RENEWAL of the CONCEPTUAL FOUNDATION for STS Design (STSD)

PREAMBLE

1. Societal transformation and the choice for humanity

Humanity is at a fork in the road. The world we live in has become hyper-turbulent and interconnected, such that the challenges for organizations and society have become increasingly *complex*, often in the form of "wicked" problems. Meanwhile, exponential and disruptive digital transformation in all sectors of work and life creates significant new opportunities as well as threats of technological hegemony, "surveillance capitalism" (Zuboff, 2019), and "mass extinction" of jobs and corporations (Siebel, 2019). For humankind, the imperative to act is clear, but to achieve 'whole' outcomes with humane as well as effective results, this new era calls for institutions and society to choose new ways of 'organizing'[1] for action.

It is important to note that we have answered this call before. Seventy years ago, a similar call to action arose in the challenge of recovery from the social, economic, and political devastation of the 20th century's second world war, at the same time that transformative mechanization held out promise of greater efficiencies throughout industry, albeit at some human cost. Fortunately, in this critical period, there was also the discovery by scientists at the Tavistock Institute of Human Relations (London, England) of a new "organizational paradigm" that acknowledged and valued the interconnectedness and interdependence of human and technical aspects—a holistic approach to 'organizing'—which opened up the study and development of work organizations as "socio-technical systems".

As foreseen by Tavistock social scientists (led by Eric Trist and Fred Emery) and their colleagues in Europe, Scandinavia, and Australia, there is a third dimension of 'organizing' that has emerged in the post-industrial order. This is the ecological perspective--the dynamic relationship of organizational entities to one another and their increasingly "turbulent" environments. The three perspectives—human, technical, and ecological—constitute what we believe is a new pattern of 'organizing' and a basis for comprehensive, 'whole system' design. Renewal of this coherent set of ideas can act as both a map to see key aspects of organizational entities and as an 'ideals' compass for making the 'organizing' choices relevant for our new digital era according to adaptive normative principles.

[1] In the words of Christis (2009) and Luhmann (2000), "organizing refers to the process of division and coordination of work", and "the product of organizing is…the work organization of an organization: the way its work is organized".

2. Three Perspectives As Fundamental Theory About Open Whole Systems

The growing complexity of our world requires a new definition of design foundations, theory and practice. The Conceptual Foundation of Three Perspectives is a fundamental theory about **social ordering in complex adaptive systems**. Ordering is NOT about control relationships, but rather about how *independence and connectedness* are balanced dynamically among social entities at different levels in complex systems to achieve adaptiveness for specific contexts.

Emery and Trist recognized that in a turbulent world, the rapidly changing dynamics of visible, surface interactions may obscure organizing choices, thus making intentional designing difficult so they looked for *deeper patterns of social ordering* that could offer clarity about adaptive design choices. They identified **three patterns of deep social ordering** – **human, technical and ecological** – as the *normative humane wellsprings* that form, according to complexity theory, the initial conditions (minimal critical specifications in STSD terms) for emerging adaptive design foundations across all social levels – micro, meso, macro.

Cal Pava coupled open systems theory with complexity theory when he described the formulation of these initial conditions as nonlinear work done through a process of deliberation with a structure of discretionary coalitions based on an infrastructure of collective learning. Traditionally, this work was often background work called Design Project Setup and Organizational Diagnostics that was done prior to the focal 'design work'. This figure and ground is now reversed in designing adaptively for a turbulent world.

The new 'figure' are the lenses that Emery and Trist provided us for understanding interaction patterns around three normative imperatives—built on ideals of common good and human dignity--for adaptive design. Interaction patterns are thus 'designed' through minimal critical specifications to:

a. exchange and interpret meaning among diverse participants in a network
b. sustain shared meaning by a 'small world' (small self-managing social entity in STSD terms) for a significant period of time until these simple structures eventually become linked into larger clusters of orderliness within a network organization
c. capture collective learning *and* enable independent improvisation to empower continuous dynamic learning for thriving of the whole ecosystem

The **Three Perspectives** are simple 'lenses' to illuminate the intricacy of ordering in complex systems. They are meant to grab one's attention to perceive differently and to help one see through a shared set of eyes in order to develop a new understanding of the whole.

I. **HUMAN** – defining the pattern for **agency.** Every social entity has different motivations and aspirations, which must be understood by all in the ecosystem in order to

collectively form a logic for thriving of every social entity at every level. This logic is a framework of rules and norms (culture) for the whole to abide by to nurture the agency of every entity. The framework represents a delicate balancing of drawing out full individual (team or organization) potential with community safety and support mechanisms so as to bring unique capabilities to bear on the whole ecosystem's robustness.

II. **TECHNICAL** – defining the pattern for **value creation**. To create value, we must understand what value means for everyone in the ecosystem, including how they think that value should be created through use of technology. Engineering is one of humankind's greatest achievements; it is an extension of human behavior, but we are often not using it effectively to increase our ability to survive and thrive, especially under VUCA conditions. To arrive at ethical technical decisions, everything must be thought about from the perspective of each participant in the ecosystem so as to arrive at synergistic solutions and experiences that are mutually beneficial for all.

III. **ECOLOGICAL** – defining the pattern for **wholeness.** Social transformation entails changing a whole system and all its interrelationships, which means helping the members of each distinct social system level (micro/meso/macro) see their system as a whole, in its immediate context, and help it engage effectively with whatever unique challenges or opportunities that its context raises. However, this often creates macro social, economic and political differences that can result in unequal advantages. Thus, balancing dynamically all these different contexts in physical, temporal, and digital ways is needed to create a proactive and responsive ecosystem wholeness.

In a constantly changing environment, social outcomes can't be designed, but initial conditions, or what STSD calls *minimal critical specs,* can be set for outcomes to emerge in a healthy versus maladaptive way. So, awareness of context and of ethical and practical choices for healthy adaptation is the most critical design role. Together these perspectives clarify the whole system complexity of organizing choices so everyone in the system can become mindful about them as they continuously design their everyday interactions. Organizations that use these three perspectives to their advantage in the short and long term will flourish in the emerging new era. Those that ignore these perspectives will risk the chance to make positive change, miss highly successful market opportunities, and will be out of step with future technologies.

3. Three Perspectives as the Discovery and Understanding Phase of Designing

Exponential digital change has situated us in a liminal (transformational) space between linear organizing and nonlinear organizing. Every day we are challenging "command-and-control" organizing that no longer works in a VUCA world. We are trying to connect with untapped possibilities in order to imagine more relevant future structures. We are in a messy process of undoing old elements such as hierarchy and centralization, clear cause

and effect relationships, and the efficiency paradigm that show up in status, roles, and rules that are increasingly dissolved into new patterns of social order, creating tremendous ambiguity and confusion for all stakeholders in the ecosystem.

We can only make design decisions about things we perceive and understand. People have what Herb Simon [Simon, Herbert A. 1957b, *Models of Man*, New York: John Wiley] called 'bounded rationality' – limited information processing capabilities, changing memories and short attention spans that leads them to notice different things, reflect at different times, and process different segments at different speeds. As a result, there are many versions of "organizing reality" because people have different experiences of it. So learning what is shared (or not shared) about this reality becomes central to designing in a turbulent world. Learning is the meta process that includes the subprocesses of perceiving, understanding and designing.

Opportunities for learning arise from discrepancies between what is cognitively expected and what is perceptually experienced. In the modern workplace, these discrepancies occur all the time as both perceptions of time and space are altered by new ways of thinking and new technologies. This generates 'moments of insight' that allow for reconfiguration of how one construes one's identity and one's world. By letting our imagination flow loosely, we come up with hypotheses that can then be put to the test by means of the rational logic of the sciences and mathematics. The interplay between the rational and the imaginative is the dance of creativity, invention and innovation that is the new role of designing. However, this collective learning (nonlinear work) does not occur on its own. It must be fostered by the intentional design of deliberations and learning coalitions that are talking about, exploring, and prototyping new ways of being and doing, of asking and listening, of valuing and seeing that results in a new shared framework of meaning or narrative that given enough sustenance, support and space to flourish, will gradually nurture a small world reality.

The designing process, where choices are made, has always been the focal point because of its decision making power – the pride of linear organizing. But it has always been preceded by processes of discovery and system understanding that have most often been done differently by the distinct STSD approaches as well as idiosyncratically by every practitioner, thus making knowledge exchange among us difficult.

Work today, done through networks, makes the process of discovery and understanding of a shared reality more important, but even harder to achieve. Organizations today are always seeking difference – in ways of thinking, experiences and networks – in order to better address their strategic areas of focus and their stakeholders' needs so as to achieve agency, value and wholeness for themselves and for the ecosystem of which they are a part.

Understanding is constrained by context, distributed information, differentials in power and vested interests that reside within systems in the ecosystem. And this is complicated further

by the nonlinearity principle of requisite variety, i.e. having to match an ecosystem's sensemaking capability with the complexity of its environment.

Understanding based on using the three perspectives is what creates an open system's model of its design space that describes the environment and the system's interactions with it. The lenses reveal the fundamentals of ordering in a unique ecosystem with the aim of (1) dissolving the deeply ingrained and obsolete patterns of the past and (2) determining the leverage points for action with multiple social system levels at the same time.

The 'Three Perspectives' provide an information-processing backbone to support collective explorations of different pathways by which organizations and individuals can loosen the grip of what no longer serves them, and design the possibilities of a thriving future. Thus, the Perspectives are foundational to the participative and inclusive process that is at the 'heart' of 'Whole/Integral System" STS Design.

4. Three Perspectives – New Insight for Digital Transformation

Digital transformation has brought us to a new frontier in organizing **– intentionally designing for whole adaptive ecosystem emergence.** We are in the midst of letting go of yesterday's organizing narrative based on mechanistic paradigms defined by an inherent need to impose control and order on a seemingly chaotic and random context that required predictability and efficiency to get desired outcomes with scale, speed, and perfection.

The world today is more connected through technology and therefore more interdependent so pure independence of any social entity is simply impossible in the 21st century. Our products and services, largely because of technology, require increasing coordination and faster, more effective collaboration. Because of the speed required, designing needs to occur on two levels – first, to synchronize around principles of wholeness, inter-relatedness, interdependence, resilience, and thrivability that provide the framework of understanding that drives action. Then, secondly, the action design space, i.e. operating system design, can be addressed directly by users who can self-design, employing different design practices and methodologies appropriate to their context. This is the small world/large world inter-relationship.

Principles designing is about balancing human, technical and ecological paradoxes, not solving specific stakeholder problems, which are in the realm of the operating system. Principles define the right initial conditions, nurturing, and stewardship that can transform an ecosystem to become what we collectively envision as individuals, groups and organizations expressing and exploring their fullest potential in order to bring their deepest gifts in service to a larger purpose. It is about making choices between several, sometimes positive, alternatives where there is no simple right answer. Paradoxes are things that will never go away; they may disappear if they are balanced successfully or be intentionally hidden from view, but as the context changes each of those paradoxes will suddenly re-emerge and need to be deliberated again. Paradox balancing creates principles that are

about deep transformation of the purpose of work, and our relationship to work and each other.

While digitalization has made available many new technologies such as AI, Blockchain, Virtual Reality and Machine Learning to augment our human capacities in the operating system, there are also new social technologies available to us like Theory U, Circle of Trust, Liberating Structures, Sociocracy and Open Space that are just as – if not more – important for generative conversations that lead us back to our humanity and wholeness. Also, there has been considerable innovation in supporting *online deliberation*, i.e. sharing, discussion, debate, acknowledgment, and agreement types of communication through deliberative discourse platforms designed to present hundreds of supporting and opposing arguments in a dynamic argument tree. And new machine learning approaches to summarizing comments will also make an impact in this space.

Further support of participative design will occur when we give up the paradigm that only hero leaders and individual organizations can govern. We now have evidence that no single individual or organization can appropriately match the scale needed for the critical, substantive and multifaceted complexity of ecosystem issues. Principles designing work is really about designing a participative governance function for the ecosystem that includes purpose, mission, strategic direction, and priorities; developing and allocating resources; adopting and applying rules of interunit engagement and relationships; and implementing an ongoing system of health assurance for the whole.

STSD's nonlinear design methodology is well suited for the designing of paradox balancing to ensure the true global value of technologies is achieved for the benefit of all. It allows us to carry out ethics by design on a global scale to protect us against bad actors who would use data to create addictive algorithms or against unintended outcomes from bias perpetuated by algorithmic decisions based on too small a set of data. A renewed conceptual foundation for 'organizing' through the three perspectives and their respective normative principles, provides the fluidity and responsiveness needed for a dynamic ecosystem governance.

What follows in this paper is first, a brief review of the heritage from which these 'Three Perspectives' were born; and secondly, detailed discussion of the new meaning that this conceptual foundation yields for an era of digital transformation.

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