepreneurial enterprise instead of the managerial one. People are co-creators and intrapreneurs rather than mere performers of tasks assigned top-down. Neither geniuses nor solitary rebels, intrapreneurs are generators of cognitive conflicts that contribute much to breaking entrenched rules.

During the past industrial revolutions, the search for a better life, in the sense of material wellbeing, for oneself and one's family progressed. Human conduct has focused on one's private and material interests, and the public good has been neglected or thought to descend from the providence of personal passions and ambitions. This belief has been shaken by the emergence of digital public goods, the formation of sharing communities that leverage the virtual to achieve virtuous

Four Guiding Principles of Transformation

- Transformations must reflect the peculiarities of nature, as highlighted by polymath Pierre Simon Laplace (1749–1827):

> Infinitely varied in its effects, nature is simple only in its causes, and its economy consists in producing a great number of phenomena, often very complicated, by means of a small number of general laws (www.santafe.edu/research/projects/feldstein-program-law-history-and-regulation).

- Reliance must be placed on experimentation rather than on experience and predictions. Modes of experimentation with explanations (the 'whats', 'whys' and 'hows') replace or complement the methods of forecasting the directions to be taken.
- Empty spaces need to be designed where companies, products and services can move, otherwise they are inconceivable because they are contrary to common sense.
- Qualities of intuition and foresight must give free rein to the opportunities hidden in the folds of transformation are at stake.

results (as in the case of social streets whose conduct opens the door to accessing and sharing goods and services) and new visions of biology encompassing the economic environment and its effects on business and society. On the side of 'who controls who', the outcome of the battle for power reckons with the value placed on the exchange between the desire to fulfil one's wishes and the relinquishing of control in favour of the hidden persuader. We need only think of Zuckerberg's Metaverse and other foundational technologies underpinning Web3 on which the edifice of new desires is being built. The balance will hang on the side of desires before the force that will urge to possess an increasing quantity of new objects. If we continue to listen to and pander to common voices and opinions, the quantity will continue to rule everything. With the quantity criterion measuring everything because of prejudices, the few feudal lords of foundational technologies will dominate. To fully understand the value of what is at stake, the transformations we are experiencing should be read by combining technological discourse with philosophical thought, starting with Socrates, who did not allow himself to be seduced by objects – today we say technological devices capable of excessively fulfilling our desires.

The assault of desires that translate into consumption increases man's impact on the planet. Hence, the space available for other species continues to shrink, as naturalists Edward Osborne Wilson (1929–2021) and Thomas Eugene Lovejoy (1941–2021) never ceased to denounce. The distinction between civic, public and private goods and the shift from ownership to the service provided by a product both reverse the course of human behaviour. The automobile is a case in point. After Henry Ford (1863–1947) pioneered assembly-line production at the beginning of the twentieth century, the invention of the internal combustion engine gave millions of people the benefit of unprecedented mobility. Today, this technology raises greenhouse gas emissions that cause climate change. Cars are on the move only for a small fraction of the time. If the habit of vehicle ownership were to be replaced by greater sharing facilitated by digital technologies, a significant reduction in the global carbon footprint of transportation could be achieved by more intensive use of the existing stock of cars and their longer life.

There is a desire that detaches itself from the others. It is wellbeing that is freedom from suffering. Wellbeing concerns the universe of living species and their cultures, and it encircles the three transformations – digital, ecological and behavioural. The design and implementation of One Health hinge on these three transformations.

One Health is an attempt to voluntarily construct the future using intelligence that recognises how intrinsically linked the economy and the health of humans, all other living animal and plant species on Earth and 'natural objects' such as rivers, lakes, seas and mountains are. Since the Earth is a closed system, economics must also accord with the physics of closed systems. In this new scenario, the many certainties of the past fall away. In economics, work and enterprise are no longer such well-defined categories as highly reassuring. As early as the 1970s, the German artist Joseph Beuys (1921–1986) argued against a clear separation between work, art and science. According to Beuys, we are all artists whose thinking is the invisible material that values work and reconciles it with nature. In

our field of life, each of us can no longer plough a precise and straightforward furrow of decisions that begins in school, continues in professional activity and ends in retirement. On the business side, sectorial boundaries are being blurred by transformative enterprises, those operating at the intersection of advanced technologies and the health of our planet. Therefore, we must pay close attention to all that makes a difference in making things happen. Because of this complexity, 'One Health' is a construct that unfolds slowly and needs revision following a probabilistic process.

To *One Health: Transformative Enterprises, Well-being and Education in the Knowledge Economy of the Digital Age*, IVI researchers and thought leaders collaborated with partners from the open innovation communities with which IVI is associated. We hope that the traces left by this work will be helpful to those who venture further down the path of human activity performing in harmony with nature.

Chapter 1

Carving the Transformative Enterprise Profile

Piero Formica

The Time in Which We Live

We live in the time of the Great Transformation made up by the Transformers, who shape transformative enterprises. Artificial intelligence, data science, mobile technologies, the Internet of Things and many other disruptions are energies that trigger novel and unusual processes. Their protagonists are not reformists but revolutionaries. We call them 'Transformers', in analogy with the electrical transformer, because they move those energies towards utilisation. The Transformers act like Richard Feynman. The pioneer in the field of computer science was enchanted by the breadth of the world he faced, aware that he did not know what he was doing. Knowing how to imagine is at the forefront of their thoughts.

The Transformers reject the standards of today's society, believing that imposed social norms and cultivated expectations have become obsolete. One could call them 'Dadaists'. Among them, some represent transformation from multiple points of view to frame it in a broader context. They can be likened to the 'cubists'. Others, like the 'surrealists', draw the transformation with illogical scenes, strange creatures, surprising elements and unexpected juxtapositions; thus, divergent ways of thinking and then acting. Curtis Carlson, the entrepreneur who helped create the iPhone's Siri voice assistant, often asks groups of aspiring innovators to write their definition of 'innovation' on post-it notes. The definitions never agree. What about reaching a much-needed agreement?

Successful transformation requires a shared vocabulary so that it is easy for ideas to communicate with each other. Otherwise, as it becomes hugely strenuous to advance along the path of transformation, the likelihood of success is slim. Here the transformers make Bertrand Russell's thinking their own, focusing on intelligent disagreement rather than passive consensus. The constructive contrarianism will result in an agreement that is a vehicle for transformation. Designed for the subjective and qualitative world of possibility, not the mathematical and statistical world of probability, the shared language of uncertainty facilitates consensus.

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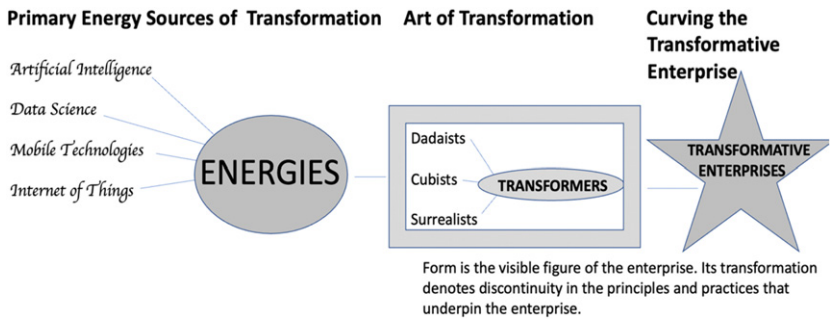
doi:10.1108/978-1-80382-783-420231001

How do we evaluate Transformers in progress? Technologies and, consequently, evaluation metrics change. We can rely upon the Santa Fe Institute's physics-inspired evaluation model. According to Cantwell and Moore, two researchers from that Institute, 'One problem with rankings is that they're typically discrete, which means they follow the whole numbers: 1, 2, 3 and so on. That ordering suggests that the "distance" between the first- and second-ranked members is the same as that between the second and third. But that's not the case. [It is better to resort to] a system that evaluates rankings based on a continuous numbering system. A ranking could assign any real number – whole number, fraction, infinitely repeating decimal – to a player in the network. Continuous numbers are easier to work with, and those continuous numbers can still be translated back to discrete rankings' (https://www.santafe.edu/news-center/news/new-model-offers-physics-inspired-rankings-evaluation).

New technologies and metrics; learning and experimenting with the art of transformation; transformers able to use the former and be valued with the latter to arrest thinking that increasingly resembles the parasitic plant of morbid habit: there is no other alternative to regression towards mediocrity.

The Transformers



Source: Created by Author.

Transformers create the artefacts for the emergence of scientific endeavours that, unlike those born in the successive industrial revolutions, do not merely expand man's physical powers but magnify the powers of the mind. Transformers perform this task by building bridges between different disciplines so that the results of discoveries that would otherwise remain confined to the narrow world of specialisation can be grasped. Transformers possess two doors. The primary winding door gives access to the results to those who can apprehend them. The secondary winding door gives access to others who can extend the significance of the scope of the results. Two vital doors. Suffice it to say that an entire generation

missed Mendel's concept of the laws of genetics because his publication did not reach those capable of understanding and extending it (Bush, 1945).

The transformations arouse great fears, but they also induce us to seize the moment, not let the mutations' opportunities slip away. The English writer Samuel Butler (1835–1902, 1872), talking about the mutation of machines, wrote of the alarm that aroused 'the extraordinary rapidity with which they are becoming something very different to what they are at present'. On the opposite side, John Maynard Keynes (1883–1946, 2013), the English economist as saviour with an aversion to old ideas, penned in 1929 about the need to 'feel ourselves free to be bold, to be open, to experiment, to take action, to try the possibilities of things'. On that year, the 'Black Tuesday' of 29 October occurred with the heavy fall of the Wall Street stock exchange that triggered the Great Depression. In Keynes' view, uncertainty is the condition of all human life, a conception of uncertainty that goes back to his early work on probability, as his biographer Robert Skidelsky reminds us. Today is the right time to take up the Keynesian lesson on the inevitability of uncertainty and, hence, the impossibility of predicting shocks.

Reviving Keynes and his disciples means returning to the real world, increasingly confined by today's professional economists to a set of statistics and complex mathematical equations. Keynes opposed the unbridled use of quantitative methods in economics and required economists to be mathematicians, historians and philosophers. Thus, on 21 January 1940, when the Cambridge economist was about to publish his book *How to Pay for the War* (1940), he remarked in a letter to his research assistant Erwin Rothbarth (1913–1944), a German economist and statistician of Jewish origin,

> When statistics do not seem to make sense, I find it generally wiser to prefer sense to statistics.

Is it possible today to catch a glimpse of the lively insights Keynes called for in an attempt to solve the major problems that beset us? It seems that being wrong by juggling econometric forecasts is still a preferred exercise than getting closer to the truth by reasoned approximations.

A return to Keynes and Cambridge economics could be a significant behavioural transformation needed to govern the other two major transformations currently underway, the digital and the ecological. Following the Keynesian approach would be a vision more open to the concrete behaviour of people and firms regarding investment decisions. Abstract mathematical models contemplating a hypothetical, optimal capital stock would be sidelined. Behaviour that is aware of the unavoidable uncertainty of the future would raise the propensity to experiment and improvise, opening the door to technical progress and institutional changes in society. Keynes argued that the entrepreneurial path is traced by the prevailing institutional arrangements and the relative benefits they offer to firms that, by transforming themselves, promote qualitative growth as opposed to those that do not or even hinder it. Policy-makers with their economic policies should smooth the sharp edges of entrepreneurs' behaviour on which income

distribution depends, as Nicholas Kaldor and Luigi Pasinetti, influential exponents of the Keynesian revolution, have shown. Consequently, economics should be 'a science of the evolution of economic institutions'.

Economic policies with such Keynesian traits, and, we would add, with an eye to ecological transformation, would shake from their torpor that vocation for transformative entrepreneurship whose impact on society and the environment is positive. This is the entrepreneurship that subordinates pecuniary activities to the social function of its work. In his essay *Economic Possibilities for Our Grandchildren*, Keynes (1930) cursed the indiscriminate love of money,

> The love of money as a possession – as distinguished from the love of money as a means to the enjoyments and realities of life – will be recognized for what it is, a somewhat disgusting morbidity, one of those semi-criminal, semi-pathological propensities which one hands over with a shudder to the specialists in mental disease.

Before the English economist, the Russian writer Lev Tolstoj (1828–1910), in his account of the American and British colonisers of the Fiji Islands, pointed out that an economy governed by money is an instrument of power before being a means of exchange (Tolstoj, 1886). Ultimately, was not the 2008 global economic and financial crisis the sick fruit of the power and greed of the agents in the financial markets?

In the 1950s, the opulent society was on the horizon. The dominant thought was to produce bigger and bigger pies from which everyone would benefit. From the fall of the Berlin Wall to the present day, global liberal economic policies have allowed a small number of people to make disproportionate profits. Attention, acceptance and recognition of others are investments made possible by the social capital that comes from trust in one's neighbour nourished by behavioural transformation, a favourable terrain for sowing the seeds of happiness. A theme dear to Keynes, who in 1919, following the German defeat in the First World War, denounced as abhorrent and detestable the policy of degrading the lives of millions of human beings and depriving a whole nation of happiness.

An Overview of Obstacles and Opportunities

We live in the knowledge economy of the digital age, with a handful of global technology companies growing year on year. The evolution of the World Wide Web, recently marked by blockchain, cryptocurrencies and the metaverse (Web 3.0), has strengthened the giants' power. These technology makers climbed the ladder of success, starting with the interconnection of users based on communication networks (Web 1.0) and continuing with the hype of social media and the growth of user-generated content (Web 2.0). Bringing them undisturbed to the podium are the increasing returns whose trend in favour of network giants in the digital age has accelerated with the advance of artificial intelligence. As James Galbraith pointed out, recalling the thought of the American economist Allyn

Young (1876–1929, 1928), later taken up by the Cambridge (UK9) economist Nicholas Kaldor (1908–1986, 1985), 'increasing returns generate cumulative causality: the advance of leaders' gains over laggards produces increasingly extreme inequalities and imbalances'. Resuming the thinking of these economists and making it penetrate economic policy decision-making, as Galbraith argues, would counteract the power of the giants. It is equally important to fight it by affecting the culture of technology takers. By transforming their way of being, one can intervene in digital transformation by freeing it from the yoke of the practices adopted by the giants, who, for example, have no incentive to optimise traffic on the Internet. They do not pursue enlightened self-interest, meaning that they consider the common good. On the contrary, the technology makers maintain the narrow vision of maximising their interests. In the regime of digital giants as feudal lords, some companies would live as vassals (at best), others as vavasors, a majority of them and people would be no more than vavasor's vassals and, even worse, enslaved people.

Conversely, the transformative enterprise would drive digital transformation. If this were to happen, we could face the future with optimism by equipping ourselves with good mental and physical health and acting so that other living species and nature could enjoy the same good health. So keen will be the desire for vitality and wisdom that will come true as we remove the obstacles to the door of opportunity. It opens with the keys of ethics and artificial intelligence (AI) to assist in searching for conditions favourable to human progress in harmony with environmental sustainability. Lacking or malfunctioning of either key, that door remains closed, and obstacles are encountered against which one bumps.

To use the two keys properly, AI must be trained so that the algorithms do not reflect the prejudices that harm people by discriminating against them. To this end, reports the Financial Times (Ahuja, 2021), the White House in the United States is proposing an AI bill of rights that would emulate the US Bill of Rights adopted in 1791. On the other hand, ethics poses a question of great magnitude: should we decide and thus behave in reliance on data, or should we base our decisions on what we think is right? As Callum Williams (2020) points out, there is an opposition 'between utilitarian ethics (exemplified by Mill, Jevons etc.) and deontological ethics (exemplified by Malthus, Kant, Condorcet etc.). Essentially the split concerns what produces the best results versus what is inherently a better act'. From the values and disvalues of AI to the hard-to-solve ethical conundrums, economists are called upon to express themselves as the current upheavals raise ethical, social and ecological problems and goals. To date, the economists' yardstick is a tool that is little or not at all adapted and used to measure, for example, the many services rendered by nature. In addition to these services, the now pervasive penetration of AI and digital technologies into everyday life, starting with the way we work, is barely visible in economic statistics.

Barriers are products and services demanding low skills paid for by low wages. Other barriers are erected by low productivity and inadequate skills for the dual revolution of knowledge and technology. It follows that – as Jeff Gates wrote back in 1998 – 'The ideal of an employer is to have output without employees, while the ideal of the employee is to have income without work' because work is sacrifice, toil, which is the meaning of the Latin word labour. Considerable sacrifices for households and businesses entail the work that changing its nature should be reallocated and the accelerated obsolescence of the capital stock due to CO_2 removal or reduction. On the consumption side, consumers are becoming less and less active agents and more and more passive users. Social network superstars penalise them for prioritising advertisers, significantly reducing their control over the content. While denouncing the bottlenecks in supply chains that limit GDP growth, we overlook the vast amount of stuff we own. In the world of the well-off, the 'rich countries', there is the satiation of demand after a century that, in the words of the Italian writer Daniele Del Giudice (1994), 'has solidified fantasies into objects'. Nor are the lessons of history taken into account. Ronald Wright (2004) writes: 'Palaeolithic hunters who learnt how to kill two mammoths instead of one had made progress. Those who learnt how to kill 200 – by driving a whole herd over a cliff – had made too much. They lived high for a while, then starved'.

It is an opportunity balanced on a tightrope working together in office presence and working alone remotely and with others in digital encounters. Remote working that is smart when it involves a person whose mental ability is such that they are not subservient to technology relegates to the dustbin the model of being in the office for seven to eight or more hours a day throughout the working week. As production activity becomes geographically decentralised, work can be done outside the traditional office. Moreover, offices have long been in the process of breaking down the walls and cubicles built by the old hierarchies. People work in an open plan and teams, using digital tools (e-mail, videoconferencing, virtual whiteboards and social channels), which makes it possible to avoid being on site. Innovation requires smart and quirky innovators. The important thing is to ask where they should be. Is it presence or distance that people think more about the devices they use and less about the ideas they generate? Satya Nadella, CEO of Microsoft, believes that creative work wants social capital that puts personal knowledge into a broader context. That capital, Nadella says, is accumulated by working in the presence of others and depleted during virtual interactions. What would produce creative sparks would not be Zoom, but the face-to-face interaction with words and body language giving rise to tensions, frictions and disagreements unimaginable on the screen. These conflicts are sources of innovation. On the contrary, according to others, the physical location prevents the spontaneity of dialogue, as participants are subject to the rule of seniority, which induces them to tend towards the boss's opinion. In contrast, in remote meetings by videoconference, everyone is inclined to express themselves freely.

We have the chance to inhabit virtual realities by interacting with people and modelling increasingly sophisticated forms of work. We will find ourselves

Smart Working

Triggered by steam technology, the Industrial Revolution pushed farmers and artisans out of their homes, fields and shops. Populated by a mass of workers and machines, the factory became the new workplace. 'Everything that is not a steam engine is a reverie' and the human species becomes 'a mechanical species, which will necessarily act, in all circumstances, according to codified patterns of behaviour', wrote the political activist Benjamin Constant in the early nineteenth century (Todorov, 2003).

Smart working is a great social experiment that brings with it a swarm of virtues that, however, could turn into vices. By navigating the Internet Ocean, the worker can reach many places. Experimentation will show how effective digitally enabled virtual work teams can be, drawing on the knowledge mastered by their members. However, it is not only the speed and productivity of work that is at stake. Innovation is also at stake. In the nascent world, the route to innovation is yet to be discovered. Smart working is helping to chart the path to the New World. What makes the difference is not working remotely but working in collaboration with tribes other than our own. A company that rewards the creativity of its employees and organises work by objectives and results is indispensable. Equally essential is the employee's passion and ability to present herself as an ideator who promotes and participates in casual encounters and free conversations, thanks to the Internet and crossing the virtual with the real (the face-to-face) world.

The world in front of us requires us to think of new combinations of knowledge and ideas. The locomotive of transformative enterprise will have to equip itself to run wagons where so many workers and machines are no longer crammed together. The quantity of GDP growth must no longer neglect the quality of progress. The best use of smart working is cultivating a generation of restless creators who want to keep moving because 'I have never heard of anyone stumbling on something sitting down. The wandering dog always finds a bone'. This thought of Charles Kettering, the renowned US automotive engineer, can only be appreciated and translated into action by transformative enterprises.

together in the 'Metaverse', a term coined by Neal Stephenson in Snow Crash (1992), to denote a shared reality via the Internet, where you are represented in three dimensions through your avatar. The Metaverse that creates new types of common public goods is an opportunity. The Metaverse dominated by a few colonising companies is an obstacle. Not wanting to be confined to the digital world, we aspire to design a 'Converse', a hybrid environment composed of spaces where we can converse to discover new things by converging physical, digital and virtual reality. WYTH, the platform for hybrid and digital events, 'creates a space that facilitates human relations, networking and community building, combining

the potential of digital with the excitement of the physical experience'. Thus, the best of both the remote and in-person experiences are brought together.

It is an opportunity to do more and differently in education through constant experiments in entrepreneurship as well as in schools. Entrepreneurship that perceives its main task as doing better all that it already does is an obstacle. It is an opportunity the entrepreneurship, evoked by Peter Drucker, that, in uncertainty, decides to disrupt, disorganise, create something new and change values. The lack of knowledge of the technologies on which so much of our lives depend is an obstacle. Confusing the high tide of information raised by technology with the waves of knowledge raised by the wind of intuition makes us powerless and panic-stricken when faced with even minor upheavals in ordinary life. The barrier raised between the offline and online worlds is an obstacle. It is an opportunity to see them as entirely fungible.

The common denominator of all opportunities is the prevalence of relations between people over relations between people and things. The comfort of material needs is not the main reason for living in society. The art of living aimed at satisfying desires for vitality, wisdom and knowledge shape the image of the economy. With the emergence of 'converged' environments, life in the cities and surrounding villages and suburbs increasingly overlap. Manufacturing is distributed across villages and the countryside through the use of intelligent technologies. The gap between doing and thinking is bridged, an impairment produced by the age of mechanisation.

With this mental equipment, we begin our navigation in the river of the economy that washes the populous land of quantity on one side and the land of quality on the other. In the former, large quantities of goods are produced with a lot of increasingly automated routine work. People indulge in consumerism. Wealth is poorly distributed; the natural environment, destroyed. On the other side, the land of creative activities is sparsely populated. People devote themselves assiduously to designing for spiritually and imaginatively intensive consumption – consumption aimed at learning, art, music, improving the environment and health, and healthy longevity.

In the world that is changing under the revolutionary impetus of Mother Nature, to leave behind the land of quantity and touch the shore of quality, we must build and then cross the Ideation Bridge. That crossing is a journey of discovery whose guide is intuition. As we walk, we take adventures that are transdisciplinary rather than interdisciplinary. In short, as we walk, we discover original ideas rather than exchanging common ideas for exploitation. When ideas are exchanged, it is because they are new to both parties. In the land of quality, the creator is an explorer who searches for something different from create connections that were previously non-existent for both parties.

The times we are living in call for timely actions. These include the marriage of manufacturing and digital technologies for biomedical science and its applications in healthcare, environmental sustainability and climate change. Such an alliance provokes economic growth with higher levels of transformative entrepreneurship, many new companies, and increasing participation in financing the investments needed because of the growing awareness of accelerating processes that threaten