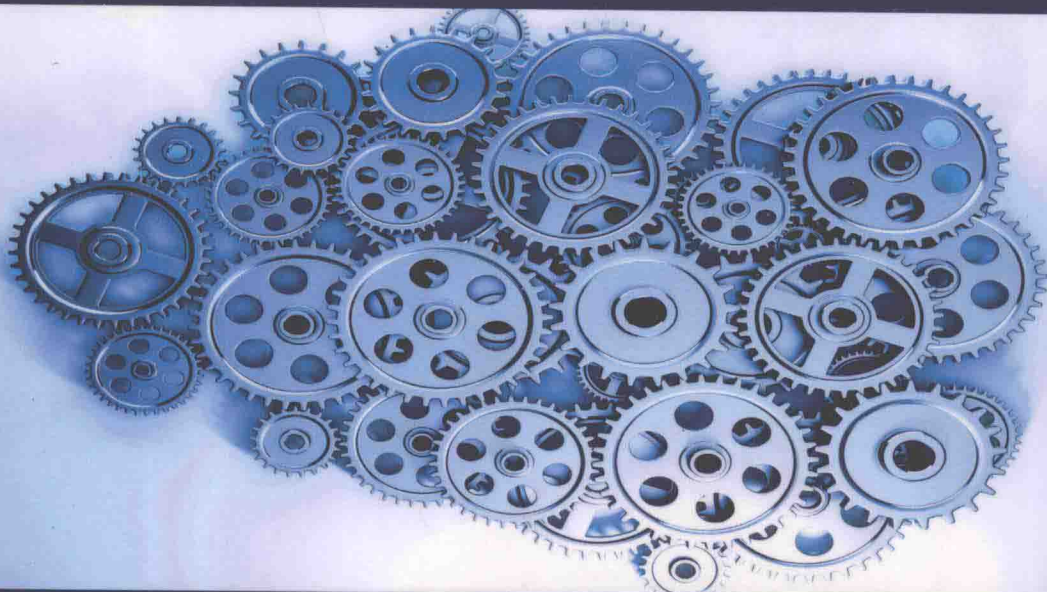


INFORMATION SYSTEMS, WEB AND PERVASIVE COMPUTING SERIES

INTELLECTUAL TECHNOLOGIES SET



**Volume 2**

# **Transformation of Collective Intelligences**

*Perspective of Transhumanism*

**Jean-Max Noyer**

**ISTE**

**WILEY**

Intellectual Technologies Set

coordinated by

Jean-Max Noyer and Maryse Carmes

Volume 2

---

# Transformation of Collective Intelligences

---

*Perspective of Transhumanism*

Jean-Max Noyer

ISTE

WILEY

First published 2016 in Great Britain and the United States by ISTE Ltd and John Wiley & Sons, Inc.

Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the publishers, or in the case of reprographic reproduction in accordance with the terms and licenses issued by the CLA. Enquiries concerning reproduction outside these terms should be sent to the publishers at the undermentioned address:

ISTE Ltd  
27-37 St George's Road  
London SW19 4EU  
UK

[www.iste.co.uk](http://www.iste.co.uk)

John Wiley & Sons, Inc.  
111 River Street  
Hoboken, NJ 07030  
USA

[www.wiley.com](http://www.wiley.com)

© ISTE Ltd 2016

The rights of Jean-Max Noyer to be identified as the author of this work have been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

Library of Congress Control Number: 2016950829

---

British Library Cataloguing-in-Publication Data  
A CIP record for this book is available from the British Library  
ISBN 978-1-84821-910-6

---

---

## Introduction

---

### Collective intelligences in the perspective of trans- and posthumanism

The modes of production of knowledge and intelligibility are undergoing a great transformation. Collective assemblages of thought and research are deeply affected by what we call the “digital folding of the world”, in concordance with the converging NBIC<sup>1</sup> technologies. The very aims of these assemblages are controversial issues that question the performative becomings of science and technique in general. In particular, issues emerge that increasingly fuel debates about a subject that has several names: “transhumanism, posthumanism or speculative posthumanism”. Transhumanism comes as a Great Narrative, the master story of our future becomings as we enter an era defined by humanity making the world become increasingly artificial: the Anthropocene. Furthermore, transhumanism presents itself as a tangible utopia, the harbinger of a major anthropotechnical bifurcation. In this, the transhumanist subject inscribes itself precisely in the tradition of those who once attempted to imagine the “cerebralization” of the world.

In this book, we will therefore attempt to show how collective intelligences stand “right in the heart” of the coupling of, on the one hand, ontological horizons and, on the other hand, processes of biotechnical maturation.

---

<sup>1</sup> NBIC: Acronym for the multidisciplinary scientific field that combines the fields of research of Nanotechnology, Biotechnology, Information technology and Cognitive science.

New types of memory, renewal of analogical thought, powerful associationism, irresistible rise of algorithmics, distributed cognition, novel cartographic practices and relational encyclopedism are phenomena that manifest the transformation under way. What we call “nugget encyclopedism” is the open set made of “the community of works (texts, objects, hybrids, etc.) considered as an incompleteness in process of production”. This is the great system of internal relations that constitute collective enunciation assemblages, the collective equipment of subjectivation that define the community, the vast texture of digital writings, objects and generalized algorithmics. Altogether, this is the huge Precambrian cauldron of Data, Metadata and Linked Data... a cauldron that enables its own folding. Producing new collective intelligences to be boiled in this cauldron and finding a new cauldron for the intelligences to come are the two issues we aim to address in this book, which is divided into three chapters. We first of all describe in Chapter 1 the most salient characteristics of the transformations currently taking place. These characteristics are mostly determined by the digital folding of the word, expressing the extension of the assemblages of intelligences and we detail how they differentiate and articulate from and with each other. In Chapter 2, an attempt has been made at summarizing trans- and posthumanist narratives, strictly abiding by their modes of enunciation. It also puts them in the perspective of the history of the cerebralization of the human species and sheds light on the symptoms these enunciations reveal. Lastly, in Chapter 3, we investigate the question of what encyclopedism is today underlining several issues it faces as well as some of its concrete modes of embodiment. The main writing apparatuses that affect the conditions of production and circulation of knowledge are thus analyzed.

---

# Contents

---

<b>Introduction . . . . .</b>	<b>ix</b>
<b>Chapter 1. Elements of the General Configuration and Adaptive Landscape of Collective Intelligences . . . . .</b>	<b>1</b>
1.1. The intertwined narratives of tangible utopias and brilliant futures . . . . .	1
1.2. Intelligence is “always already collective and machined” . . . . .	5
1.3. Collective intelligences in the weaving of data . . . . .	9
1.4. Semiotics and statistics . . . . .	13
1.5. Data cities and human becomings: the new milieus of intelligence . . . . .	17
1.5.1. Open Data (OD): a heterogeneous movement, the contribution to novel forms of knowledge in question . . . . .	22
1.6. Coupling OD/big data/data mining . . . . .	32
1.7. The semantic web as intellectual technology . . . . .	34
1.8. Toward understanding onto-ethologies . . . . .	42
1.9. Marketing intelligences: data and graphs in the heat of passions . . . . .	50
1.10. Personal data: private property as an open and unstable process . . . . .	59
1.11. The figures of the network . . . . .	64
1.12. Machinic interfaces: social subjection and enslavement. . . . .	67
1.13. Collective intelligences and anthropological concerns. . . . .	70
1.14. Toward a new encyclopedic state: first overview. . . . .	74
1.15. Controversies and boundaries . . . . .	78

1.16. The milieus of intelligence and knowledge . . . . .	84
1.17. Which criteria for writings? . . . . .	86
1.18. Collective intelligences of usage and doxic collective intelligences: the status of short forms . . . . .	90
1.19. Collective intelligences, self-organization, “swarm” intelligences . . . . .	92
1.20. Short forms, relinkage, relaunching. . . . .	99
1.21. Insomniac commentary as a catastrophic correction of short forms. . . . .	100
1.22. Twitter as a Markovian Territory: a few remarks. . . . .	103
<b>Chapter 2. Post- and Transhumanist Horizons . . . . .</b>	<b>107</b>
2.1. Some bioanthropotechnical transformations . . . . .	107
2.2. What to do with our brain? . . . . .	113
2.3. About transhumanism and speculative posthumanism . . . . .	122
2.4. Epigenetic and epiphylogenetic plasticity . . . . .	125
2.5. Speculative uncertainties . . . . .	127
2.6. Trans- and posthumanism as they present themselves. . . . .	152
<b>Chapter 3. Fragmented Encyclopedism . . . . .</b>	<b>169</b>
3.1. Collective intelligences and the encyclopedic problem . . . . .	169
3.2. The political utopia in store . . . . .	170
3.3. Encyclopedism and digital publishing modes. . . . .	174
3.4. A new documentary process . . . . .	176
3.5. Fragmented encyclopedism: education/interfaces . . . . .	190
3.6. Encyclopedism and correlations. . . . .	192
3.6.1. “Correlation is enough”: the Anderson controversy, and the J. Gray paradigm and their limits . . . . .	192
3.7. “Perplication” in knowledge. . . . .	198
3.7.1. Doxic tension in fragmented encyclopedism and format accordingly . . . . .	198
3.8. Networks of the digital environment . . . . .	199
3.8.1. Variations of speed and slowness at the center of encyclopedic pragmatics. . . . .	200
3.9. Knowledge and thought in fragmented encyclopedism . . . . .	201
3.10. What criteriology for encyclopedic writings? . . . . .	202
3.11. Borders in fragmented encyclopedism: autoimmune disorders and disagreement . . . . .	205
3.12. Fragmented encyclopedism: a habitat for controversies? . . . . .	207

---

3.13. Encyclopedism according to the semantic and sociosemantic web (ontologies and web): mapping(s) and semantic levels . . . . .	209
3.14. From ontologies to “onto-ethologies” and assemblages. . . . .	212
3.15. Fragmented encyclopedism in the digital age: metalanguage and combinatorial . . . . .	214
3.15.1. Encyclopedism and doxic immanence field: the proliferation of short forms. . . . .	216
3.16. From fragmented encyclopedism to gaseous encyclopedism . . . . .	217
<b>Bibliography. . . . .</b>	<b>219</b>
<b>Index . . . . .</b>	<b>233</b>



---

# Elements of the General Configuration and Adaptive Landscape of Collective Intelligences

---

The conditions in which intelligence is applied evolve. All encompassing narratives and anthropological accounts are on the rise, and their discourse envisions a very specific future. Sometimes, they relatively boldly predict that humanity will soon overcome the limits of physiology, medical practice, intelligence or creativity. Sometimes, they find allies in key sectors of scientific or technological research as well as in large sections of the most powerful politico-economical agencies and legitimize the implementation of actual apparatuses that aim to redefine the essence of knowledge and existence to set up new ways of collectively inhabiting the world. This chapter explains why we try to relate these transformations and why we stress the lines of tension they bring about.

## **1.1. The intertwined narratives of tangible utopias and brilliant futures**

Relating these transformations is indeed nowadays unavoidably necessary because of the very transformations globally affecting the ecologies that constitute our associated milieus and of which we are both the expression and the expressed. This renewed effort to address the issue of the collective intelligences is produced in specific conditions that are worth reminding, if not exhaustively, at least through some of its moments and main

characteristics. We will stick to recent history, because we see the decades between the two world wars and the few years that immediately followed WW2 as specifically rich periods of transformations of modes of production and circulation of knowledge, as well as moments of change in the means of semiotic management of societies, organizations and companies.

This period was followed, at the end of the 1950s, by the first massive effects of the process of digitization of the sign, itself the forerunner of what was about to happen, a phenomenon we could call the great disruption. The disruption was caused by this very potent new system of digital, networked writing, whose virtual productions and constant updates increasingly influence and encompass our lives and experiences.

During the 1920s and 1930s, several innovative research projects were carried out, especially in the documentation domain. They epitomized the growing awareness that fundamental issues were becoming prominent concerning document and information management, in societies whose modes of organizing was becoming increasingly complex. These works remind us of the necessity to reflect on the environments of intelligence and on the environments of memory under the constraining weight of complexity and on the constant challenge of always renewed forms of collectives that become increasingly heterogeneous. Vannevar Bush, on his part, developed an interest for the new apparatuses of intelligent access to documents (Memex<sup>1</sup>), showing in his research that accessing issues were somewhat overridden by cognitive navigation practice. Of course, accessing documents involves collecting and classifying them, but only in order to better sort, navigate and associate them. In a nutshell, in order to better exploit and create in an ever-growing indeterminate mass of knowledge and documents whose differentiation keeps increasing.

Many research works were published across the world around this time, that all pushed in the same direction. The Second World War and the fast rise of the American War Machine, with in particular the Manhattan Project Vannevar Bush was in charge of, strikingly exposed the collective dimensions of (applied and fundamental) research as well as the coexistence of heterogeneous processes and evermore sophisticated mediations. This increase in complexity in turn proved to be urgently in need of

---

<sup>1</sup> See <https://en.wikipedia.org/wiki/Memex>.

collective organization and new intellectual technologies in order to augment the cognitive abilities of the human mind. Vannevar Bush himself expressed this call [BUS 45] in his famous 1945 paper “As we may think”<sup>2</sup>, an essay in which he brings to light a number of transformations that affect the modes of production of knowledge. The effects and the posterity of this essay are well known.

To keep a long story short, during the end of the 1950s and the beginning of the 1960s, Carl Robnett Licklider<sup>3</sup> [LIC 58], initially working as a psychoacoustics specialist, promptly imagined the possibility of connecting several computers together with user-friendly interfaces. Licklider therefore played a significant role in the design, financing and management of the research that led to the elaboration of personal computers and the Internet. In *Man-Computer Symbiosis*, he wrote: “Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. The main aims are (1) to let computers facilitate formulative thinking as they now facilitate the solution of formulated problems, and (2) to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs. In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform. Prerequisites for the achievement of the effective, cooperative association include developments in computer time sharing, memory components, memory organization, programming languages, and in input and output equipment”<sup>4</sup>. Douglas

---

2 Vannevar Bush, As we may think, 1945. <http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>

3 [https://en.wikipedia.org/wiki/J.\\_C.\\_R.\\_Licklider](https://en.wikipedia.org/wiki/J._C._R._Licklider).

4 Carl Robnett Licklider, Ire Transactions on Human Factor in Electronic Man-Computer Symbiosis.

Engelbart<sup>5</sup> also inscribed his work in the perspective of collective and augmented intelligence. His invention of the mouse and more generally his work on the computer were nested in the reflection on the collective dimensions of intellectual activities, within the framework of the emerging systems of digital hypertext.

Nelson<sup>6</sup> [NEL 65] invented digital hypertext (20th National Conference of the Association of Computer Machinery). He developed, with the Xanadu project, a system that aimed at enabling each individual to store information and make it accessible to all. "The aim of Xanadu was to build a universal system for hypertext publishing: in other words, a virtual library that could host infinite numbers of documents, in which we could wander freely via hypertext links. The authors would be automatically remunerated by a 'royalty micropayment mechanism'"<sup>7</sup>.

We thus see that the whole process of work began to transform as soon as the Second World War was over, as well as all the modes of production of knowledge, all the organizing types and methods. Far be it from us to immodestly attempt to draw in this book a general history of the concept and notion of collective intelligence. We furthermore would not attempt such a history because we inscribe our reflection in the line of those who think that intelligence "is always-already collective and machined" and that its history is always fundamentally bound to the history of the environments and to the ecologies of the brain-body-(writing-mediation)-world couplings. To keep a long story short, let us only state that we inscribe our work in the continuation of that of Leroi-Gourhan [LER 64], whose research and reflection have been, in recent years, furthered in the powerful works of Stiegler [STI 94] as well as in the ideas

---

5 Douglas Engelbart created the Augmentation Research Center in the Stanford Research Institute, as well as the famous on-line system. [https://en.wikipedia.org/wiki/Douglas\\_Engelbart](https://en.wikipedia.org/wiki/Douglas_Engelbart).

6 "Let me introduce the word 'hypertext' to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper".

7 [https://en.wikipedia.org/wiki/Project\\_Xanadu](https://en.wikipedia.org/wiki/Project_Xanadu), <http://www.xanadu.com.au/ted/>, <http://hypermedia.univ-paris8.fr/jean/fiction/Nelson/Nelson.html>.

expressed by Goody [GOO 77], Lévy [LEV 93], Herrend Schmidt [HER 07] and Latour [LAT 84].

Further back in time, Condorcet during the 18th Century and Durkheim in the 19th Century had already developed ideas about the concept of collective intelligence. Fleck [FLE 05], on his part, insisted during the first half of the 20th Century on the essentially *collective* characteristic of scientific research and proposed, in order to elaborate on this concept, notions such as thought collectives (or thought styles). More recently, Lévy in his 1994 book entitled “L’Intelligence collective” (“The collective Intelligence”) remarked that in the new digital conditions of networked hypertext memories, “collective intelligence (appears as) the project of a varied intelligence, distributed all over, always building synergies and being valued in real time”.

## 1.2. Intelligence is “always already collective and machined”

There is a long history of collective assemblages of intelligence. In only a few millennia, humanity fostered the vast Nile water resource management system, the cities of ancient Greece, Rome and its empire, collective intelligences of the Arab world, the large network of copyist monks, the rise of merchant capitalism and the invention of the printing press, etc. This long tradition of collective intelligences is constitutive of our history.

Assemblages were complex from the very first times. In Sumer, for example, they combined the invention of writing systems, currencies and the State, all these intertwined with a growing urbanization that, although initially relatively slow, was irresistible.

Nowadays, the milieus of intelligence are heterogeneous and the types of writings that constitute them are legions. The couplings “cortex-mediation-world” are intricately woven together. The alliances that unite texts, images and sounds were initially only slowly varying, but have very recently begun to change rapidly. Semiotics and the diverse non-exclusively linguistic writings have very early played a major part and, today more than ever, the empire of artifacts relentlessly brings new differentiations and intensifications of analogical interplays.

Later in this book we will detail how, nowadays, the complication of the world alters the conditions of exercise of intelligence, the conditions of creativity and the cognitive becoming that affect the imitative and analogical regimes, the regimes of “meme”<sup>8</sup> propagation and translation and, once more, the regimes of memory.

As Stiegler writes in his comments about the current vertiginous deepening of non-exclusively linguistic writings, “digital printing allows to 3D print objects that renew, in depth, the question of the artifact, a question that has been constitutive of the epiphylogenic tertiary retention since the beginning of hominization. As a printed object, the most mundane epiphylogenic tertiary retention becomes altogether hypermnestic, transitional and industrial, all the more because RFID chips as well as other tags embedded in objects. The so-called “communicating” objects, endowed with Internet modules (whose generalization the IPV6 protocol would enable) are constitutive of the Internet of Things (IoT) in a hyperreticulation stage in which not only its inhabitants but the whole world itself is double. It becomes the subject of an interpretation grammar throughout, as realized by, for example, by smart cities. For one thing, the digital tertiary retention has forever upset the functional and oppositional divide between production and consumption. But more importantly, the offset of the function of materialization of industrial design toward the tridimensional printers as robotic terminals seems to complete the industrial metamorphosis: it irreversibly condemns the centralist reticulation that spread through the United States and then Europe via the networks of roads, motorways and audiovisual Hertzian broadcasting”.

In this perspective, we seem to be advancing toward complex “cognitive onto-ethologies”, according to the scales considered. This movement involves the possibility of combinatorics and appropriate semiotic grammars that should enable wider navigations than in the past. This point will be developed further in what follows. One finds so many phrases that invoke

---

8 Memetics: introduced by Richard Dawkins in 1976 by his book *The Selfish Gene*.

Also see: Francis Heylighen Proc. 15th Int. Congress on Cybernetics, Namur, 1999, What makes a meme successful? Selection criteria for cultural evolution,

Liane Gabora, *A DAY IN THE LIFE OF A MEME* 1996,

Susan Blackmore, *The Meme Machine*, Oxford University Press, 2000.

this trend that their repetition sometimes induces a sense of running gag: Smart Cities, Smart Agriculture, Smart Grids, Smart Factories, Smart Buildings, Smart Interfaces, Smart Algorithms, Smart Medicine, etc. The “associated milieu”<sup>9</sup> to which our cerebralities are bound keeps extending itself. What is called the IoT is central to this extension. From the IoT to the hybrid becomings of the Living, a hypernetwork of  $n$  dimensions is being deployed, a kind of network shaped by the multiplicity of connections and interfaces that come with or between artifacts, actants (be they organic, non-organic, algorithmic) and writings. A network that relies on operating concepts (linked data, metadata, ontologies, folksonomies)<sup>10</sup>, a network that connects billions of human beings as well as billions of things and documents in “clusters” of infinitely varying sizes that can legitimately and concretely be connected in a plastic and open way. This is an emerging anthropological stratum embroidered of an additional synaptic world that seeps in everywhere, weaving into the texture of the world, weaving against it, tightly adhering to the global fabric. This ever-expanding weaving of links and data are therefore complicated by the interweaving of being and things and beings and objects.

These new textures, as we briefly mentioned, are deeply involved in the continuous urbanization movement. More generally, they are at the heart of the transformations that redefine our associated milieus, the ways we inhabit them, the ways we travel across them, we think them, we live them, all the way to the deepest roots of our ways of life according to new or soon-to-be physiological–biological–cerebral conditions. These textures are therefore deeply affected.

---

9 G. Simondon defines the technical individual endowed with an “*associated milieu*” through the functioning of the machine that contributes to the production of his milieu, thus making his functioning possible.

Ars Industrialis (<http://arsindustrialis.org/>) borrows from G. Simondon the concept of “associated milieu” to analyze the collective individuation that constitutes any human society, in a way that binds the history of human individuation to the history of technical individuation. A techno-symbolic milieu is associated with you if it is the medium and vector of your individuation, which is itself only possible because this milieu associates individuals. On the contrary, a milieu is dissociated if it does not help your individuation, if you do not contribute to your milieu.

10 <http://www.w3.org/Metadata/Activity.html>, <https://www.w3.org/standards/semanticweb/data>.

The movement of artificialization, a concrete expression of the interweaving of texture, is unprecedented and the convergence of NBIC<sup>11</sup> is very powerful. We must live through this evolution with renewed creativity in order to ensure a new stability of our lives in such uncertain ecologies. At the end of the day, it is the very survival of our species that is at stake.

The works and concerns of current and future religions, although we may have no knowledge of them yet, are also constrained by this transformation and by new types of productivity<sup>12</sup>. Among the narratives to come, and although it might be difficult to precisely perceive its borders, part of what we usually agree to call “speculative fiction” seems relevant in exploring the forces and hybrid forms in which the most archaic is mixed with the most futuristic, and narratives of immanence are intertwined with narratives of the great outside.

The emergence of such global assemblages of collective intelligences and the milieu for new forms of reflexivity to develop is central to these processes and the pluralism of writings, semiotics and hitherto unseen narratives, which are more than ever situated as a hub in the powers of algorithmic becomings.

The scales at which cognitive ecologies and the socius do transform are numerous and intertwined. The “problematic” need for new black boxes is pressing. We need to be able to inhabit this, especially because it does not go

---

11 NBIC: Nanotechnology, Biotechnology, Information technology and Cognitive science (NBIC) refers to a multidisciplinary scientific field that combines the domains of nanotechnologies (N), biotechnologies (B), information technologies and artificial intelligence (I) and cognitive sciences (C).

12 For example, see “LAUDATO SI”, the encyclical Pope Francis about the *care for Our Common Home* “We are not God. The earth was here before us and it has been given to us. This allows us to respond to the charge that Judaeo-Christian thinking, on the basis of the Genesis account which grants man “dominion” over the earth (cf. *Gen* 1:28), has encouraged the unbridled exploitation of nature by painting him as domineering and destructive by nature. This is not a correct interpretation of the Bible as understood by the Church.” “The biblical texts are to be read in their context, with an appropriate hermeneutic, recognizing that they tell us to “till and keep” the garden of the world (cf. *Gen* 2:15). “Tilling” refers to cultivating, ploughing or working, while “keeping” means caring, protecting, overseeing and preserving. This implies a relationship of mutual responsibility between human beings and nature”.



without challenging the conditions of collective living. The big data movement, coupled in an essential manner to the IoT<sup>13</sup>, is also linked to the sometimes worrisome will to permanently control strategic and political dimensions. It is tightly related to all that sets new conditions for the governance of populations. It strongly echoes the becoming of performative societies that is characterized, at least partly, by the triumph of means and procedures, a “constructal” perspective that invariably raises major anthropological issues. Its complex marriage with the trans- and posthumanist trends therefore needs to be reflected upon. We will come back to this later on.

The IoT also carries political issues that apply to, for example, the fields of hypercontrol and cyber criminality. It deeply alters how individuals, companies and institutions relate, which in turn influences all the domains of co-construction of knowledge, the fields of companies and administration management, including educating technologies. It also affects the modes of production of culture and health. From a sort of “HyperUrban” perspective, the IoT is altering the vast system of internal relations that constitutes our world. This transformation questions forms, arts and new subjectivities and places these issues in a key position, influencing even the still-in-limbo digital immersive becomings.

The IoT is central to all the modern technological developments whereby any object, any living being, any plant or mineral (with its associated data) can instantly be related with any other, through unprecedented semiotic elaborations and through the proliferation of interfaces and their software applications (smartphones, tablet computers, captures, CCTV cameras, etc.). Meanwhile, the consumerist vertigo finds therein new raw material to explore and exploit.

### 1.3. Collective intelligences in the weaving of data

Collective intelligences carve their essence under the aura of a proliferating new species, the “Data”. Simultaneously, they are immersed in the intensification of both inherited political economies and the emergence

---

13 [https://en.wikipedia.org/wiki/Internet\\_of\\_things](https://en.wikipedia.org/wiki/Internet_of_things).