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Transmissivity of Measure and Value in Human Systems

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ABSTRACT

If competent human intervention is about functional appreciation of change as a motion of matter, it must begin with measure and quantify. This old challenge, recast into the 21^{st} century social, acquires a novel technical as well as moral methodological dimension. For today's life is characterised by many interacting 'levels of being', of disparate, contingent complexity, geo-political and communicational, genetic and viroid etc., often operating away from equilibrium, each with its input-output variables and limits of applicability. Its action space is fragmented and manipulated by the victorious neo-liberal division of labour increasingly traumatised by the range of capabilities of the high tech tools vastly exceeding those of the human body and mind. The competence then depends chiefly on the ability to project one such set of parameters on another without losing the transmissivity of projected content and its limits. It will be argued that this challenge calls for a fresh research and development agenda of mapping such transmissions across the relevant domain boundaries, and for fostering a class of facilitators fit and willing to legitimate this process by methodological procedures rising to the requirements of dynamic ontology of quasi-objects underlying the functioning of human systems and of human expression and communication at large. What is at stake is a shift in attitude, chiefly about the way of seeing and connecting things in terms of quantitative, accreditable relations between empirical parameters and their limits. Its ultimate aim is to provide generic guidelines for developing competent citizenship in which the ultimate measure of value is personal and social independence for all; only then a credible and sustainable process of reforms can come into being and gradually return emergent knowledge to the service of humanity.

Key words: Emergent Knowledge and Human Systems–Competence–Digital Humanities–Social Ontology–Systems of Thought–Applied Communication

1 INTRODUCTION

1.1 Genealogies of Change and its Representations

The discursive space of the 21^{st} century is generally acknowledged to be a superposition of rising and declining interventions competing in the action space full of remnants of systems of thought and their verbatim spanning many centuries. In the absence of speculative assumptions about the world, the degree to which one can account for the present and future developments depends much on that of the past. To convey the content of emergent meanings of the actualisation of concepts of measurement, order, and value to be recognised in today's dynamics of material and conceptual exchanges, it is proposed here to adopt a genealogical approach. It proceeds via matching projected comparisons lying along the relevant vector of change. Every time we want to account for any of the manifestations of change, in general to 'express ourselves', we must select, consciously or unconsciously, a group of signs from whatever options are potentially available to us. In doing so, we de facto evaluate such options and their relations. Until very recently, much of discourse in social science and humanities was grounded in qualitative methods based on speculative assumptions about the world and its development; indeed, outside natural sciences and mathematics it is rare to hear even today of variables, their limits of applicability and degree of independence, i.e. the language of techniques of measurement and quantification. Advances in modern physics and instrumentation, and maturing quantitative digital technologies have provided powerful tools which challenge the legitimacy of this tradition. Once we acknowledge the act of measurement in expressing relations between ideas, and change in general, the method of describing human expression and its development takes on a fundamentally different form. In order to account for change in a reproducible manner one needs a set of norms which in turn rest on what constitutes order. When in the course of the 18^{th} and 19^{th} century physical sciences became the basis of a functional

materialistic worldview, the pursuit of human exploitation of nature and industrialisation turned instruments of cloistered science into instruments of applications. The order and ordered structures discovered by physical science, and by critical inquiry arisen in its wake or instrumental in bringing it about, soon became a backbone of novel methods driving technology and with it the division and valuation of human labour and organisation. Already in the first decades of the 19^{th} century, in his Berlin Lectures on Aesthetics, Georg Friedrich Hegel argued that artefacts are no longer directly enjoyed and appreciated by us. We are compelled to judge, to reflect upon the relative content and value of things in the light of our conceptualisations of the world and its development [1]. The shift from 'direct' to 'mediated' appreciation of the human environment brought about a change in the method of inquiry which came to depend increasingly on readily available 'objective' demarcation criteria. The surest way to show that some-thing is different is to measure. The event-artefact then had to be identified and viewed so that the claim to difference and directional progress was measurable. What mattered was the demonstrability of the key abstractions underlying Hegel's notion of History and Progress in which value rests in retaining access to the absolute and eternal. The outcome is well known. Not only the scientist and sociologist but even the avant-garde artist suddenly wanted to prove that his or hers marks on the canvas are the first of its kind. And of course, his style or 'ism' is another unavoidable step in the ascent of 'necessary' Progress! In Ernst Gombrich's words, Hegel had bequeathed to the 19^{th} century historian and his followers the agenda of finding in every factual detail the general principle of underlying Order [2]. The ascent on the road to Self-understanding of the collective mind was to be 'quality assured' by the objectification process of dialectics of history later recast in the language of historical materialism bequeathed to the 20^{th} century thinkers by Karl Marx. That which has been, and the experience of it, its impact on the present, is consumed in works of science, art, and communication and infused into social norms. Traditional historiography relied on storytelling that presupposes homogeneous continuity of development. Such images suppress those aspects of change that may not fit into the doctrine informing them. Many thinkers early in the 20^{th} century ceased to believe in the possibility of such direct factuality of narrative as well as material documents. Though they wanted to account for the fragmentation and growing conceptual divergences weakening credibility of Hegelian-like historicism, they feverishly speculated about how to redeem what they called the truth content of the work, how to turn what amounts to over-layers of meaning piled up during the work's life into some lasting residue or originary content worthy of eternity. For example, Walter Benjamin's idea was to create a series of images 'torn' from what the doctrinaire approach would have regarded as the relevant (original) context, and composed into a text conceived as a montage. He believed that this might present a more authentic account of the vector of change in that it would bring to light that which may have been buried under the phantasmagoria of urban bourgeois lifestyle, perhaps because of its radical pointedness and singularity. This is what he refers to as "crystalisation of history" into the present, into what he calls "dialectical image". In Das Passagen-Werk (Arcades Project) [3], Walter Benjamin sets out to account for the shift in the material condition of humanity in the course of capitalist modernity and its social impacts. Benjamin's method is to assemble a graphic (visual, material) representation of "truth" in which material records make visible the philosophical concepts underlying them. Unlike for example Heidegger's, whose chief aim was to oppose the Kantian distinction between nature and history, his Passagen-Werk becomes a material counterpoint to such abstract projects. For Benjamin, the characteristic feature of modernity has been systematic destruction of traditional bonds and narratives grounding the intuitive notion of order. He chose the 19^{th} century Paris as his empirical domain in which to show how this slaughter had taken place. Instead of Hegelian continuity and linear causal chains on which to hang well chosen meta-narratives, he finds artefacts coexisting as fragments as if scattered by a giant explosion across the sacred Parisian ground. He joins the isolated fragments of reality layer by layer like an archaeologist- genealogist uncovering a buried city. Although Benjamin's aim is not debunking of techno-science, he does not anticipate the unleashing by technology of active, self-organizing and heterogenous biomatter. Still less does he, just like his distinguished contemporaries such as the physicists and philosophers around the Vienna Circle [4], even begin to anticipate the empirical, quantitative techniques made possible by the instruments born out of recent advances in microscopic appreciation of laws of physics – not to speak of its off-springs engulfing us today! Instead he wants to recover under the fragmentary appearance of reality an irreducible material trace of Urhistory, of an originary history of signs and bonds. For him, behind the fantasmagoria of capitalist progress, lie eternal returns and the trickster of theology animating technology seen through the lenses of allegory! The backbone of his Konvolutes in the Arcades Project are Jungian-like archetypes 'transposed' into the capitalism of the 19^{th} century Paris, the gambler and the flaneur who personify the empty time of bourgeois modernity, the whore standing for the 'commodity form', the decorative mirrors and interiors for consumer subjectivism, mechanical dolls emblematic of worker's existence, the store cashier as an allegory of the cashbox, and so on. Among the creative moves of the first half of the 20^{th} century of particular interest is Marcel Duchamp's foresightedly intervention. He took as his point of departure the conjecture that the signature of a new work is to be found in what amounts to an inscribed structural order. At least since Pythagoras, artists have always sought a reference to an order parameter – revealed to them in moments of divine inspiration. Recall, for instance, the Harmony of the Spheres, the Golden Section, Fibonacci series, etc. Duchamp's idea was to move the notion of order to a novel level. In the absence of any external ontological source (e.g. divine will), an object or event 'is' only if 'it' is capable of initiating a recognisable series of steps! In his Warning, Marcel Duchamp implies [5] that these sequences of approximations, as if implementing a mathematical prescription or

formula by automatically invoking a series of analogies attached to an impulse, are traces in our unconscious of the invisible rails along which contemporary thought and power travel and collide. They are the ultimate residual source of motion, what remains when traditions become withdrawn. These 'rails' have been laid down and perpetually re-cast during the many decades of our civilisation; and in the course of this 'liberating progress' of the 'Rational Man' they have gradually replaced the pathways laid down by 'revelations', by 'traditions'. And so it may not come as a great surprise when, in a recent review of the work of the 20^{th} century artist Lincoln Kirstein exhibited in the MoMA, it is concluded the lesson of his legacy is that it is the eternal in artist's work that matters [6] ; in spite of wildly changing verbatim of passing decades, what is recognised as key signature of a work is its underlying order parameter. It is of course an old friend of any rational mind, for its role in conceptualisation of creativity, and change in general, was inaugurated in Kant's Critiques and redeemed for the post-mechanical age by Michel Foucault's Order of Things. And it was not just Galileo's dictum "the book of nature is written in the language of mathematics" that shaped modernity; the notion of independent order also acquired a novel social dimension under "liberation by reason", liberation not just from caprices of nature but particularly from impositions of arbitrary will upon other humans or simply from ignorance. Today as yesterday, without this quality we are indeed not much more than a "human swarm" [7]. The outstanding challenge is to recognise order amidst its varied forms of contextualisation today! In his last years, Walter Benjamin hypothesised that the true image of an event could be retrieved – "cited" – only "in the present that recognises itself as intended in that image". "To grasp the eternity of the historical events is really to appreciate the eternity of their transience" [8], p. 661). Hence citability is the necessary condition for a work with the ambition to play a part in a living civilisation. However, by now this citability – and transmissivity of any form in general - is being manipulated not only by impositions of philosophical, religious, and other social constructs that have always been around. The age of instruments vastly superior to the instruments of human body, and networking marked by ontic conditioning of high complexity, gave this process a qualitatively novel dimension! Whatever was left of the memory of cultural heritage has been fatally weakened by the victorious neo-liberal practices. Amidst the debris of overlapping fragments laid bare and empty by this slaughter, there remain as the only potential source of order the structure formative mechanisms associated with the practices mimicking mathematisation and digitalisation of the world. The trickster who pulls the strings animating act-object assemblages of today is no longer Benjamin's shaman-theologian playing with "Ur" or "baroque" ornaments but a pseudo-mathematician manipulator-mixer. The visible sign today does not 'represent' a face, a landscape or an injured body, a thing out there recognizable by the meaning granted to it by a place in shared narrative. Nor does it represent representation. Instead, in most encounters it puts before us whatever brings to life a driving process, a 'machine', a pseudo-formula, an arrow. It is also this reference to the type of motion or relation, located at the site of experience, which makes the event recordable and communicable and constitutes the 'journey' and its ontic content or objectness. Most of what one sees appears to be interchangeable with other equally powerful bodies, shapes and colours. If the whole retains certain solidity and encouragement for the visitor to enter, it is mainly because of the 'visibility' of the 'virtual machine' or at least a promise of it. The breakdown of the legitimacy of traditional symbolism and the emergence of creativity as a temporal and individual act reduced narratives to the status of a place where individualisation processes are acted out. This then becomes a new space for inserting another subdivision, not only to measure and quantify but in order to re-cast the 'story'. It is re-positioning meaning and knowledge by changing the way knowledge is recorded and accessed by a gradual reduction of structure and controls of organisation and remembering, by openness to perpetual re-writing. Hence the 'Arcades of the 21^{st} century' could be thought of as a book of 'maps' of transmissions of meaning constituting journeys-as-act-objects of today. To ground such mapping, it would be necessary to establish links between territories and their defining coordinate-variables and boundary conditions. Such 'transmission matrices' would provide the means for facilitating the connections between the past, present, and future; connections dynamically projected into the social sphere from the processes born in a laboratory and cloister and turned into novel order grounding production and social developments. It is the recognition of these fragments amidst the flow of appearances of material exchanges in the daily chaos called life that offers the possibility of formation of genealogical lines of developments and of semi-continuous notions of work, value, and directionality of thought. It is then possible to build an update of social and cultural history as a superposition or 'maps' of genealogical lines of such encounters and constitute the 'new' reality amenable to empirical, quantitative studies, and to perpetual critical re-assessment. Value is here given by a measure of recognition of such a process and its genealogy, not by the status of an object or event in some general hierarchical systems imposed from above. That is why today we talk about "human systems" - to refer to those human organisations that depend for their functioning on interrogation of knowledge systems, often in conditions of high complexity and away from equilibrium, in general on systemic structures such as internet-based, external to the organisation in question algorithms defining and controlling the access, input and output data processing, indeed any thinking and knowing passing through the organisation in question. To an external observer, they may appear as semi-autonomous units of overwhelming power with a dynamics of functioning of their own [9]. The paradox of the label virtual, used to refer to the internet and to computer-based work and its structures in general is that it is the most material of tools of work and communication known to us since it is cast and stored in high purity silicon layers. As such it is available for 're-use' any time and anywhere! It is then imperative to seek the

'truth' (transmissivity) of change and value by reaching the level of emergent order and its place in the genealogy of order generation and consumption developed for the class of events in question. For this is the only independent means of identifying and recording development [10] . This methodological turn underlying legitimisation of transmissivity is of particular importance in the light of impact upon culture and communication of the neo-liberal division of labour and its intended and unintended outcomes. What is now known as neo-liberalism, which stands for what survived from von Hayek's Roads to Serfdom and the goings on in the Mont Pelerin Society out of which this form of social manipulation surfaced to victory in the 1980ties, brought about a new and much talked about global challenge (e.g. [11] and refs. therein) which is still with us. Its deepest conceptual objective has been to abolish "history" in the minds of trustful citizens - who in the course of much of the 20^{th} century had been taught to associate it with the necessary succession of social norms – implying among other interesting predictions inevitability of the end of exploitative capitalism. The drive fuelled by the cold war regime culminated with Fukuyama's infamous End of History and the Last Man. Though it filled - and amazingly enough is still filling - the deep pockets of the few, far from the free-wheeling individuality they were promised they wear the void thrust upon all by the very libertarianism they so ruthlessly brought about. Of course by now it is not just to dispose of Hegel's or Marx's notions of history and capitalism - both being barely detectable in the work practices of the digital age - but anything that suggest there is more to society than the business of war of all against all rewarded by several times removed 'pleasures' offered by the 'free market'. And so we do not go to see a new production of the Seagull but "The Seagull after Chekhov"! Instead of offering new plays and books full of the vision they purport to possess, the perpetrators of this campaign do not rise much above parasitic exploitation of a famous brand… It goes without saying that any work worthy of lasting human attention must undergo every other generation a process of re-translation and re-production to bring it close to something like the current idiom. But this process has always been aimed - be it in the course of vigorous debates – at redeeming the cultural heritage, at preserving, making transmissible, the creator's signature in the work to new audiences. For without so retained a legacy of the past, we would lose the capacity to recognise our future! It is not only the fate of plays, paintings, and novels but also of Newton's Principia and quantum theory. Far from opening the work for deeper personal appreciation, these interventions reduce it to "pata-physics" of one of the well oiled politically correct topics for sale in so imaginative a way that Alfred Jarry and his papa Ubu must be green with envy in their graves [12]. It has now become a runaway 'method' whose viroid existence reaches far beyond any structured intervention such as those of the wars of ideologies. It sets in motion travelling instabilities from various shapes of false news to 'problem solving' by inserting in existing target structures 'well chosen' subdivisions which recast the meaning and impact in question so as to suit the agency rich enough to afford the fee. It is not to suggest that all those who are prepared to sacrifice the author and his day on the altar of their preferences are not capable of grasping the meaning of their choices or that they are in it only for money. Clearly, at least for some – having faced the impotence to produce a new social contract of substance - this is a sacrifice which is in their judgment one of the few remaining means to undermining the tired regimes unable to correct even the most blaring inadequacies, an attitude much written about - e.g. in books like Geert Lovink's Uncanny Networks. Alas! Even in the unlikely event that these interventions do knock out this or that prejudice or shift some of the hot dollars from one pocket to another, they lead the human condition into the same void as the neo-liberal Establishment they wish to challenge; yes, they both seem to take us - be it for very different reasons - unstoppably to what reminds one of Harold Pinter's futureless No Man's Land… If there ever was a serious challenge to transmissivity of 'measure and value', this is one! For a 'computer-aided' inquirer, change is a motion of matter. The transmissivity of the content of any message and its limits between different realms of measurement depends on the effectiveness of the transition from one set of variables and conditions of applicability to another. Structures of knowledge and social organisation have attracted much of studious attention in physical and social sciences, not to speak of philosophy. However, the radical shift in onto-epistemic conditioning of transmissivity, arising particularly from the weakening of the Cartesian notion of subject and object by the dynamic character of ontic relations and clashes of varied levels of complexity, still remains in conceptual Limbo. This calls for developing generic guidelines for legitimating conditions of accreditation for transmissivity of 'measurement and value' across the boundaries between disparate knowledge and human systems. This is tantamount to answering how are change and value to be 'measured' today, and how they can be transmitted across the boundaries of varied domains of measurement. Although terms like measurement and limits of applicability in their rigorous rendering are still rare outside science and technology, a shift to this way of approaching transmissivity is to be expected of any mature inquiry [13], [14]. The task is formidable; if there is anything to gauge the scale of the challenge by it is that the problem of measurement has long been at the heart of epistemology of physical sciences never to be satisfactory closed off. Yet it is a key means to deeper appreciation of successive stages of scientific development (e.g. [4] and refs. therein). It will be argued that an analogous be it even more taxing process is just beginning to assert itself as a key to meaning making concerning all aspects of functioning of human organisations. The novelty of the human condition in the 21^{st} century also calls for a methodological shift in learning, thinking, and knowing. It has recently been proposed that competent decision making depends on giving individuals as early in their life as possible a chance to ground their judgement and the uptake of top down political and 'technical' input in an object-based, project-mediated, student-tutor rich process of experiencing the fullness of life. It rests on bottom up, iterative empirism which contextualises events without first falling into

pre-packaged meanings and relations. A workable curriculum designed with a view to addressing this agenda in the context of the British educational system has been developed in the course of the last two decades and successfully implemented, with encouraging results across a wide range of ability, from school to post-graduate levels [15–17], [18] .

2 CONDITIONS LEGITIMISING TRANSMISSIVITY IN THE 21st CENTURY

2.1 What Cause?

If competent decisions are about making sense of change as a motion of matter, the simplest way to legitimate it is to measure, using this term in the broadest sense. In order to be able to measure, one needs variables, units, and territories of their applicability. For this procedure to be relevant in the space of human organisations, whose functioning critically depends on the capacity to engage with overlapping systems of thought and organisation, it is particularly important to retain clarity about what is cause and what effect, and about the degree of independence and applicability of variables. The principles of causal change and its implementation in developing and evaluation of scientific theories have been of significance in the history and philosophy of European science and this is also where its understanding has been much advanced. In publications of physicists there are frequent references to positions and velocities, masses and times. References to a cause are rare and when they do occur it is not in technical reports but in places where a socially placed explanation is sought, i.e. in the sense "this is how it happened". As the general notion of explanation implies, to describe a cause of something is to explain first of all why it took place. In its more specific or narrow meaning, cause is an active agent, something that exerts a force and pushes or pulls to bring about a certain effect; in this sense it is of course a technical term. However, the two meanings are related. The form chosen for an explanation often directly or indirectly specifies the deductive structure which constrains the causal reasoning in its technical sense. For instance, depending on the context of the explanatory anecdote, it may be sufficient to say that two electric charges repulse each other because of the inverse square law of electrical interaction. In another context we may be expected to go on to account for the origin of this interaction. Hence, whatever the causal reasoning in the technical sense, the length of the chain of causal sequence and perhaps even its direction may depend to some extent on a 'subjective' element smuggled in via the choice of frame for 'explanation'. Naturally, the preferred form of explanation has changed throughout the ages and with it the notion of cause. Aristotle analysed every change in terms of four causes, material, efficient, formal, and final. According to him, these four types accounted for all aspects of change. The material cause of a building is the stone used to erect it. The efficient cause it the force exerted by the builder and his tools upon the stone. The formal cause is the model or plan of the building. This is the ideal version of the real thing. The final cause is for example the mission accomplished by the a contribution of the building to shaping and enhancing the public space in the city and the aesthetic and political ideas of the community. The final cause – Aristotle's demand to specify in the abstract the purpose of a thing - amounts to giving it a meaning or essence as part of a purposeful Organism. For what is a leg without a body? The Aristotelian cosmology when accounting for the tendency of, say, planets circling in perfect orbits or stones falling to the ground, is an example of the application of this scheme. The essence of stones is that they belong to the earth and there they find their natural equilibrium place. If we disturb them by throwing them into the air they will necessarily fall to the ground. Aristotle tells us not only how they get to the ground but why! In the 17th century the argument that mass bodies fall to the centre of the Earth or that planets do what they do because this is the best way to realise their nature became unacceptable. Galileo did not require such analysis. He abandoned Aristotle's "why" and was content with "how". The explanation was based on mathematical regularities supported by empirical data processed by a disinterested reason. In Aristotle's terms, it was the efficient cause, the mechanical explanation. Although Newton's force of gravitational attraction between planets acted "at a distance", Newton himself and his followers dismissed this as a temporary shortcoming and stressed the cause-effect or contact character of all forces of Nature. Causality meant that for anything to change (move) one particle hits another. That is the principle of force acting on masses in Newton's mechanics. As a result, the 17th century physics witnessed a revolution in attitudes. In Aristotle's physics – as in much of theology - the causes when invoked were the formal and final ones which in practice amounted to the same thing. They were concerned with the nature of ideal forms given to us by Divine powers. For Aristotle the subject of physics was the description of eternal order and procreation in Nature. Only regular, eternal processes such as rotations of planets had reality. Irregularity was a kind of imperfection to be ignored. 'One off collisions' were either trivial events not worthy of philosopher's attention or violent changes that interfered with the perfect arrangement of things in the Universe. Such changes, attributable to efficient causes, fell outside the terms of reference of Aristotelian physics. With Galileo, Newton, and Bacon's empirism, attention focused on the efficient cause. In fact, the efficient cause (contact causality) retained the status of the most fundamental quality in much of science well after the advent of quantum physics and theory of relativity and remains to the present a mental tool underlying most commonly invoked explanations including those turning up in physics lectures. In his seminal work [19] on the origin of scientific revolutions Thomas Kuhn argued that changes in scientific outlook or scientific progress do not occur continuously. Most of the time, science is like any other activity. It takes the laws and equations inherited from the earlier generation and uses them to solve a particular class of problems. If the solutions appear to be contradicting the fundamental premises on which the whole conceptual enterprise is based - the paradigm of

that period - the most common reaction is to assume that there must be a mistake in the implementation of the rules or that the question is really a pseudo question, something science should not be concerned about. It is only when such a paradigm is exhausted, when it runs out of problems or when the number and gravity of findings contradicting the premises are such that the whole game simply comes to a halt. Then the real creativity sets in and everything is questioned. During the crisis, a new set of views and concepts is introduced during a relatively short transition period. Gradually the whole set of concepts is replaced as if translated into a new language. For example, Newton's mechanics is formulated in terms of masses and forces. In Aristotle's day there was not even an expression for mass in his language. The transition is a process of transmission of the content by projecting the set of variables and norms defining one (old) order upon those of another (the new order)! As the mathematical foundations of science became better established, the problem solving procedure became linked to the framework of the appropriate differential equations (e.g. Newton's equations of mechanical motion, Maxwell's equations of electromagnetism, etc.). A physicist would then specify what is called boundary conditions, say the initial velocity or position of interacting particles, and compare the solution so obtained with experiment. He would then correct these boundary conditions and carry out more checks until the agreement with experiment lies within the error bars specified for the application. For example, it is to check that the moon is in a certain position at a given time. The answer is obtained by inserting into Newton's equations the position and velocity of the moon at previous times that are known to us and computing the answer. This earlier position may be regarded as the real cause of the moon's position at a later time. However, this is not something that the physicist needs to address. It is automatically taken care of so long as the concept of boundary conditions and the law-like relation contained in the mathematical formula are regarded as standard. Under these conditions the cause in the sense of efficient cause is irrelevant, at least among professionals. Instead, the discussion is about technical problems of making the calculation, the form and precision of the result, etc. The answers obtained are called explanations since once an agreement between mathematical model and experiment has been achieved there is no more to say. The problem has been solved, explained away. The need to specify the active agent in this mode of enquiry is pushed into the background. In Aristotle's terms the range of meaningful (scientific) questions is determined by the formal cause. As pointed out by Kuhn, the formal cause dominates the modern mind. Only when dealing with an insurmountable anomaly does our physicist also invoke cause in its specific use, i.e. also the efficient and material cause!

2.2 Conditions Imposed by Dynamic Ontology, Technicity, and Probabilistic Representation of Event-ness

There are at least two semi-autonomous layers of relations or signs on which the functioning of social systems rests. One concerns the drivers of development born and nurtured in the 'lab and cloister'. Their vectors of change are cast at the level of specialist manipulations and as such are hidden from view for most. The other is the realm of the social in which these drivers, once allowed effectively to engage with its systems, join them in reshaping the human condition.

With the fading of the language and symbols of our premodern past, representations of change in social discourse have in the course of modernity become expressed in terms of collisions of collective norms and values, in the "spirit of the age" (Hegel's Zeitgeist) - in concepts like epochs of feudalism and capitalism, in styles of baroque and romantism, in dialectics of collective norms and drivers of change like class struggle, free market, and capital enforced division of labour. However, in the maturing digital age, consensual communicability of such relations of cause and effect becomes increasingly lost in the overload of fragmented meanings separated by the dynamics of different levels of their complexity anywhere, whether making phones or paintings. As a result, the relationship between the two layers of functioning of society has recently acquired a very different character. It is peculiar to the greatly increased capabilities of interactive tools for structuring human systems, indeed any forms of human expression. These novel relations have risen in tandem with the neo-liberal enforced division of labour driven away from equilibrium by runaway technology. No wonder that not only literature and social media but also many expert works in social studies and humanities perpetually recast their verbal and procedural structures which - since most are not based on accreditable, quantitative empirical databases – rapidly acquire a life of their own. Yet, thanks to the mediaphilic schizophrenia of neoliberalism, this does not prevent some of them from being cherished by many as expressions of their ephemeric personal needs and as such to frame social norms and public imagination, even well after their clash with reality becomes apparent. It is as if instead of attempting to see change, as was the custom in the 'age of ideologies', as motion of some autonomous totality, it focusses on a particular 'local' function relevant to the event in question. It attaches a certain finite weight or probability to two or more states in which the object – event in hand may find itself. Amusingly enough, this is formally analogous (but only analogous) to the probabilistic interpretation of quantum mechanics developed in the first decades of the 20^{th} century to deal with representation of properties of electronic states in atomic structures; the field theoretical approach takes this further for in its rendering 'existence' becomes a localised outburst of energy in space-time. And it remains a standard practice in physics to the present day, a splendid example of the late dominance of formal cause highlighted by Kuhn! In the social context this means that every time a certain object – event assemblage comes up in a report, play, exhibition etc., it is likely to be expressed in terms of a different function and in a different state or states (of meaning and appearance) - each with a different level of probability of occurrence - even though the drivers of the vector of change, identifiable as the causal forces underlying the event may well be the same

or very much related. To put it bluntly, what some-thing is depends on how it is registered at the site of action, by its functional engagement there rather than as an autonomous object. Indeed, this is the only way to ensure that the choice of variables and limits fits the specificity of the purpose of modelling. This aspect of our digital meta-modernity, the so called dynamic ontology, may be particularly startling when we realise that we are likely to end up for the same 'what' (i.e. body) with a different 'who' depending on the choice of section of the action space – i.e. on how we perform the experiment, on how we 'measure' 'its' performance [10].

There is yet another novel onto-epistemic dimension to be reckoned with when formulating conditions of transmissibility. For today knowledge, communication, and their product - the creative Self - are constituted in an experiential space consisting of different 'levels of being', each with its characteristic set of 'parameters', e.g. scales, units, and instruments of 'measurement', and, significantly for the citizen, with its entry and usage requirements. Since the range of reach of current instruments vastly exceeds that of human senses and mind, it becomes imperative to establish and to open access to routes enabling the actor to recognise the ways techno-science, knowledge management, and their engagement with the social inscribe and codify human experiences in which the Self appears to be conditioned by a multi-level system of norms and inputs often well hidden behind appearances. For today technology resists simplistic reduction to 'instrumental action' or conditioner of discourse. The relation of humans to technology is then best thought as necessarily bound up with what is often called originary technicity. Technology is a kind of 'constitutive prosthesis' of the human species [20]. This concept amounts to a working hypothesis that life and meaning are technical without always being 'technologically determined'. Here technicity refers to an ever present dynamic aspect of human existence which is not necessarily fully actualised, represented or symbolised, yet which remains fundamental to the human condition and its limits at a given stage of development. More precisely, this technicity is a unity of becoming, of a network of relations, a mode of being as a temporal and spatial network. This is often expressed in a cavalier way by saying that objects are 'loaded with life', for example in theories of 'object based' art and technology [21] .

It follows that 'technicity of a machine' cannot be separated from the milieu which it inhabits. Today this milieu is characterised by processes that arise in conditions of high complexity from ever present meta-stabilities in the flow of material exchanges and activate spatio-temporal domains with sites 'open' to supplies of structural energy. They set themselves in motion to which the system responds in progressive iterations promoting structuration. The newly constituted local structures serve as a base for a new round of structuration, and so on. The journey constitutes the 'object' and vice versa. This aspect of dynamic ontology of event-ness implies that the vector of motion or directionality and specificity of development arises from the process itself, from the supply of energy at the site of action-event that fuels the rise (and decay) of the assemblage (of things, humans, and machines). Hence, at least in its initial impact, neither the sites (place, time) and character of such outbursts of energy (of physical or social innovations, change and development), nor that of their actualisation can be readily controlled (predicted, modulated) even by the very structure hosting its birth!

Finally, it is worth noting that one of the outcomes of this change in the human condition is that privacy and personal autonomy – one of the chief demands of Enlightened Modernity and a key condition for protecting independent reason – can no longer stand as constants of life. The act of journeying – as – life constitutes both the wayfarer and his 'way', and in almost any quasi-structured territory replaces the role of traditional symbols, i.e. the objects and narratives supplied and 'accredited' by centuries-old development such as for example the Jungian archetypes of rebirth and immortality, of spirit and body, mother and trickster, etc. It then matters less what exactly happens, say, on the stage, in the square or on a football pitch - so long as one's place in the dynamic onto-epistemic is not seriously challenged, i.e. there are at least one or two 'familiar lines' with which to identify oneself. That is why very often nowadays the task of making a selection, decision, etc., or persuading a viewer to choose a 'show' - not to speak of rendering its content - is not so much about why and what but about how 'it' best satisfies his or hers current 'existential' needs – or rather the bit of it projected upon the spatio-temporal site of experience in question. All this fits well the metaphor of a 'neo-baroque stage' - with 'homo-marionettes' now convinced it is all about expressions of their individuality and in fact animated by a multitude of competing quasi-machinic systems with lives of their own! This is just such a moment in the flow of social development when availability of a state-of-the-art transmissibility matrix should dramatically improve the quality of life! For it is ultimately those processes that best match the demands of the underlying (causal) order generation upon social organisation and its actors-citizens that sooner or later emerge victorious and visible as such be it still mysterious to most.

3 COMMENTS: CHALLENGES AND OPPORTUNITIES

It has been shown that the conditions for effective transmissivity of 'measurement and value' in the social of today are best cast in terms of deeper appreciation of the way causal forces make their appearance in the social [10]. In order to uncover and preserve the content of the process in question, it is essential to 'peel off' the contingent layers of appearances. Their effect is contained in the vectors of directionality of their presence; once recognised, it becomes apparent what has to be undone and how to recover the event's position in the relevant genealogical line of the underlying ordered structure and its parameterisation. The challenges of achieving competent levels of transmissivity of content and limits of applicability in the social spaces of the 21^{st} century are reducible to the fundamental methodolog-

ical difference between, say, accounting for change and development in physics and that in social systems. For example, in Newton's mechanics, we define a set of applicability conditions (approximations) which fence off the mechanical motion of macroscopic bodies, and turn it in into what is call "closed system". That is a system in which it is possible to define a set of independent variables like coordinates, velocities etc. enabling the researcher to account for any state of the system. As pointed out by Kuhn, most of the time our physicists function under a certain paradigmatic consensus which protects the notion of how the content and its limits are to be transmitted and read. They can concentrate on researching clever choices of initial conditions and on manipulating variables in their differential equations, i.e. they can afford to confine their efforts in accounting for and predicting change to what falls under the "formal cause". In constructing models of change in social spaces, this operational closure is mostly less than possible to achieve even at the cost of numerous approximations since it is difficult fully to recognise and acknowledge all relevant contributing factors and their mutual dependences – e.g. clearly to separate variables like personal income, skills, class, etc. Hence change must be captured in a multi-dimensional matrix of relations, i.e. it must be accounted for by what amounts to specifying an equivalent of Aristotle's 'four causes' so ably brought to our attention by Kuhn's work: the elements the object-event consists of (the material cause), the dynamics or the force driving and putting it together (the efficient cause), and the plan, design or ideal form (the formal cause, today really the same as Aristotle's fourth, the final cause which stood for purpose or law). The sufficient condition is the match achieved when the iterative procedure for optimising the choice of variables and data domains converges to being self-consistent within the given data base and acceptable error bars (limits). For this to enable rapid competent decisions there must be readily available transmission relationships - or at least well advanced methodological and empirical provisions leading to such relationships - between relevant domains of activity, particularly those taking care of transmissivity across the dividing line between the technical-specialist and the communicative and normative social systems. It is this set of tools that must clear the action space of parasitic pathways along which thought and matter can travel and collide only to end up in a failure. It goes to the credit of many a distinguished historian of 'predigital' generations, who, in spite of belonging to very different schools of thought, endeavoured to embrace in their particular way this multi-facetness of the object of their inquiry (e.g. refs. [22–24]). Yet even today, though lack of any consensual social space of consequence is all too obvious, the availability of powerful digital tools does not always lead to discourse grounded in well accredited applications of data bases. Such studies read more like a diligent chronicler's narration taking the reader through dates and venues of meetings and proclamations on the grand - or not so grand - stages of politics with an occasional mention of 'statistics' concerning preferences, alliances, etc.; it is as if only the "formal cause" was in the play (e.g. ref. [25])! Examples of what happens when conditions for effective transmissivity are ignored can also be found in various media reports. When Mr. Blair's government wanted to reduce the number of teenage single mothers, they gave them a statutory right to the housing benefit which included not only a place to live but also a stipend. Alas! Soon the number of single mothers greatly increased! Not only was the housing benefit 'variable' not independent, it bore no resemblance to it: desperate girls queued to be impregnated by the first willing man - no questions asked! At another level, it was trying to hear, throughout the 1990s and even some years later, in meetings on sustainable design, well-meaning professionals praising the silicon chip phenomenon as an example of sustainable technology; oh, so small yet so powerful! Their enthusiasm rarely declined even when they were told that, in order to manufacture such miracles of microstructure science and engineering, tons of virgin rocks have to be destroyed - not to speak of keeping busy a power station and a water supply facility worthy of the consumption of a small town. They were much too suspicious of the sources of such warnings which they saw as grounded in causal processes outside the reach of their notion of the order of things, even among friends! More recently, in spite of hearing repeatedly in the media that even small disruptions at the border bound to occur in the case of "no deal BREXIT" might ruin a number of businesses, a large section of the public simply refused to hear it. Of course, whichever side of the divide one wants to favour, conditions for departure from the European Union are not to be taken as something obvious and therefore require a rational, data based debate; but these good citizens seem to have felt so alienated they chose to dismiss any argument against their 'gut feeling' as one of the tricks of the manipulative elites. The first reports of programmatic, concerted efforts to provide guidelines for implementing convincingly the methodology based on empirically grounded quantitative accounts of order generation and actualisation, and offering re-assessments of what has been taken for standard by previous generations, have already appeared in the last decade or so, such as the outstanding works of Morris and Piketty [13, 14]. In his study, Professor Morris presents an evidence-based multi-dimensional picture of a particular class of social development. He uses it to compare the degree advancement in Western and Eastern societies. Piketty's Nobel Prize winning work shows the changes in relations of income and capital to social inequality in key Western democracies over the last two hundred years or so. This creates a base for makings predictions about the future development in such domains, too. Both studies are based on extensive digital data bases and innovative processing tools made available in the public domain and open to public scrutiny. The benefits, risks, and limits of these new methods are critically assessed, particularly the choice parameters and the degree of their independence. This then constitutes a maturing research platform offering a fresh opportunity particularly for the younger generations who may feel more comfortable with digital tools and enthusiastic to take the matter further under one of the research scenarios aiming at redeeming our cultural heritage

by recasting its content into the language of independent order parameters [9, 10]. Moves in this direction are not confined to academic pursuits. At least in highly technical, large scale projects such as building airports or integrated satellite communication systems people have gone a long way in developing and making use of well founded transmission matrices between sets of parameters of adjacent stages of the task embracing both knowledge and human systems. For example, to build an optoelectronic system for networking applications such as satellite based communication systems, one starts with a physics lab where they use quantum theory to design, model on the atomic scale, and make samples of ultra-thin layers of semiconductors. The result must be made available to teams concerned with material characterisation, processing, device design and testing. Then enter system's developers and people concerned with matching it to the satellite manufacture teams, to legal and security matters, safety, ethics and health standards, norms for usage in operational monitoring and control, management, finance, marketing and patenting experts. Finally, there are those whose task it is to make the product available to the user. At all stages, clarity of the transmission from one set of parameters to another is of essence for any misunderstanding may stop or delay progress.

4 CONCLUSIONS

It is argued here that competent intervention depends on the ability to recognise causal origins of social events and to position them into genealogical lines of development constructed in quantitative studies of empirical data. The necessary condition for such judgments to be successfully made and implemented is a high degree of transmissivity of 'measure and value', particularly when it concerns the divide between two semi-autonomous, yet deeply engaged and interacting layers, namely those of order generation and its actualisation in the social. This challenge calls for a fresh research and development agenda of mapping such transmissions across the relevant domain boundaries. It also founds terms of reference for a new class of facilitators steeped in the conceptual foundation of order generation and recognition peculiar to this century's division of labour and instrumentation. Their key role is perpetually to create and optimise relevant sets of variables and their domains of applicability as well as fitness for quantitative processing to be implemented in collaboration with computer scientists and technologists able and willing to legitimate this process by methodological procedures rising to the requirements of dynamic ontology of quasi-objects underlying the functioning of human systems and of human expression and communication at large.

The difference in outlook advocated here is not so much about any particular specialist knowledge but about developing a way of seeing, selecting, and connecting things in terms of quantitative, accreditable relations between empirical parameters and their limits. The challenge is in overcoming the legacy of speculative doctrines and their impositions while redeeming the lasting core of their insights by recasting them into the language of independent order parametrisation and its genealogies [10]. The generic aim of this endeavour is to provide constructive guidelines for developing competent citizenship capable and willing to bring about fresh normative structures for returning emergent knowledge to the service of humanity designed to promote personal and social independence as the ultimate measure of value.

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