Living Cognitive Society: a ‘digital’ World of Views

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Abstract

The current social reality is characterized by all-encompassing change, which disrupts existing social structures at all levels. Yet the prevailing view of society is based on the ontological primacy of stable hierarchical structures, which is no longer adequate.

We propose a conceptual framework for thinking about a dynamically changing social system: the Living Cognitive Society. Importantly, we show how it follows from a much broader philosophical framework, guided by the theory of individuation, which emphasizes the importance of relationships and interactive processes in the evolution of a system.

The framework addresses society as a living cognitive system – an ecology of interacting social subsystems – each of which is also a living cognitive system. We argue that this approach can help us to conceive sustainable social systems that will thrive in the circumstances of accelerating change. The Living Cognitive Society is explained in terms of its fluid structure, dynamics and the mechanisms at work. We then discuss the disruptive effects of Information and Communication Technologies on the mechanisms at work.

We conclude by delineating a major topic for future research – distributed social governance – which focuses on processes of coordination rather than on stable structures within global society.

Keywords: cognitive system, living society, information and communication technologies, future social governance, individuation, cognitive development.

1 Introduction

Today’s society and life in general are characterized by all-encompassing fast change and movement. New technologies, new jobs, new opportunities, new challenges – i.e. new unknowns – seem to fall on us before we can figure out how to make sense of the current ones. Our psychological reactions vary between: (1) attempts to ‘stabilize’ the environment (social, political, technological, biological) by imposing more controls and checkpoints; (2) calls to embrace
change and ride its wave towards a ‘new world order’; (3) *ad-hoc* proposals for dealing with challenges of our times (e.g. information overload); or (4) a sense of helpless dis-attachment.

No matter what the specific reaction is to the socio-technological change we are experiencing, it is based on the way in which we make sense of ourselves, others and the world. Usually we base our sense-making on perceivable stable objects and their relationships in the world. A specific configuration of such objects and relationships within a system describes its state. The change of the system is then perceived as a chain of transitions between states. This is a well-established mode of thinking which has helped us tremendously in achieving most of what human civilization has created since its beginning. But is it still valid in the era of ever-accelerating change?

This paper proposes an original conceptual framework for thinking about a changing social system and applies it to the contemporary situation of the global information society. The gist of the framework is an approach to a social system as a living cognitive system – an ecology of interacting social subsystems. We do this by developing the concept of the Living Cognitive Society – a distributed social system characterized by the interaction of a multiplicity of heterogeneous agents and subsystems. First, we analyse the current situation of global society and its underlying reasons, and ask the question ‘what kind of global system could be sustained and thrive in these circumstances?’ (Section 2). Then we provide a detailed tour of the theoretical concepts which form the basis of the framework (Section 3). The description of the main concepts is followed by the rationale of their integration (Section 4), which explains the application of the theoretical basis of our framework to the situation of global society. The locus of the paper is the detailed characterization of the Living Cognitive Society in terms of its structure, dynamics and the mechanisms at work (Section 5), building on notions and concepts introduced in the previous sections. Finally, we apply the concept and mechanisms of the framework to discussion of the impact of information and communication technologies (ICT), particularly the Internet, on global society (Section 6). The issue of the governance of the Living Cognitive Society is intricately related to the mechanisms at work within the system, and also represents a distinct challenge and the field of research. We therefore dedicate the last section to introducing the paradigm of *distributed governance* (Section 7) as an avenue for future research.

We aspire to several goals simultaneously with this work. Most importantly, we aim to construe how the concept of the Living Cognitive Society, and our approach to the global information society, follow from a much broader philosophical and theoretical framework, guided by the theory of individuation. Therefore, while the theoretical framework alone has been developed elsewhere (Veitas and Weinbaum, 2015; Weinbaum and Veitas, 2014; Weinbaum, 2012), this paper provides an integrated summary of the main concepts with references to appropriate sources.

Hence, the paper combines: the conceptual framework (Sections 3 and 4); the application of the framework to social reality (Section 5); the role of ICT and Internet in the disruptive change of the global social system (Section 6); ‘con-
nective tissue’ – the interpretation of the current situation of society (Section 2) and consolidation of concepts with application (Section 4); and finally, avenues for future research (Section 7). These themes are not presented in a linear fashion, but rather intertwined in order to better convey the relation between the philosophical framework and its application to the global social system. A number of cross-references are provided in the text for navigating its thematic structure.

2 The current situation of global society

The current situation of global society can be characterized by the overwhelming feeling that the world is changing too fast for a single human and society to comprehend. This feeling furthermore extends to the inability of coping with change, at least without a paradigmatic shift in how humans individually and humanity collectively relate to the world and themselves. There are two aspects to the perception of disruptive change of our social reality, both playing an important role. The first is the actual acceleration of the life pace, which can be connected to the relative, yet increasing, separation of humans from nature. It is probably rooted in the dawn of human civilization, but has ‘become a fully fleshed out experiential concept only with Industrial Revolution’ (Koselleck, 2009), and arguably is reaching its climax with the rise of the ‘networked world’ (Helbing, 2013; WEF, 2013). This separation has allowed humanity to dissociate its activities from the rhythms of natural phenomena (day and night, harvesting seasons, etc.) forcing the socio-technological acceleration on itself. Another aspect is the psychological reaction to uncertainty, mostly related to ‘information overload’ and the ‘future shock’, inherent in our times (Heylighen, 1999). Both aspects contribute to the increasing social complexity of our world.

2.1 Factors of social complexity

Three major factors of social complexity can be identified: accelerating change, hyper-connectivity and reflexivity:

Reflexivity is probably the most important characteristic of a social system: it refers to the consideration that the social system is created by the collective behaviour of its participants and, at the same time, exerts an influence on the behaviour on its participants. Every participant (e.g. person, institution, nation state) of society both affects and is affected by other participants, causing circular internal relationships among them, as well as mutual dependency between participants and the whole society. Most importantly, reflexivity refers to a feedback relationship between observer / participant of a social system (i.e. intelligent agent) and the observed (i.e. the ‘environment’ – the system as a whole).

Hyper-connectivity is a major symptom of progress, resulting in a world where every agent, event and process is connected to many other agents,
events and processes, therefore making all elements highly interdependent. The ‘networked world’ is therefore an example of a fragile system, where local events may spread to affect the whole global system (e.g. in the case of stock market crashes).

**Accelerating change** is due to the explosive multiplication of information in the hyper-connected and reflexive system, which is our global information society. It is a source of uncertainty and confusion in almost all domains of social and human life, because participants of the system have limited capacity to process this information, let alone to match the speed of information multiplication.

The central question which this paper aims to answer is therefore: what kind of social system could be sustained and, furthermore, grow and thrive in such circumstances?

### 2.2 Fluidity versus Hierarchy?

Due to increasing social complexity, the future of global society no longer resembles the past, and therefore our mental and formal models lose their predictive power even in the short term (Veitas and Weinbaum, 2015) resulting in an impression of chaos, ‘crisis’ and ‘a state of emergency’. While accelerating change and information overload are the actual characteristics of the current situation, the ‘state of emergency’ is rather a subjective reaction rooted in our prevailing worldview.¹

The prevailing worldview held today derives from the *Newtonian* worldview – based on the concepts of reductionism, determinism and objective knowledge (Heylighen et al., 2006). Following this worldview we make sense of social reality by looking for the existence of stable states in a social system. These states are usually manifested as hierarchical relations among the system’s elements, participants or subsystems. Change is then conceptually understood as a series of transitions between stable states.

In other words, we are trying to mentally ‘stabilize’ the increasingly fluid and changing social system by finding more or less stable hierarchical structures within it and then reflexively enforcing them onto the system in the form of governance systems and institutions we create. In terms of Figure 1, we are used to thinking of social systems and global society as if having the hierarchical structure on the right, while it actually resembles more the image on the left. This discrepancy creates an impression that there are no good models (or even worldviews) for understanding what is going on.

¹The concept of a worldview is instrumental for the conceptual framework of a social system which we are building in this paper and will be addressed in detail later (Section 3.4).
In a situation of hyper-connectivity and accelerating change, the ‘stabilization’ operation becomes non-effective – leading not only to the impression of ‘crisis’, ‘state of emergency’ and ever growing uncertainty, but also increasing tensions within and fragility of the system. Seeing the global society as a dichotomy of ‘disorder versus hierarchy’ is counter-productive for understanding and governing it.

2.3 A ‘Viscous’ society

We therefore emphasize the view of the global society as a complex system consisting of interacting subsystems at multiple scales. Nations, states, religions, languages, local as well as international institutions and governments, enterprises, philosophical schools and academic institutions, fishing and golf clubs, families, persons and pets are only a few examples of subsystems of the global society. While social systems are neither completely fluid nor completely hierarchical, we tend to see hierarchies in society, because: (a) temporary hierarchical organizations do emerge and exist in it; and (b) it is related to our ‘wired’ tendency to search and see stable ‘coherent’ patterns in messy data. But what we seem to de-emphasize are the fluid dynamics of a social system which, we argue, form a more fundamental characteristic of the global society than any observable stable state, which is never permanent. Almost without exception however, contemporary governance structures are organized hierarchically, which leads to the false impression that society can be described and, moreover, governed, based solely on a hierarchical model.

Certain social subsystems and units, such as linguistic dialects, communities or religious beliefs, are fuzzy, overlapping and interactive among themselves in a largely non-hierarchical manner. Others, usually human-made systems, such as companies, armies and factories are predominantly organized hierarchically.

Moreover, each social subsystem is constituted of a number of smaller scale systems and each smaller scale system can be a member of more than one subsystem at the higher level (Section 5.2.2). For example, the same person can be

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2 Pattern recognition forms the basis for categorization and concept learning. Hierarchical organization is a particularly important way of organizing and relating concepts (Murphy, 2004), which is a necessary aspect of sense-making.
a member of a fishing and golf club and speak several languages. Furthermore, boundaries among certain subsystems, such as cultures or philosophical schools, are far from being well defined or easily definable. The conceptually coherent image of society is a ‘viscous’ system – combining different degrees of stability and fluidity. Due to accelerating change, the level of ‘viscosity’ of society moves towards higher fluidity up to a point where the aspect of hierarchical stability becomes hardly visible.

Therefore, we propose to approach any social system including global society primarily as fluid, while treating observable hierarchical structures as temporary ‘islands of stability’ in an otherwise ever-changing social fabric. The next two sections introduce and discuss a rich array of concepts and theoretical approaches integrated into the framework of the Living Cognitive Society – a fluid ecology of global society.

3 Conceptual background

The concept of the Living Cognitive Society integrates a number of propositions brought forward by complexity science, cognitive science, evolutionary theory, philosophy of individuation and becoming, and theory of assemblages. In this section we briefly introduce each concept and emphasize its influence and inspiration for the conceptual framework of the Living Cognitive Society.

3.1 Self-Organization in Complex Adaptive Systems

The Living Cognitive Society in its most abstract definition is an instance of a complex adaptive system (CAS). CAS are characterized by complex patterns of behaviour which emerge from interactions among a large number of component systems (agents) at different levels of organization (Chan, 2001; Gelli-Mann, 1994; Ahmed et al., 2005). The consequences of a huge number of interactions are most often unpredictable due to their non-linear character. Still, interactions are able to spontaneously coordinate among each other. Therefore, complex adaptive systems are said to self-organize instead of being organized or designed.

Self-organization is the appearance of structure or pattern without an external agent imposing it (Heylighen and others, 2001). Importantly, self-organization is caused by a certain amount of disorder and fluctuations in the system – formulated as principles of ‘order from noise’ by Heinz von Foerster and ‘order from fluctuations’ by Ilya Prigogine (ibid.). These principles point to an important understanding that fluidity, disorder, fluctuations and uncertainty are not only undesirable side effects which should be minimized in a complex adaptive system, but actually are necessary for it to evolve, adapt and thrive. Therefore, a social system that can thrive in uncertain environments, needs to reconcile a chaotic element in it – a crucial insight which we accommodate into the concept of the Living Cognitive Society.

3See The “Five Graces Group” et al. (2009) for the perspective on language as a complex adaptive system with a fundamentally social function.
3.2 Living and cognitive systems

We see the virtue of combining the concepts of living and cognitive systems to describe global society due to their potency to account for emerging higher level coordination mechanisms within the system.

Therefore, we propose to analyse global society as a living system (Miller, 1975) which is also an ecology for other living systems (Figure 4). Examples of living systems can be complex multi-cellular organisms exhibiting a high degree of internal coordination (e.g. vertebrates), but also loosely coordinated organisms (e.g. rhizomes and mycorrhizal networks). Clearly, the level of coordination in the living system is a defining characteristic that can bear disparate values.

Living and cognitive systems are categorized in the same equivalence class (Maturana and Varela, 1980, p. 13) or as closely related (Luhmann, 1986, p. 85). Also, Miller (1975) treats society as a living system based on the analysis of its properties.

In the context of global society, we are therefore faced with the question of what the nature and dynamics of coordination are in a society as a living system. Understanding of the close relationship between living, cognitive and social is reflected in the name of the Living Cognitive Society – the central concept of this paper.

3.3 Enaction

We largely subscribe to the research program of enaction (Stewart et al., 2010) for providing a conceptual framework of self-organization in a living cognitive system. The enactive approach treats cognition as an adaptive process of the interaction between an agent and its environment. Importantly, it considers that the boundary between an agent and its environment is constituted by these interactions and largely defines an agent’s identity, whereas identity of a self-organizing system is ‘generated whenever a precarious network of dynamical processes becomes operationally closed’ (Di Paolo et al., 2010, p. 38). Operationally closed networks of processes are adaptively autopoietic systems, i.e. capable of creating and sustaining themselves as well as continuously improving their own conditions (ibid., p. 50) (Maturana and Varela, 1980, p. 78).

Simply put, living cognitive systems ‘have a say’ in shaping the tendencies that constrain and shape their own developmental dynamics and effectively constitute their own identity. The enactive approach gives us the understanding that these tendencies are not given from outside of the system, but are rather self-generated from the interaction of the components within the system.

3.4 Sense-making and a worldview

The essence of the sense-making process is already encoded in the word itself – it is an active ‘making’ of a ‘sense’ or ‘meaning’ by an observer – a cognitive agent. The concept does not overlook the fact that sense-making is based on
extracting information about observable patterns in the system (the world, self and others) being perceived. But, at the same time, it emphasizes that it is the observer who decides what the significant patterns are from which to extract the data about a system or phenomenon. Sense-making is rooted in the enactive approach to cognition (Section 3.3) which puts the concept in a larger context, first of all entailing the individuation of the very agent which performs sense-making.\footnote{We employ the simplification of a well defined observer - observed distinction (i.e. agent - environment) at this point mostly for didactic purposes. Actually, the distinction between observer and observed itself individuates during the process of synthetic cognitive development (Section 3.5). For in-depth analysis of the individuation of agent-environment boundary, please refer to Section 2 of (Weinbaum and Veitas, 2015).} For an in-depth definition of the sense-making concept, please refer to Section 1.3 of (Weinbaum and Veitas, 2014).

The process of sense-making begets a worldview. Importantly, the relationship between sense-making and a worldview is a reflexive one – an observer's worldview determines significancies which then influence the sense-making process of the same observer. The concept of a worldview is a rich and multidimensional one (see Vidal, 2008; Vidal and Dick, 2014 for an in-depth discussion and references). It can be understood as a gestalt perception – unique and integrated cognitive structure – held individually or collectively in relation to self; others, society, and the cosmos at large (Markley and Harman, 1981; Veitas and Weinbaum, 2015). With respect to the social system we are living in, each worldview includes our aspirations, the views on ‘natural tendencies’ and ‘trends’ of the system, and related possibilities for the future as well as approaches to the appropriate modes of social governance. Each of these aspects is based on a combination of sense-making perspectives which may be overlapping, incompatible or even mutually exclusive. For example, individuals or collectives may prefer exploration, growth and development of persons, society and life in general, or, alternatively, stability, safety and preservation. Often such preferences cannot be accommodated within a single value system and represent different ‘points of view’ of the same phenomena.

The Living Cognitive Society is the multiplicity of interacting embodiments of worldviews, representing different value systems and points of view. In a ‘viscous’ society (Section 2.3), where no single value system or worldview can be considered dominant or ‘objectively’ better/best, the resilience and growth of the global system depends on the mode of interaction among many worldviews rather than on the properties of any one of them.

### 3.5 Synthetic cognitive development

The theory of cognitive development posits identifiable patterns of human cognitive development, which are described as developmental stages (Piaget, 1971) or truces (Kegan, 1982), usually ordered in predictable sequences. Cognitive development theories generally describe an ‘evolution of meaning’ (ibid.): the recursive subject and object relationship when the subject of a previous stage, becomes an object during the next stage. The process is not linear, but rather
is manifested through sequences of integration and disintegration of cognitive structures (i.e. developmental truces).

In Weinbaum and Veitas (2014) we generalize the process of cognitive development to all classes of living cognitive systems (i.e. humans, societies, artificial intelligences) and call it synthetic cognitive development. We define synthetic cognitive development in terms of the variability of the level of internal coordination (Figure 2) within a complex adaptive system – leading to the higher cognitive complexity of a living cognitive system.

The generalization is achieved via a series of observations. First, human cognitive development is largely driven by a cognitive dissonance – a measure of subjective psychological uncertainty. Subjective uncertainty is nothing other than ignorance about the state of the system and is related to the level of unpredictability of the system’s behaviour. Entropy is used for measuring such ignorance about the state of a system (Ben-Naim, 2012). Therefore, cognitive dissonance can be understood as the level of entropy of a cognitive system – a level of subjective uncertainty. Finally we observe that the level of entropy/uncertainty in a cognitive system is consonant with the level of disorder in a complex adaptive system. The concept of synthetic cognitive development therefore operationalizes ‘order from noise’ and ‘order from fluctuations’ principles describing self-organization dynamics of complex adaptive systems (Section 3.1). We apply these general principles of cognitive systems’ development for understanding global society. It allows us to start describing the interaction of processes of integration (i.e. leading to more order) and processes of disintegration (i.e. leading to more fluidity) and their primary role in the self-organizing dynamics of the Living Cognitive Society.

3.6 Theory of individuation

The philosophy of individuation by Gilbert Simondon is the ontological foundation of the conceptual background described in this section. The theory of assemblages and the notion of tranduction – central concepts required for understanding the workings of the Living Cognitive Society – are direct descendants of the theory of individuation. Simondon opposes the hylomorphic schema which posits the dichotomy of form and matter: he sees the form, the matter, the objects and the relations among them individuating together without any primary principle defined prior to this individuation. In the context of the present paper we see this principle particularly useful for conceptualizing the social reality, largely made of relations among social actors. The theory of individuation allows us to reconcile social structures and subsystems with social processes, which is a conceptual core of the Living Cognitive Society:

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5Section 1.4 in (Weinbaum and Veitas, 2014, p. 6).
6The entropic brain hypothesis by Carhart-Harris et al. (2014), showing that the entropy of brain activity is associated with mental states, supports this observation.
7Refer to Section 2.1 in (Weinbaum and Veitas, 2014, p. 13) for a brief philosophical introduction.
The relation is not an accidental feature that emerges after the fact to give the substance a new determination. On the contrary: no substance can exist or acquire determinate properties without relations to other substances and to a specific milieu. To exist is to be connected. This philosophical proposition allows Simondon to establish the scope of his project: to reconcile being (l'être) and becoming (le devenir) (Pascal Chabot, 2013, p. 77).

Most importantly, Simondon’s theory of individuation, while being an abstract ontological framework, at the same time promotes what can be called ‘concretization’ – the explanation of the emergence of observable and graspable objects and relations in the social or socio-technological reality, as well as the relationships between them. In other words, ‘concretization’ allows us to approach the emergence of order from noise in an abstract way, as well as to apply the concept to the specific system - the Living Cognitive Society.
3.7 Theory of assemblages

The theory of assemblages was introduced by Deleuze and Guattari (1987) and further modified and developed by DeLanda (2006). Our usage of the theory and its concepts is motivated by a number of reasons:

- The theory of assemblages provides an avenue for conceptualization of a generative model of individuation. At its original level of abstraction, the theory could be seen as a direction towards formulating mechanisms of the process of becoming, i.e. emergence of objects, systems and subsystems and their relations from initial noise and disorder.

- Furthermore, DeLanda (ibid.) has developed the theory as a philosophical framework explaining the emergence of scalable social entities such as personal networks, social organizations, markets, cities, nation states, etc. General premises and concepts offered by it are broadly applicable to the study of coalitions of cognitive agents and living systems, especially in cases of heterogeneous and hybrid populations of human and non-human agents (Weinbaum, 2012).

- As will become clear later, we view any entity that can be assigned with a certain degree of autonomy, intentionality and identity as a cognitive agent. We maintain that such a view, partially inspired by Latour (1996), is reasoned and informative with respect to the global information society, especially considering its future developments in the short and medium-term (Veitas and Weinbaum, 2015).

Furthermore, assemblage theory builds on the distinction between relations of interiority and exteriority, which relates closely to the distinction between subject and object in the framework of synthetic cognitive development. It also develops the concepts of territorialization and deterritorialization, which we reformulate as processes of integration and disintegration within the framework of synthetic cognitive development.

One and the same assemblage can have components working to stabilize its identity as well as components forcing it to change or even transforming it into a different assemblage. In fact one and the same component may participate in both processes by exercising different sets of capacities. (DeLanda, 2006, p. 12)

3.7.1 Territorialization and deterritorialization

The notion of interaction between processes of deterritorialization and territorialization originated from Deleuze and Guattari (1983) and Deleuze and Guattari (1987), first in the context of socio-economics of production, and then with relation to the dynamical systems theory and self-organizing material systems. DeLanda (2006) applies the concept when developing the theory of assemblages as one of the dimensions / axes along which the specific assemblage is defined.
This dimension delineates variable processes in which components of a system 
become involved and which either stabilize the identity of an assemblage, by 
increasing its degree of internal homogeneity and sharpness of its boundaries, 
or destabilize it. The former is referred to as a process of territorialization 
and the latter as a process of deterritorialization (DeLanda, 2006). The main 
mechanism of territorialization is the formation of habitual repetition, providing 
the assemblage with a stable identity, while that of deterritorialization is the 
breaking of habits, effectively influencing and changing its identity (Smith and 
Protevi, 2013, p. 34).

3.7.2 Relations of interiority and exteriority

The need to define the concept of relations of interiority and exteriority comes 
from the notion of a scalable system – a multiplicity of recursively nested popu-
lations of heterogeneous assemblages which themselves consist of populations of 
yet lower level elements. Relations of interiority are defined as relations between 
lower-scale elements within the boundaries of an assemblage. Relations of exte-
riority are relations among elements across the boundaries of an assemblage – 
i.e. with the elements of other assemblages in a population.

From the perspective of synthetic cognitive development, the distinction 
between relations of interiority and exteriority is fluid, because, due to the pro-
cesses of integration (territorialization) and disintegration (deterritorialization) 
the boundaries of assemblages are ever-changing:

  Already at the level of physical beings, [...] interiority and exteriority 
  are not substantially different; there are not two domains, but a 
  relative distinction; because, insofar as any individual is capable of 
  growth, what was exterior to it can become interior (Combes, 2013, 
  p. 43).

The relation of the theory of assemblages to the framework of synthetic 
cognitive development lies primarily in the conceptual understanding of indi-
viduation and becoming as the interaction among processes of integration and 
disintegration mediated by temporary structures emerging within a cognitive 
system. The actual mechanism of this interaction is unveiled by the concept of 
transduction, which is introduced next.

3.8 Transduction

One of the most significant innovations in Simondon’s theory of individuation is 
the concept of transduction – the abstract mechanism of individuation. Trans-
duction lies at the basis of the process of interaction between structure and 
dynamics of the Living Cognitive Society. For the purposes of this paper we 
single out two important aspects of the concept – metastability and progressive 
determination.  

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8 For in-depth introduction to the concept of transduction please refer to Section 2.4 in (Weinbaum and Veitas, 2014, p. 11) and Section 3.4 in (Weinbaum and Veitas, 2015, p. 11)
3.8.1 Metastability

The ‘classical’ concept of metastability is mostly used to describe a far-from-equilibrium complex system in terms of its movement in a state-space. A metastable system can be seen as having a state-space with many basins of attraction. Most of the time it is ‘being stuck’ in ‘shallow’ attractors which may or may not be the state of system’s least energy. A metastable system can be easily perturbed, in which case it moves over the border of one basin of attraction to another (Figure 3). A classical example of a physical system at a metastable state is water at 0°C temperature. If water is still, it stays in a liquid state (even below the temperature of 0°C), but if it is perturbed by vibration, it collapses into the state of ice.

![Figure 3: ‘Classical’ metastability](image)

What we add to the ‘classical’ understanding of the metastability is the fluidity of the state-space itself, meaning that it can adapt or otherwise become perturbed. The concept of metastability within a fluid state-space provides a concrete notion of what in the theory of individuation is referred to as the pre-individual – a seemingly disordered state from which an identifiable and observable system may emerge.

The extended concept of metastability allows us to see the connection between the theory of individuation and complex adaptive systems. The ‘order out of chaos’ principle can be intuitively grasped by imagining the state space in Figure 3 being ‘shaken’ by an influx of additional perturbations. The energy from the noise increases the probability of a system overcoming the ‘saddle’ configuration and ending up in another basin of attraction. In the case of a fluid state space, the noise does not ‘shake’ the state-space, but rather changes its configuration. An important implication of this difference is that in a fluid state-space we can relate the transformations of a state space configuration to the movement of a system in it, without positing an external source of noise or energy, as is usually done within the framework of classical metastability. This operation is important for understanding the mechanism of progressive determination.
3.8.2 Progressive determination

Perhaps the most important aspect revealed in transduction is the progressive co-determination of structure and operation. Progressive determination can be seen as a chain of transformations where an operation transforms a structure and a structure in turn transforms an operation (Weinbaum and Veitas, 2014, p. 11):

$$S_1 \rightarrow O_1 \rightarrow S_2 \rightarrow O_2 \rightarrow S_3 \rightarrow ... \rightarrow O_n \rightarrow S_{n+1}...$$

- operation $O_i$ is a function which transforms one structure to another: $O_2 = S_i(O_1)$;
- likewise, structure $S_i$ is a function which transforms one operation to another: $O_2 = S_i(O_1)$;
- note that $S_1 \neq S_2$ and $O_1 \neq O_2$ – they are different functions;
- also note that $\rightarrow$ denotes the relations of dependency between the transformations, so that every transformation depends on the full history of previous transformations.\(^9\)

4 Connecting the dots

Let us now summarize our train of thought so far. First, in Section 2 we asked the question of whether our current social structures and, even more importantly, the modes of thinking and making sense of the social reality which guides the creation of these structures, are still valid in an era of ever-accelerating change. Our clear answer is ‘no’. We then ask a question of what kind of social system could thrive in these circumstances. We argue that in order to conceive such a system we first of all have to give up our prevailing modes of thinking about social reality, specifically – the assumption of supremacy of stability and stable structures in it. The concept of the Living Cognitive Society – the social system which we argue can remain resilient and thrive in circumstances of hyper-connectivity, accelerating change and reflexivity – combines influences from theories and conceptual approaches discussed in Section 3.

Drawing from complexity science and the concept of Complex Adaptive Systems (Section 3.1) we argue that in order to be resilient, the Living Cognitive Society has to accommodate an element of disorder – a necessary component of ecology of interactions among heterogeneous social subsystems. This does not mean that there should be no coordination, but rather emphasizes the emergent nature of it. A clear example of such self-organized coordination is to be found in living and cognitive systems (Section 3.2). Processes driving emergence of higher scale systems from the coordinated interaction of heterogeneous elements of a population at a lower scale is the subject of the theory of assemblages.

\(^9\)I.e. it should not be understood as a piping of inputs and outputs through the chain of immutable transformations.
Most importantly, the theory offers a concept of competing integrative and dis-integrative processes (Section 3.7.1) leading to the emergence of higher order dynamics in a social system. We further observe that the non-linear development of cognitive systems happens via stages of integration and disintegration. Therefore, cognitive development can be understood as a special case of formation of assemblages driven by these processes. The concept of Synthetic Cognitive Development generalizes insights from domains of cognitive science and human cognitive development and applies them to the development of social systems (Section 3.5). Assemblages which are being formed in the process of bottom-up self-organization are non other than 'structures' which we observe in a social system. These observable, yet often fuzzy, structures influence further dynamics of self-organization in a system. The philosophical concept of transduction (Section 3.8) provides an avenue for exploring and understanding the mutual dependency between structure and dynamics in the Living Cognitive Society.

Philosophy of individuation by Gilbert Simondon (Section 3.6) serves us as the conceptual glue for integration of aforementioned disciplines and concepts via a carefully constructed ontology where objects, their relationships, structures and processes do not enjoy ontological primacy over one another but individuate via mutual interaction. In order for the individuation of objects, their relationships and structures to take place, the formation of boundaries between agents and environment has to be explained, which is the emphasis of the enactive approach (Section 3.3). The enactive approach treats cognition as the adaptive process of agent-environment interaction. Both the theory of individuation and the enactive approach deal with the abstract question of how observable phenomena get determined from an indeterminate 'fabric of reality'.

These introductions to rich interdisciplinary sources which inspire our thinking barely scratch their surfaces due to limitations of space and scope of the paper. Yet our goal is not to fully describe these theories, but rather provide the substantiation of characteristics of the Living Cognitive Society concept, which we elaborate in the next section.

5 The Living Cognitive Society

The Living Cognitive Society is an ecology of emerging, interacting, integrating and disintegrating cognitive systems at multiple scales (Section 5.1). This vision addresses challenges of the current situation of the global social system (Section 2) and incorporates a novel line of conceptual thinking (Section 3). Namely, it is a conceptual framework for conceiving the integration of social institutions into the flexible, fluid and adaptable global society operating in circumstances of uncertainty and change.

The Living Cognitive Society is described: (1) in terms of its scalable structure – A World of Views (Section 5.1); (2) in terms of its dynamics – the process of Synthetic Cognitive Development (Section 5.2); and (3) in the coupling and interaction of structure and dynamics (Section 5.3).
5.1 Structure: A World of Views

Society is the vast ecology of interactions and communications among agents – more or less fuzzy integrated social assemblages and institutions: nations, states, religious, cultures, companies and governments, factories, academic institutions and families. If we abstract from the concrete examples of social subsystems (i.e. persons, families, etc.) we can start regarding the scalable structure of the social system where interacting generic cognitive agents (i.e. individuals) assemble into cognitive agents at higher scales (i.e. organizations, cities), interactions among which create ecosystems (i.e. markets, communities, nations), which shape global society. In a scalable system, every subsystem can be approached as an element of a heterogeneous population which forms assemblages at a higher scale or, alternatively, itself as an assemblage of a population of elements at a lower scale. The adjacent scales of the system interact among each other.

Figure 4: The structure of global society.

Abstracting further we observe that each social subsystem can be understood as an embodiment of a certain worldview embedded in its own unique social context. A worldview is the integral system of sense-making, incorporating cognitive and behavioural patterns which govern social interactions of a system, embodying the worldview (Section 3.4). For example, individuals have value systems, organizations and companies – by-laws, cities – regulations, states – laws, etc., all of which are expressions of their worldviews.

Social subsystems – embodiments of worldviews – operate as cognitive agents with their own knowledge, competence, values, goals and styles of behaviour. In a social context, a worldview can be embodied as a person, a family, an organization or a company. But actually any social subsystem with diverse levels of technological involvement can be accommodated within this framework (Section 6.2.2). By taking this perspective we enable ourselves to: (1) approach the impact of technological developments to the social systems’ dynamics within the unified conceptual framework; (2) start describing not only interactions at one scale (e.g. persons with persons) but also interactions between scales (e.g.
persons with nation states).\textsuperscript{10}

A social system whose subsystems are abstracted from their specific embodiments, i.e. understood purely in terms of worldviews, is a World of Views – a conceptual construct depicting society as a multiplicity of interacting embodiments of unique, modular and open-ended co-evolving worldviews. The construct of A World of Views was developed as a philosophical framework and first used for describing a futuristic socio-technological system by Veitas and Weinbaum (2015). It emphasizes an ecological view of global society as a super-organism (Heylighen, 2002b), albeit having no single locus of control. Here we apply the construct for the contemporary global society and its near future – related definitions are therefore adapted for this context. For broader conceptual formulations we refer the reader to the original article.

We started this paper by challenging the prevailing approach of looking at social systems, in particular, and dynamic systems, in general, as series of transitions between their identifiable stable states. The alternative approach, named a ‘viscous society’ (Section 2.3) approaches stable structures only as ‘islands of stability’ in an ever-changing social fabric. We can look at the viscous society via the metaphor of photography: a picture is ‘stable’ only because it captures the otherwise moving objects with the help of the short exposure time. Yet it is possible to set a very long exposure and by that make a picture where all fast moving objects (cars, people, sun, stars, etc.) are unseen. In principle it is possible to set a long enough exposure for the picture to be blank – i.e. not to capture any stable objects in it. The metaphor of photography illustrates how greatly context-dependent is the property of stability of any given phenomenon we observe. It also provides an intuition as to why in certain situations (e.g. when a photographer wants to capture the trajectories of planets in the sky instead of the planets themselves) the pre-position of stable objects does not allow to whole picture to be seen. We therefore now turn to analysing the dynamics of social systems without this presumption.

5.2 Dynamics: synthetic cognitive development

5.2.1 Processes of integration and disintegration

Dynamics within the ecology of A World of Views, which structurally describes the Living Cognitive Society, is based on interacting processes of integration and disintegration. These processes are the application of the theory of assemblages and generic processes of territorialization and deterritorialization (Section 3.7.1) to social systems. Here we define these processes in the context of a scalable system, i.e. a system consisting of subsystems which themselves consist of populations of yet another lower scale of ‘sub-sub systems’ in a recursive manner.

Integration is a process which can happen locally or globally in a system and leads to higher levels of coordination among some elements of its population at any scale. Clusters of elements which coordinate more strongly

\textsuperscript{10}This aspect is central for discussion of a scalable system’s dynamics and the concept of metastability (Section 3.8.1).
among themselves than with the rest of the population start forming an assemblage which, after reaching a certain level of internal coordination and resilience, can be identified as a newly formed subsystem with unique characteristics.\footnote{For the formal measures of coordination see also \textit{\cite{weinbaum2015}}, Appendixes A,B. \footnote{For the formal measures of coordination see also \textit{\cite{weinbaum2015}}, Appendixes A,B.}}

\textbf{Disintegration} is obviously the process of the opposite direction from integration: it leads to a lower level of coordination among elements of a given subsystem, ultimately reaching a level when a boundary between elements within the subsystem and elements outside dissipates – i.e. the subsystem disintegrates.

Despite being always present, processes of integration and disintegration are never symmetric: at every given moment either one is stronger, giving rise to the complex dynamics of the living system in an ecology of other living systems. The interplay between the processes of integration and disintegration of variable strength and the importance of this interaction in the growth of the cognitive system is captured by the concept of synthetic cognitive development (\textit{Section 3.5}). Therefore, the maintenance of the interaction of the processes of integration and disintegration in the Living Cognitive System is instrumental for sustaining its resilience and enabling open-ended development.

The lesson of complex adaptive systems is that processes of disintegration (towards fluidity) are as important for the self-organization of the system as processes of integration (towards order). The awareness of such a balance is clearly missing from current approaches to social governance. As we have seen, the elements of the social system are its subsystems – institutions, organizations, companies, businesses, governments, states. Therefore, trying to enforce stability of social institutions – something that we argue is the prevailing paradigm of social governance – makes the global system less ‘alive’ and therefore less adaptable and resilient, especially due to accelerating change, which requires ever-increasing elasticity.
5.2.2 Relations between scales

In a scalable system, every subsystem can be positioned at a focal scale between higher $s+1$ and lower $s-1$ scales (Figure 5). A lower scale consists of a population of elements which integrate to a subsystem at a focal scale; a higher scale consists of a population of subsystems of the focal scale.

The processes of integration and disintegration at a focal scale are driven by interactions at both higher and lower scales. Relations between the focal scale and the higher scale are referred to as relations of exteriority; relations between the focal scale and the lower scale – as relations of interiority (Section 3.7.2). The above extends and elaborates on a well known scheme of ‘upward’ and ‘downward’ causation, which argues that ‘the whole is to some degree constrained by the parts (upward causation), but at the same time the parts are to some degree constrained by the whole (downward causation)’ (Heylighen, 1995; Campbell, 2013). Our extension considers fluid boundaries between scales (i.e. what is considered a ‘whole’ and ‘parts’ in any specific situation) and the influence of the processes of integration and disintegration on them. What it actually means is that the distinction between interiority and exteriority, while of utmost important for the operation of a cognitive agent as an assemblage, itself gets individuated via the process of synthetic cognitive development.

In the context of global society, the scheme depicted in Figure 5 offers a conceptual outlook at how communities, nations and institutions emerge from interactions and relationships of the population of heterogeneous elements and further influence these interactions. It relates to the notion of synthetic cognitive development by referring to the processes which underlie integration and disintegration.
5.3 Interaction between structure and dynamics

In order to arrive at the complete picture of the ecology of the Living Cognitive Society, we have to see how structure (Section 5.1) and dynamics (Section 5.2) inter-operate in a metastable system. We propose to explain this interaction and, most importantly, evolution of the structure-dynamics relations as a special case of progressive determination (Section 3.8.2). We can recall that a metastable system is a system which is permanently in a configuration other than the state of least energy and having a fluid state space. Progressive determination cannot be understood without the concept of metastability, as it describes the very mechanism of fluid transformations of a metastable state space (Section 3.8). Progressive determination of a metastable system is the answer to the question which we asked at the beginning of the article: ‘what kind of social system could be sustained and, furthermore, thrive and develop in circumstances of reflexivity, hyper-connectivity and accelerating change?’.

That is, the concept of transduction (Section 3.8) is applicable for describing the mechanism of the operation of such a social system:

- First, it delineates how in a chain of transformations, every social structure is related to the momentum of immediate change happening in the system. Likewise, every attempt to change the social system should be related to the current configuration of its social fabric.
- Second, it points at the deeply rooted unpredictability of the process, which can lead to an either more or less integrated system.
- The mechanism therefore implies a variety of possible configurations of a system.

The important message is that we cannot expect global society to be resilient and growing by trying to artificially stabilize its structures in the circumstances of all-pervasive accelerating change.

The structure of the Living Cognitive Society is a metastable system applied to a social context and taking into account the mechanisms of interaction among its internal subsystems. Every observable structure in the Living Cognitive Society (nations, institutions, families, communities, persons and their relationships) should be understood as a specific state-space configuration of a metastable system. As such, this observable structure (a) is temporary and unstable, yet nevertheless (b) influences the further transformation and evolution of global society. Furthermore, social institutions, observable in the process of change, can have different and varying levels of internal coordination – i.e. can be more or less integrated depending on their level of cognitive dissonance (Section 2).

Armed with this conceptual model of the Living Cognitive Society we can now describe how Information and Communication Technologies (ICT) change global society in terms of their influence on the process of progressive determination.
6 The disruptive impact of information and communication technologies

6.1 ICT and Distributed Computing

Let us first define the two central concepts used in this section – information communication technology and distributed computing.

Information and Communication Technology (ICT) acts as “an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them”. A complementary yet somewhat more modern term is cyberspace – a communication medium over computer networks, created by ICT. Both terms refer to the same phenomenon, but with a clear difference between the emphasis on technical (ICT) and visionary (cyberspace) aspects.

Distributed computing “arises when one has to solve a problem in terms of distributed entities such that each entity has only a partial knowledge of the many parameters involved in the problem that has to be solved” (Raynal, 2013, p. v). Distributed computing entails not only the multiplicity of distributed interacting processes but also the fact that there is no single overarching process which can centrally integrate or control the interaction of this multiplicity. Therefore, distributed computation embraces uncertainty and non-determinism and offers a computational perspective to complex adaptive systems.

We find the above computational perspective instrumental for describing the processes within the Living Cognitive Society, especially with relation to Information and Communication Technologies. According to this perspective the Living Cognitive Society is a distributed system consisting of a multiplicity of processes of progressive determination, modelled following the principles of distributed computing. Note, however, that while we borrow terms and concepts from computer science, we do not use them in a strict formal sense. We rather use the concept of distributed computation as a ‘lens for looking to the world’ (Moore and Mertens, 2011, p. xv) in order to show how seemingly simple technical processes enabled by ICT can influence and disrupt the dynamics of the ecology of global society in terms of the impact on its structures (Section 6.2.2) and communication processes (Section 6.2.1).

6.2 The mechanisms of disruption

The disruptive impact of ICT on global society happens via the cumulative effect of three mechanisms: (1) accelerating interaction among the embodiments of worldviews in the Living Cognitive Society, (2) multiplication and diversification of worldviews and their embodiments, and (3) empowerment – the
increasing social power of individuals. These mechanisms are reflexively inter-related: accelerating interaction stimulates the development of social subsystems and catalyzes higher diversity, while diversity of embodiments within the same medium brings about higher volumes of communication and interaction. Empowerment of individuals is positively influenced by the increasing fluidity of the global social system and at the same time contributes to it. Each mechanism – interaction, diversity or empowerment – taken separately, characterizes a long-standing tendency of socio-technological development of human society which is not directly related to information and communication technologies as they are currently understood. Yet, ICT contributes to the amplification of all three mechanisms. Most importantly, it greatly facilitates a positive feedback among them – the actual determinant of the disruption. Let us take a closer look at each mechanism, considering their reflexive relations.

6.2.1 Interactivity

Dynamic interactions among social subsystems are triggered by factors of social complexity – reflexivity, hyper-connectivity and accelerating change (Section 2.1) – which cause an explosion of the amount of information flow within the system. ICT enables, facilitates and supports this explosive multiplication of information flow being exchanged among participants of the system. Yet while the total amount of information in the system grows, the ability of a single subsystem to process even a fraction of this flow (note, that processing of information most importantly includes selection for relevance) decreases. This phenomenon is called information overload.\footnote{It usually refers to human limits of information processing (Heylighen, 2002a), but can be extended to any generic cognitive agent – i.e. every system has certain limits of information processing. We therefore can apply the concept also for understanding the dynamics of hybrid populations of humans and technological artefacts.} Due to it, any subsystem (individual, family, company and/or country) is able to select for relevance and process an increasingly minuscule fraction of the information available about the events happening within the whole society. Therefore, the global system becomes increasingly less graspable and predictable from the perspective of any subsystem. In order to successfully operate in such environment, participants – social subsystems – have to increasingly rely on the immediately available external information.

ICT offers exactly that. Consider, for example, smart-phone usage for travelling in a city. Before internet based navigation technology became widespread (e.g. GoogleMaps; AppleMaps; OpenStreetMaps), people memorized their route trajectories, and used printed maps. Note, that consulting a map application on a smart-phone is understood here as first of all an act of communication between two social subsystems – a human user and the navigation technology. The technology thus made navigation much more efficient by allowing the user to rely on immediate external information obtained through interaction rather than internal representations of the route prepared in advance. It allowed the user to consider quick changes of plans, transportation means and trajectories.
depending on the context (e.g. changed time of the meeting or delayed flight),
which an is essential aspect of operation in an increasingly fluid environment.

Therefore, the nature of interaction and communication of subsystems be-
comes relatively more important for the dynamics of the global social system
than individual properties, or the behavioural patterns of any single participant,
as well as the feasibility, predictive power or accuracy of any model of the system.
In the Living Cognitive Society, these interactions among subsystems are per-
ceived via the concept of the relations of exteriority (Figure 5), which, together
with relations of interiority, drive both the pace and nature of the cognitive
development of the system. In terms of the Synthetic Cognitive Development
(Figure 2) this means that ICT facilitates both integration and disintegration
processes (Section 3.5). Dynamic interaction between integration and disinte-
gration processes leads to accelerating change in observable stable structures of
global society via the emergence of new subsystems and dissolution of the old
ones up to a point where it makes sense to say that all hierarchical structures
dissipate in favour of an ever-increasing fluidity of the system (Section 2.3).

6.2.2 Diversity

As we have seen, accelerating interaction via processes of integration and dis-
integration brings about the emergence of more diverse embodiments of world-
views in the ecology of the Living Cognitive Society. Apart from facilitating
the existing channels of communication, ICT also enables social subsystems –
the embodiments of the worldviews – to develop new ways of interaction within
the same ecology. There is virtually no limit to the number of social identities
and assemblages that can operate in a social system. We have already discussed
how families, companies, institutions and states can be approached as social
subsystems of various scales. The following examples illustrate different forms
of social subsystems starting with the pre-Internet era, where ICT had little
importance, and finishing with the ones for which cyberspace is the basis of
existence:

**Dame Agatha Marie Clarissa Christie** was known by two ‘social identi-
ities’: (1) Agatha Christie, who wrote 66 detective novels and 14 short
story collections, and (2) Mary Westmacott who produced six romances;

**Nicolas Bourbaki** - sometimes called “the greatest mathematician who never
existed” - was a group of 20th century mathematicians which published a
series of highly influential books under the collective pseudonym.

**Corporations** are treated as legal personalities – non-human entities which are
created by law with their own rights and responsibilities, not reducible to
persons who are part of them.

**Wikipedia** is a famous example of how a trusted source of information can be
created without trusted individuals involved in producing it, and therefore
can be approached as having distinct ‘social individuality’.
Satoshi Nakamoto is a person or group of people who created the Bitcoin protocol and reference software which started the ‘blockchain boom’ with potentially wide disruptive results for the whole Internet ecosystem (Swan, 2015). The ‘actual’ identity of Satoshi Nakamoto is unknown – therefore it is a nice example of a social identity completely decoupled from the physical embodiment.

Decentralized Autonomous Organization (DAO) is a futuristic concept of an organization operating at an intersection of cyberspace and social reality. It is defined as a decentralized network of narrow-AI-type autonomous agents which performs an output-maximizing production function and which divides its labour into (a) computationally intractable tasks (which it can motivate humans to do) and (b) tasks which it performs itself (Babbitt, 2014). DAOs may play the role of business entities as well as non-governmental organizations without human management or even human involvement.

All the above are single and integrated social identities which in the framework of the Living Cognitive Society are subsystems of the same ontological status, i.e. they are all embodiments of unique worldviews.

Cyberspace, as a digital medium, enables the easy creation of joint or multiple identities not unlike the examples given above. We therefore increasingly start to see social subsystems with the variable ratio of human/technology involvement. Along these lines, the radical dissipation of the difference between sociological and technological and the birth of socio-technological can be best illustrated by the emerging concept and technology of a decentralized autonomous organization. Therefore, individuals or groups of people operating under pseudonyms, legal corporations, crowdsourcing projects, synthetic identities and DAOs can be approached within the same framework of Living Cognitive Society as social subsystems embodying diverse worldviews. ICT, being an enabler, allows the embodiment and multiplication of worldviews, which would be impossible without it.

Whether or not the dissipation of the difference between sociological and technological reaches its radical levels, the influence of information and communication technologies on the global social system is profound in terms of increasing the number of subsystems within it and fostering meaningful communications among them. These effects will continue to increase the ‘birth’ and ‘death’ rates of institutions, companies, states, communities, families, individual social identities, etc., facilitating faster and larger data flows, communication and interaction, inducing the higher fluidity of the Living Cognitive Society.

6.2.3 Empowerment

Technology in general and information and communication technology in particular, despite the immense possibilities it brings, is ‘only’ an enabler of different

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13 The name of the concept has not yet stabilized, therefore it is also sometimes called fully automated business entity or distributed autonomous corporation/company.
embodiments of worldviews and an amplifier of their interactions. Therefore, while the development of a World of Views and the way it will affect social life will be greatly enhanced and enabled by ICT, the direction of the disruption will be determined by the “modes of the social inscription” of these technologies (Zizek, 2013).  

A ‘real life’ example of such possibilities could best be seen in the ‘case’ of the National Security Agency vs. E. Snowden (Poitras, 2015) which illustrates a collision of two opposing social functions realized by the same technology: the first seeking total surveillance and control; the other – freedom and diversity of expression. In the vocabulary of the Living Cognitive System, this is an example of opposite worldviews embodied in the same technology. While particularities of embodiment are important, the direction of interaction is very much determined by the worldviews themselves.

The case of ‘NSA vs. Snowden’, as well as ‘U.S. vs. WikiLeaks’, illustrates another important aspect of the future global society – the greatly increased capacities of individuals. A few years ago it would have been unimaginable for one person or small group of individuals to ‘throw down the gauntlet’ to a powerful state agency. Empowerment of individuals has profound systemic effects adding to the factors of social complexity - by enabling persons or small groups to engage in activities which can disrupt the whole global system.

7 Governing the fluid society

As we have seen, social subsystems are embodiments of worldviews which guide sense-making processes and, at the same time, are shaped by them (Section 3.4). The dynamics of the Living Cognitive Society is driven by these interacting worldviews via their embodiments. This is the central corollary of our conceptual framework, which can by applied to the issue of governance of ecology of the Living Cognitive Society (Section 7.2).

7.1 Fluid society - A ‘digital’ World of Views

The Living Cognitive Society will have a fluid identity (or rather it will be a fluid process) emerged from an ecology of interacting diverse embodiments of multiple worldviews. This fluid identity will reflexively shape the underlying worldviews of its constituting elements and subsystems.

We draw a clear parallel between Living Cognitive Society and the perspective of the cognitive system as an ecology of interacting parts, components, agents or thoughts (Bateson, 2002; Minsky, 1988; Dennett, 1993). The same perspective can be applied to society, individual humans, or any social subsystem as a cognitive agent. No matter which social subsystem we consider, it embodies certain perspectives of the environment that surrounds it – in other words, it ‘has’ a worldview. As ICT enables embodiment of images and worldviews

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14 For the philosophical / psychoanalytical speculations of the possible modes of social inscription, see (Zizek, 2004).
of humans and their groups with different degree of technology participation, we may see an explosion of diversity of interacting identities – digital, physical, ‘natural’, ‘artificial’ and otherwise – within the ecology of global society. This ecology and its dynamics, rather than command-control hierarchies which will increasingly become temporary and ad-hoc, will determine and accelerate the fluidity of the identity of the Living Cognitive Society.

With the concept of the Living Cognitive Society we have provided our answer to the central question of this paper: ‘what kind of social system could be sustained and, furthermore, grow and thrive in circumstances of accelerating change?’ Yet the framework of the Living Cognitive Society raises a further question – is it possible to coordinate or govern such a system and what governance approaches will it require? The elaborate answer to this question is beyond the scope of this work, yet the governance of the Living Cognitive Society is essential to the concept, and therefore the paper would be incomplete without touching major aspects of it.

7.2 Distributed Social Governance

The current hierarchical order of global society is often referred to as ‘global governance’ (Beauchamp, 2015) or ‘post World War II’ structures of governance. At the core, this order amounts to the complicated, yet highly hierarchically ordered network of governance institutions at local, national and supranational levels. The ideal system of global governance, following the prevailing perspective, is a command and control hierarchy with a supranational institution (e.g. the United Nations, or a ‘World Government’) at its top. Yet there is a clear perception that the ‘post World War II’ structures are failing. The response to the perceived risk of ‘fraying global governance structures’ usually amounts to ‘building better structures’ or ‘strengthening democratic institutions’ (U.S. Department of State and U.S. Agency for International Development, 2015), following the same paradigm of global governance in terms of sustaining a command and control hierarchy.

What we propose with the images of A World of Views and the Living Cognitive Society is the shift of emphasis from the structures and institutions to the very process of creation, adaptation and dissolution of social subsystems at all scales of the global society. Furthermore, the naturally distributed nature of the process – meaning the absence of central body or ‘trusted party’ governing it – should be embraced, rather than fought with establishing global institutions or ‘world governments’ since, we maintain, no stable structure is able to outweigh the factors of social complexity driving society towards increasing fluidity. It is difficult to imagine such a system, which we call a ‘distributed social governance’, but the latest developments in the ICT, especially Internet technologies, may provide important insights and examples of the technological feasibility of this concept.

While developing the concept of the Living Cognitive Society, we have emphasized the ecological nature of the interactions among diverse social subsystems. This notion primarily comes to contrast the prevailing hierarchical
view of social systems and their governance. Such a view is induced by the long-standing metaphor of the hierarchically controlled social organism. While scientific developments have already done away with the rigid mechanistic image of the organism (Heylighen, 2002c), contemporary governance institutions still operate according to this obsolete paradigm. The Living Cognitive Society, in contrast, highlights the distributed and synergistic aspects of the social organism as an ecology, so balancing and complementing the rigid hierarchical view. This bias is well understood, taking into account the prevailing mode of how humans individually and society collectively relate to the world and themselves, but is not justified in terms of the pressing challenges of the current situation of the social system (Section 2).

Therefore, the notion of distributed social governance most importantly relies on the explication of the close affinity of organism and ecology. It propounds an approach to the Living Cognitive Society both in terms of the ecological perspective – addressing the dynamics and fluidity of the system – and organismic perspective – illuminating the emergent coordination from synergistic interactions within it. No matter what kinds of technology will facilitate the future of governance, we believe in a distributed social governance that will be based not on the design of optimal institutions, but rather on the fitting processes which allow for better coordination of the Living Cognitive Society.

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References

Ahmed, E. et al. (2005). “An Overview of Complex Adaptive Systems”. In: eprint arXiv:nlin/0506059.
Babbitt, Dave (2014). Crypto-Economic Design: A Proposed Agent-Based Modeling Effort. English. Conference Talk. University of Notre Dame, Notre Dame, USA.
Bateson, Gregory (2002). Mind and Nature: A Necessary Unity. en. Hampton Press, Incorporated.

15Recent research of microbiome points well to the immediacy of this relationship, suggesting that gut microbiota impact the cognitive function and fundamental behaviour patterns of humans, such as social interaction and stress management (Dinan et al., 2015; Young, 2012).
16http://www.globalbraininstitute.org
17http://is4is.org/
18http://vienna2015.globalbraininstitute.org
Beauchamp, Zack (2015). *The quiet global crisis that scares the State Department*.

Ben-Naim, Arieh (2012). *Entropy and the Second Law: Interpretation and Misinterpretation*. en. World Scientific.

Campbell, Donald T (2013). “Levels of organization, downward causation, and the selection-theory approach to evolutionary epistemology.” In: *Theories of Evolution of Knowing: the T.C. Shneirla Conference Series*. Ed. by Gary Greenberg. Psychology Press.

Carhart-Harris, Robin Lester et al. (2014). “The entropic brain: a theory of conscious states informed by neuroimaging research with psychedelic drugs”. In: *Frontiers in Human Neuroscience* 8, p. 20.

Chan, Serena (2001). “Complex adaptive systems”. In: *ESD. 83 Research Seminar in Engineering Systems*.

Combes, Muriel (2013). *Gilbert Simondon and the Philosophy of the Transindividual*. en. MIT Press.

DeLanda, Manuel (2006). *A New Philosophy of Society: Assemblage Theory and Social Complexity*. en. A&C Black.

Deleuze, Gilles and Félix Guattari (1983). *Anti-Oedipus: Capitalism and Schizophrenia*. Univ Of Minnesota Press.

— (1987). *A Thousand Plateaus: Capitalism and Schizophrenia*. en. University of Minnesota Press.

Dennett, Daniel C. (1993). *Consciousness Explained*. en. Penguin Adult.

Di Paolo, Ezequiel A. Di et al. (2010). “Horizons for the enactive mind: Values, social interaction, and play”. en. In: *Enaction: Toward a New Paradigm for Cognitive Science*. Ed. by John Robert Stewart et al. MIT Press.

Dinan, Timothy G. et al. (2015). “Collective unconscious: How gut microbes shape human behavior”. In: *Journal of Psychiatric Research* 63, pp. 1–9.

Geli-Mann, Murray (1994). “Complex adaptive systems”. In: *Complexity: Metaphors, models and reality*, pp. 17–45.

Harrison, Karey (2013). “Building resilient communities”. In: *M/C Journal* 16.5.

Helbing, Dirk (2013). “Globally networked risks and how to respond”. en. In: *Nature* 497.7447, pp. 51–59.

Heylighen, Francis (1995). “Downward Causation”. In: *Principia Cybernetica Web*. Ed. by F. Heylighen et al. Brussels: Principia Cybernetica.

— (1999). “Change and Information Overload: negative effects”. In: *Principia Cybernetica Web*. Ed. by F. Heylighen et al. Brussels: Principia Cybernetica.

— (2002a). “Complexity and Information Overload in Society: why increasing efficiency leads to decreasing control”. In: *The Information Society*.

— (2002b). “The global brain as a new utopia”. In: *Zukunftstfiguren, Suhrkamp, Frankfurt*.

— (2002c). “The Global Superorganism: an evolutionary-cybernetic model of the emerging network society”. In: *Journal of Social and Evolutionary Systems*.

Heylighen, Francis and others (2001). “The science of self-organization and adaptivity”. In: *The encyclopedia of life support systems* 5.3, pp. 253–280.
Heylighen, Francis et al. (2006). “Complexity and Philosophy”. In: Complexity, Science, and Society. Radcliffe.
Kegan, Robert (1982). The evolving self: problem and process in human development. English. Cambridge, Mass.: Harvard University Press.
Koselleck, Reinhart (2009). “Is there acceleration of history?” In: High-Speed Society - Social Acceleration, Power and Modernity. Ed. by William E. Scheuerman Hartmut Rosa. Pennsylvania State University Press.
Latour, Bruno (1996). Aramis, or the Love of Technology. Harvard University Press.
Luhmann, Niklas (1986). “The autopoiesis of social systems”. In: Sociocybernetic paradoxes, pp. 172–192.
Markley, O. W. and Willis W. Harman, eds. (1981). Changing Images of Man. Pergamon Press.
Maturana, H. R. and Francisco J. Varela (1980). Autopoiesis and Cognition: The Realization of the Living. en. Springer Science & Business Media.
Miller, James G. (1975). “Living systems: The society.” en. In: Behavioral Science 20.6, pp. 366–535.
Minsky, Marvin (1988). Society Of Mind. en. Simon & Schuster.
Moore, Cristopher and Stephan Mertens (2011). The Nature of Computation. Oxford University Press, USA.
Murphy, Gregory (2004). The Big Book of Concepts. English. Cambridge, Mass.: A Bradford Book.
Pascal Chabot Graeme Kirkpatrick, Aliza Krefetz (2013). The Philosophy of Simondon: Between technology and individuation. 0th ed. Bloomsbury Academic.
Piaget, Jean (1971). Genetic Epistemology. English. Trans. by Eleanor Duckworth. New York: W W Norton & Co Inc.
Poitras, Laura (2015). Citizenfour. Documentary. IMDB ID: tt4044364 IMDB Rating: 8.2 (10,966 votes).
Raynal, Michel (2013). Distributed Algorithms for Message-Passing Systems. en. Springer Science & Business Media.
Smith, Daniel and John Protevi (2013). “[Gilles] {Deleuze}”. In: The Stanford Encyclopedia of Philosophy. Ed. by Edward N. Zalta. Spring 2013.
Stewart, John et al., eds. (2010). Enaction: Toward a New Paradigm for Cognitive Science. English. Reprint edition. A Bradford Book.
Swan, Melanie (2015). Blockchain: Blueprint for a New Economy. English. 1 edition. O’Reilly Media.
The "Five Graces Group” et al. (2009). “Language Is a Complex Adaptive System: Position Paper”. In: Language Learning 59, pp. 1–26.
U.S. Department of State and U.S. Agency for International Development (2015). Enduring Leadership in A Dynamic World, p. 90.
Veitas, Viktoras and David Weinbaum (2015). “A World of Views”. In: The End of the Beginning: Life, Society and Economy on the Brink of the Singularity. Ed. by Ben Goertzel and Ted Goertzel. Accepted for publication.
Vidal, Clément (2008). What is a worldview? Published in Dutch.
Vidal, Clément and Steven J. Dick (2014). *The Beginning and the End: The Meaning of Life in a Cosmological Perspective*. English. 2014 edition. Springer.

WEF (2013). *Perspectives on a Hyperconnected World: Insights from the Science of Complexity*. English. WEF’s Global Agenda Council Report. World Economic Forum.

Weinbaum, D. R. (2012). *A Framework for Scalable Cognition: Propagation of challenges, towards the implementation of Global Brain models*. English. GBI Working paper 2012-12. Global Brain Institute.

Weinbaum, David and Viktoras Veitas (2014). “Synthetic Cognitive Development: where intelligence comes from”. In: *ArXiv preprint arXiv:1411.0159*.

— (2015). “Open Ended Intelligence: The individuation of Intelligent Agents”. In: *ArXiv preprint arXiv:1411.0159*.

Young, Emma (2012). “Gut instincts: The secrets of your second brain”. In: *New Scientist* 216.2895, pp. 38–42.

Zizek, Slavoj (2004). “What can psychoanalysis tell us about cyberspace?” In: *The Psychoanalytic Review* 91.6, pp. 801–830.

— (2013). *Less Than Nothing: Hegel And The Shadow Of Dialectical Materialism*. English. Reprint edition. London, U.K.: Verso.