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Knowledge Engineering or Digital Humanities?

Territorial Intelligence, a Case in Point

Francis Rousseaux, Pierre Saurel and Jean Petit¹

1 Introduction to Digital Humanities

Compared to Classical information Systems, Knowledge-Based Systems are much more dependent on paradigm shifts (Kuhn 1983) that shape their fields of application. Fields of application modify the types of data integrated into the information system, but also relations between data and thus the structure and shape of the databases. More radically these fields may need a representation inconsistent or less compatible with the usual computerized centralized representations of knowledge.

When an intervention in the field of culture and the Humanities – literature, history, geography, philosophy, politics, theology, music, visual and graphic art – is at stake, it now seems (Meunier 2012) that digitalization and computation have an impact on the humanities, that culture impacts Computer Science, with the computational field opening onto the cultural, and the humanities opening onto the computational field. This is what can be called the modern-day notion of digital humanities, which more and more researchers and application designers are considering, especially when they work on e-Learning or Serious Games. At least two modes of knowledge representation confront each other – that of knowledge transmission on the one hand and that usually linked to digital knowledge representation on the other hand.

This phenomenon sheds light on the strategic position of the Chinese Academy of Science, unveiled by one of its prominent members (Wang 2009) when he states: “Although the answers to the computational dimensions of culture are not clear, we must foresee them because we simply cannot afford not to see their consequences [...] I am hopeful and optimistic, and believe this could be the beginning of a new area in computing that would seamlessly integrate information technology with social sciences in a connected world.”

Researchers David Radouin and Stéphane Vandamme pointed this out not long ago, at a seminar² on the humanities: “From the 19th century, we have inherited a clear cut separation between the Humanities and Sciences, corresponding to a growing specialization and disciplining. The modern-day university system was built on this disciplinary base, while at the same time calling for its trespassing, for the sake of educating complete individuals. How to think such a project today? [...] Do we have to acknowledge the difference between the two different cultures, while trying not to break their unity – as, precisely, forms of cultures – for all that? Is it a matter of reinventing a dialogue between two distinct entities or of questioning the nature of this distinctiveness? Can we, do we have to reactivate ancient forms of connection, or on the contrary, acknowledge a profound evolution in the two terms

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² <http://www.institutdeshumanites.fr/?q=seminaire/seance-du-23-mars-2012>

inviting to new connections? Here are some of the questions that immediately come to mind for those who claim to be interested in the *humanities*.”

As Knowledge Engineering means to serve digital humanities and provide them with innovative applications, it was expected that the methods be put to the test of new connections, even of drastic restructurings. This confrontation is obviously bi-directional, as knowledge engineering and its models change the way humanities see themselves, and humanities, with their specificities and cognitive capacity, widen the scope and modes of representation in Knowledge Engineering and drive the classic digital modes of representation into a corner and eventuality to some of their limits.

This chapter focuses on the case of land planning which encompasses geography, town planning, anthropology, and political sciences, and which raises new questions to the engineering of territorial knowledge, prone to make both this key field of artificial intelligence and our own vision of the configuration of territories evolve in today’s digital world.

1.1 Knowledge Engineering Applied to Territories

According to André Corboz, the broadest and most general definition of a territory (Corboz et al. 2009) “[...] is a space socially constructed in a given time and place, by a given society. Space, place, society: three useful terms, but yet unstable terms that have to be discussed one after the other. Nevertheless I cannot but notice that this definition admits a fixed relationship between a specific geographical area on the one hand and a group socially determined which inhabits it on the other hand. There is a one to one correspondence between an area and its occupier – this is not surprising since this definition was conceived in the 19th century, at a time of ardent nationalistic fervor. The two complementary aspects are the border (as a defense against the outside world) and appropriation (of the area thus protected). Or else, to reduce the definition to its minimal form: the territory, in its materiality is an area surrounded by a fence, occupied by a unique and homogeneous society. This definition is not only static, but it is also anachronistic. Our societies are no longer homogeneous, they are multicultural; they comprise groups whose systems of values are really contrasted, even incompatible at times. If that was the case, one would have to admit that there is one territory per group. But the very idea of area does not hold anymore when one tries to think in terms of planning. One has to move on to the notion of network: on the one hand there are networks of directions, frequencies, key hubs, transshipping points, markers, and thresholds; these are long distance highways and airports. But on the other hand there is also a network as far as decision-making structures are concerned: [...] the decisions to intervene are taken away from the places where the intervention is to take place, and sometimes very far away from them. There is no perimeter in a network, endpoints at most. The mutation of the territory into a network thus rejects the very notion of a continuous limit which becomes pointless. The network is admittedly a more subtle reality than the territory: it cannot be easily represented nor measured. It is an elastic reality, even if based upon heavy equipment which deeply modifies the backdrop of the territory: [...] the territory is divided and distributed differently, depending on the project. [...] Perceiving the territory as a network enables to feed the imagination on the territory from another angle, from other criteria which introduce the notions of time and flow. Up to now, the territory was a shape and a stretch of land which bore a name; the territory was semanticized; it could be the topic of speeches; it had an internal distribution; it was essentially static. Yet, the network – or rather networks – are also a way of fathoming the same area; a territory cannot exist without an imagination of the territory.”

Almost everything has been said about the recent shift that occurred in our conception of the territory, linked to the need to reconsider the very act of planning these territories. Two dimensions clearly appear here: first the physical space, enclosed or not, and secondly the decision space that does not necessarily overlap the enclosure of the physical space. These two dimensions are not the only ones that potentially structure the territory but the evolution of their separation is enough to induce a shift in the traditional paradigm of land planning.

1.2 Shift in the Traditional Paradigm of Land Planning

Local authorities currently face a brutal shift in the classical paradigm of land planning, the founding principles of their traditional organization and governance. If territories now comprise networks, local

authorities are also part of a worldwide network, so that the discrete values of time and space which used to prevail are fading away to allow a spatiotemporal continuum to step forward. The interactions between the different levels are more and more numerous and more and more frequent making the decisions taken locally and with no impact on other scales less and less effective.

We assume that the profound causes of this shift are to be sought in the advent of the digital in the territories which has drastically changed representations and social uses on the one hand, and in the now strong and steady demand for dialogue and community participation in the decision processes and in territorial policies on the other hand, with a growing will to implement sustainable development. But we have to admit that the second reason is indirectly linked to the first one. Indeed it is the advent of specific digital technologies that makes possible and supports consultation and participation at the different territorial levels. It is now clear that the digital revolution is triggering a radical transformation in local authorities and traditional land planning.

The networks of stakeholders involved in the decision are themselves organized digitally so that the representation of knowledge relating to the territories and the decision has to consider at least three coupled and interdependent information systems: the network of places and their supports and infrastructures, the decision-making network, and the network of stakeholders (particularly citizens) impacted by the decisions.

1.2.1 Internet and Digital Revolution

If the massive advent of digital technology in the territories has led to a shift in the classical approaches and representations used in land planning activities, it is first and foremost because the digital technology floods the territories with data and applications, and as a result they are required to provide coherent and controllable interpretations. While land planning used to be centered on and punctuated by centralized actions, organized in hierarchical institutions under the principle of subsidiarity, and controlled by stabilized representations thanks to multi-year development plans, it is now compelled to become the dynamic arrangement of a territorial continuum whose topological and cartographic granularity ceases to be its main characteristic, and where data proliferate.

Thus, by opening for example virtual interconnected worlds with no apparent territorial roots, digital technology seems to take part in a movement of deterritorialization; but it can also make massive and dazzling reterritorializations possible, as was the case during the Arab Spring in 2011 in Tunisia and in Egypt. Social network users, non-experts in territorial policies, managed to share spontaneous and tactical information via the Web, which from a strategic point of view, eventually helped and played a significant role in the collapse³ of a police state ruling the national territory with an iron fist. Simple actions in the digital world triggered a drastic change in a territory, which was not thought to be possible so suddenly.

Land planning management, thanks to territorial engineering, thus becomes *territorial intelligence*, in the sense of a field of application emerging from knowledge engineering, with its specificities and particularities. It involves territorial information systems – correlating, aggregating and merging data which are often geo-localized – it requires from the co-learning organization to set into place territorial observatories, engages co-inhabitants in collaborative networks, co-develops more and more personalized Web services and coproduces common decisions. In this case as in others in Knowledge Engineering (eLearning, Serious Games), one has to imagine, simulate, model, visualize, control, decide and play to experiment and discuss.

However the decline of radical expansionism, which has given way to sustainable development utopias, increases the questioning as regards the diversity of cultural and anthropological attitudes on the conservation and development of territories.

³ See the Round Table of June, 21, 2011 at the UNESCO Headquarters <http://unesdoc.unesco.org/images/0021/002116/211659f.pdf>

1.2.2 Decline of Radical Expansionism: Promises of Sustainable Development

Sustainable development thus appears like an operational fiction which, no doubt has the great merit of gathering and pooling together dynamic forces, but whose scientific foundations are fragile, no matter the way they are broached. Some researchers indeed underline the ambivalence of sustainable development, such as Lydie Sauv  (Sauv  2009), Canada Chairholder in environmental education, when she states: “ As in any social construction, the concept of sustainable development emerged from a specific historical context, it is rather topical at the moment and lies at the heart of tensions, it has become a thing taken for granted whose genesis has been forgotten; it serves specific interests while appearing as a consensual value. Its promoters assert its heuristic status (it is a path or rather a bridge toward a new world), but at the same time, they mix up this concept with a universal principle and insist on its institutionalization; from a proposal, we move on to a norm, a requirement and from now on it becomes THE path, THE bridge, and eventually it becomes the destination. The concept of sustainable development corresponds to the social construction of a saving project, a life buoy in the midst of the security crisis which is the hallmark of our present societies, but it seems that we mix up means, meaning and purpose.”

The position can even be more radical at times, like the one held by Nicolas Boileau (Boileau 2011), professor at the Ecole Nationale des Ponts et Chauss es in Paris: “We have to abandon the sustainable development dyptic, an ambiguous phrase that has been skewed by facts and turned into a useless slogan, and concentrate the action on worthy and lasting coexistence, by institutionally adopting at all costs a pluralist framework of mutual respects for the different civilizations, worships and customs. It means that we have to consider one’s ability to respect different views as one of the key values in all doctrines, ours included, and to admit that others also contribute to the constraining consultation which is dictated by the global dimension of the issues. Now that the communist adventure has failed with its progressive and conquering scientism, it is time to acknowledge the responsibility of the neo-liberal logic and set up a pluralistic and collective dimension of the planet urgently.”

In any case, we can distinguish at least three distinct approaches to sustainable development, each of them presenting blatant weaknesses:

- A pragmatic sense of sustainable development, widely accepted today, assumes that it is legitimate to act locally while thinking globally, aiming at a globally harmonious conversion and avoiding the trap of local optimization of ancient orders. It is in this very sense that the recommendations emerging from the 1992 Rio Summits and the tools of the Agenda 213 (Agenda 21) are based and implemented by local authorities worldwide. This approach, developed among others by Nobel Prize Winner Elinor Ostrom (Ostrom et al. 2006) has the merit of making populations aware of the challenges, but there is no evidence that it converges toward a global balance, not to mention the fact that it carries a radical anthropological injustice (addressed more fully below).
- A scientific sense of sustainable development implies a reexamination of all the activities which mankind can control directly or indirectly, in order to reverse the huge matrix and minimize their so-called adverse long-term effects. But which detailed and universal criteria should be used? Which exhaustive description of human and non-human activities should be called up? Which specific objectives should be aimed at? It would mean a genuine restructuring of the economy which would grant the advent of a new polymorph and particularly demanding actor: planet Earth, represented among men by some kind of Supreme Court. This approach has a practical sense only at a local level, with no guarantee whatsoever as to the ability of the local combinations to produce a satisfactory global outcome.
- Concerning the idealistic sense, it aims at the possibility of a radical cultural restructuring, which might guide the organization of human activities towards an environmentally friendly and lasting anthropological equity. It is in this trend that we can locate the anthropological research of Philippe Descola (Descola 2005) which shows that naturalism is but an anthropological position among others perfectly identified which he describes, along with Bruno Latour (Latour 2010a, Latour 2010b), as particular universalism. It would imply to include a real diversity in the cultural anthropological positioning. We would thus have the specification of a meaning both critical and

pragmatic for sustainable development, trying to answer the following questions: Which universal values should be chosen to back-up a policy of heritage for natural and cultural goods? How to respect the various ways of being into the world and define customs that could be agreed upon by all its occupiers? Is a relative universalism – and no longer a particular one – possible?

1.2.3 Suspicion as Regards Public Policies: Social Demand for Dialogue and Participation

There is a general consensus among observers to claim that social demand for dialogue and community participation is steadily growing in the territories (Arnstein 1969, Jouvenel 2002, Renard 2009) at a time when suspicion as regards public policies is more and more blatant.

With what success on the ground? When Loïc Blondiaux and Jean-Michel Fourniau undertake to assess researches on public participation in democracies (Blondiaux et al. 2011) – whether they relate to the impact on the decision-making process, the transformation of individuals, the structural and substantial effects of participation, the importance of the conflict, the influence of the positive (Deleuze 1989), the institutionalization of participation and its legal codification, the professionalization of participation or else the redefining of expertise – they observed that “community participation in negotiations and public debates as well as in the expertise and decision process is at the heart of the mutations concerning public action that have occurred in Western democracies over the last decades. An increase in the number of stakeholders taking part in the decision-making process, creation of new spaces for participation more open to ordinary citizens and civil-society associations, consecration on the political and legal level of a participation imperative; all these are among the many elements showing an evolution of our democracies and public modes of action, not only on the local, regional and national level, but also on the international level. Participation has become an issue way beyond the background of Western democracies, reaching countries structured around *authoritarian* decision-making processes. [...] It may be a way of organizing the information, or else the agreement of the population on given projects and policies, or, on the contrary of organizing power sharing as regards deliberation and decision between the governors and the governed. Participation can enhance understanding and agreement or, on the opposite, be a way to express diversity and conflict within a democracy.”

As for the process of mass digitization at work in the territories and elsewhere, we may wonder if it constitutes an incentive to community participation. Does it provide tools for consultation? If participation is indeed a key element of digital culture (Callon et al. 2001, Sgard et al. 2010, Lévy et al. 2009), alternative media derived from it tend to weigh on the failures of the classic representative system, rather than grasp a community voice expressing normative claims thanks to digital tools. Thus, according to Laurence Monnoyer-Smith (Monnoyer-Smith 2011), “The increasingly widespread use of the Internet and of peer to peer practice, the development of social networks, and the creative appropriation of the web cause deep and lasting changes in the relationship between citizens and their representatives and renew the forms of political mediation. However, the expectations expressed by some political scientists for a new era of active involvement that would curb the steady erosion of an electorate staying away from the ballot box and would rejuvenate democratic life have led, for a large part, to disillusion. These expectations were most likely widely based on an erroneous analysis of the causes of communities’ lack of interest, but they also reveal how difficult it is for research to tackle the question of the use of technologies other than in a deterministic perspective, if only to criticize it *in fine*.”

2 Knowledge Engineering for Land Planning: Researchers’ Spontaneous Mobilization

Knowledge Engineering spontaneously rallied the field of spatial management, following Information and Communication Technologies (ICT) which had opened the way to lay the foundations for modern territorial Engineering. Metadata are standardized to encode the content of geo-referenced data that complete the information systems. New field ontologies arise, along with reusable inference patterns, capable of steering territorial engineering to the higher level of knowledge processing. But we are still

a long way away from the paradigm of digital humanities, capable of thinking a participatory intelligence of territorial dynamics and real *ecoumenal* arrangement.

We will show how the taking into account of real cases characterized by new expectations of emerging stakeholders can bring about this change of perception.

2.1 Knowledge Engineering Applied to the Classical Approach of Spatial Management

In a few decades' time, the incredible creativity with which the ICT have broached engineering and then the humanities will probably come as a surprise, prompted by the researchers' and developers' desire to devise new tools for new uses and applications, without always thinking about the strong expectations of future users.

That was the case when the stakeholders of the computerization of our societies decided to provide tools for spatial management. It is only after a first techno-orientated phase led by the pioneers of information systems that a first draft for a more activist approach to territorial intelligence came to life, claiming the hybrid culture of digital humanities.

2.1.1 A Techno-Scientific Approach Urged by the ICT

In the 1980s, local authorities started to express their need for IT tools, whether generic or dedicated to their role as public space developers, and created a niche that appealed first to Information Technology Consulting societies, and later to software package developers. This is how ICT and knowledge engineering, more or less integrated in job-orientated software packages, structured a new business field in a context of computer science development, but still a long way away from the paradigm of digital humanities.

That was the time of the emergence of Geographical Information Systems (GIS) which extended classical data bases to cover territorial data bases, including geo-referenced data. Geographical information systems also incorporated geographical base maps, urban and architectural plans, drawings and photographs. These systems were used by town councils and local authorities to picture their urban heritage and come up with town-planning projects thanks to their ability to support thematic management views and land reattribution simulation.

Knowledge representation and structuring thus appear as relational databases whose stored content may be enriched by their multi-media form.

Very quickly, these systems are endowed with models of geo-localized knowledge representations, electronic chart display systems, maps and pictures, as well as supports for simulation, constraint optimization, and reasoning stemming from artificial intelligence. Such devices help, for instance, in the deploying of a wireless network by using intervisibility calculation functionalities. Such systems, coupled with document management apparatus, also have practical application in economic intelligence or else for decision support in economic and environmental crisis management provided time-based representations are included (Rousseaux 1995). The rapid development of the internet (Web) has increased these systems functionalities, now able to interoperate with information-seeking tools, content-based browsing tools, and web-content searching tools.

The use of these GIS coupled with web-content retrieval and extraction tools to assist correlation, data-aggregation or geo-referenced data fusion operations soon becomes widespread and leads to what might be called a territorial web. Following this, there is an increase in the availability of maps, pictures, geo-referenced plans, so much so that, thanks to the implementation of metadata adapted to cooperative applications, territorialized applications for institutions as well as for private individuals equipped with smart phones are on the rise. There is a boom in the number of data and territorial applications which constantly offer new uses and new services to communities or to individuals, ICT – driven and led by knowledge engineering eager to decipher promising valuation area, whose key-words are: visualization, simulation, decision support, struggle to overcome big data, use of virtual reality and serious games (Daniell et al. 2010), not to mention the Internet of Things and Cloud Computing.

It is only in the early 2000s that the possibility of a digital humanities approach arose in the spatial management careers. That was typically the case with the innovative concept of *Territorial Intelligence*.

2.1.2 Outline of a Paradigmatic Inversion: *Territorial Intelligence* Approach

The concept of Territorial Intelligence is at the crossroads of the concepts of territory, knowledge society, and sustainable development. It ceases to be inherently defined by the technologies it uses. It is explicitly part of the digital humanities, since it is finalized by business activity and citizens' ambitions, and cannot be reduced to the technical tools employed. In Europe for example, the concept was developed by the French teams working on the European project European Network for Territorial Intelligence⁴ (Girardot 2000). Territorial Intelligence means "the body of interdisciplinary knowledge which contributes to the understanding of territorial structures and dynamics on the one hand, and whose aim is to become a tool for the stakeholders of the territories' sustainable development on the other hand." *Ibid*. If the territory is no longer defined as a physical space, we understand that the intelligence is that of the territorial community, a construction of the stakeholders and at the same time a corporate citizen: "by involving both the stakeholders and the territorial community in the pooling of data and in their cooperative use, territorial intelligence improves, through a process at once active, iterative and prospective, their understanding of the territory's structure and dynamics and their collective mastery of territorial development." (Girardot 2004).

The reference to the community is related to the concept of *social capital* which is vital for *community development*, a concept deeply rooted in the Anglo-Saxon world whose aim is to promote local development. According to the World Bank⁵, "social capital is defined as all the conventions and social relations rooted in the structures of society and which enables the members of the community to coordinate their actions so as to reach their goals." But the reference to sustainable development as the key orientation for territorial intelligence also leads to a global approach and to a participatory governance based on the notion of partnership. Sustainable development offers a comprehensive approach taking into account economic, social, environmental and cultural objectives, without being reduced to short term economic and/ or financial aspects. Sustainable development simultaneously promotes the governance' decentralized tendencies and offers participatory and partnership-based methods to implement sustainable development actions.

Politically, sustainable development introduces a plurality of viewpoints and the *constructivist* nature of a common world in the making. As such, community development involves community participation and the partnership of stakeholders, which argues for the use of packages facilitating *seamless* sharing (in the sense of radical seamlessness as a tool for management and cyber-democracy) and *open sharing of data* (in the sense of *open-data*), e-participation and cooperative management of partnership projects. In short, territorial intelligence combines knowledge, action and participation so as to stimulate innovation to advance sustainable development, based on ethical principles which claim to be high.

However, territorial intelligence, as with all social systems, faces the question of which stakeholders matter – and consequently which facts to take into account in the agenda of the reality publicly discussed - on the one hand, and of which packages are suitable to produce collective choices on the other hand. These two obstacles lead to question once again the very notion of territory with its usual focal points linked to the stakeholders' strategies: if expertise, science or so-called proven facts cannot alone help us decide between the different viewpoints inherent to pluralist universes, and if participatory methods of animation alone may not be sufficient to produce agreements and understanding, we may need to adopt mapping tools to follow the territorial arrangements and innovative metrics so as to assess the attachments (Hennion 2010) between the objects that comprise them.

⁴ <http://www.territorial-intelligence.eu>

⁵ World Bank PovertyNet website (<http://web.worldbank.org>), keyword: poverty.

“Territorial intelligence is a way for researchers, stakeholders and territorial community to acquire a better knowledge of the territory, but also to establish better control over its development. The appropriation of information and communication technologies, of data themselves is an essential step so that the stakeholders get into a learning process enabling them to act in a relevant and effective way. Territorial intelligence is especially useful to help territorial stakeholders to project, define, apply and assess the policies and actions for a sustainable territorial development” (Girardot 2000⁶).

Territorial intelligence does not only consider knowledge and information as tools, even when referring to multi-criteria and spatial analytical tools, but as an essential vector of development in a knowledge society. It does not view the territory as a firm or a market, but mainly as an area of cooperation that does not exclude the competitive sector, just like what collective intelligence does: “collective intelligence refers to the results drawn from collaboration and knowledge sharing, and from competition between many individuals... It can be viewed as a kind of network activated by the recent evolution of information technologies [...]. Territorial intelligence aims to be the discipline whose object is territorial sustainable development in a knowledge society, and whose territorial community is the subject. Its goal is to stimulate a dynamics of sustainable development at the level of territories based on the combination of economic, social, environmental and cultural objectives, on the interaction between knowledge and action, on information sharing, on consultation in project preparations and on cooperation in the way actions are implemented and assessed. On the one hand it gathers and produces interdisciplinary knowledge useful to grasp the dynamics and the territorial systems; on the other hand it hopes to become a tool for territorial sustainable developers.” *Ibid.*

The distinctive features of territorial intelligence are summed up along that same vein by Philippe Dumas, a professor of computer science at the University of Sud-Toulon, when he states: “intelligence as a cognitive process and a way to organize information, and the territory as a space where meaningful relationships can develop.”

2.2 Presentation of our Study Fields

It is time to build on specific cases recently dealt with through our own interdisciplinary investigations, under the research group Territorial Assemblages (Agencements territoriaux) which we created not long ago (Soulier et al. 2011, Rousseaux et al. 2012, Soulier et al. 2012).

2.2.1 Will La Vallée Scientifique de la Bièvre Join the Paris-Saclay Cluster within Le Grand-Paris?

We are here interested in the recent attempt, led by a group of elected representatives, to promote the territory of La Vallée Scientifique de la Bièvre within Le Grand Paris, as a reaction to the creation of the neighboring Paris-Saclay Cluster, referred to by its promoters as future ecosystem of growth intending to attract the Ile-de-France and national economy and to become an international hub/cluster for knowledge economy. The different positioning of the two projects is still a very topical issue.

Le Grand Paris is a project that aims to transform the Paris conurbation into a great European capital and world metropolis of the 21st century, so that it is in symbiosis with its environment, like the first five of the kind which are New-York, London, Tokyo, Shanghai and Hong Kong. The first bill of law for Le Grand Paris was adopted on May, 27, 2010, following a vote in the French Senate. The senators approved the conclusions of the joint committee by 179 votes to 153, opening the path to the construction of a double automated metro loop around Paris. The creation of this new 130 km-long transport artery around the capital will connect nine economic hubs of the area – Plaine-Commune, Roissy, Orly, Saclay, Défense, Champs-sur-Marne, Evry, Seine-Oise and Montfermeil-Clichy-sous-Bois – through project agreements for future stations and will provide suburb-to-suburb links. It will cost around 21.4 billion euros in investment according to the government’s calculations, and will

⁶ This definition emerged from the experience born out of the spreading of the Catalyse method in Europe (<http://www.territorial-intelligence.eu/catalyse/>), which, since 1989, has offered tools for territorial diagnosis, assessment and observation for the stakeholder partnerships eager to increase, conduct and assess sustainable development projects within their territories.

position the Ile de France region among *the first four World Cities*, along with *New York, London and Tokyo*, according to Christian Blanc, former secretary of State for the development of the Capital Region.

While some critics view Le Grand Paris project as political gamesmanship mixed with substantive issues, others see it as a strong political and financial commitment for a priority area.

In connection with Le Grand Paris project, the Campus Plan and the Grenelle Environment Round Table, an Operation of National Interest (ONI) plans to turn of Le Plateau de Saclay into a world-class research and innovation center, a territory with high scientific and technological potentiality to boost the national economic growth. A perimeter of ONI covering a large part of the plateau was defined by Decree of the State Council in March 2009, ensuring consistency between spatial planning and the protection of agricultural areas. The project will receive an exceptional investment of one billion euros made possible thanks to a National Loan.

As the local authority representatives for the territories separating Saclay from the Capital city feared to witness the relocation to the Paris-Saclay Cluster of research institutes settled in their municipalities or departments, they in turn came up with the idea of pooling their effort to mobilize an exploratory territory called La Vallée Scientifique de la Bièvre (VSB) which they hoped to promote within the political and organizational dynamics of Le Grand Paris. A few years before, they had created the VSB, an intercommunity informal group conceived as a think tank, without realizing they would have to bring it to the forefront of the strategy for the Ile-the France region.

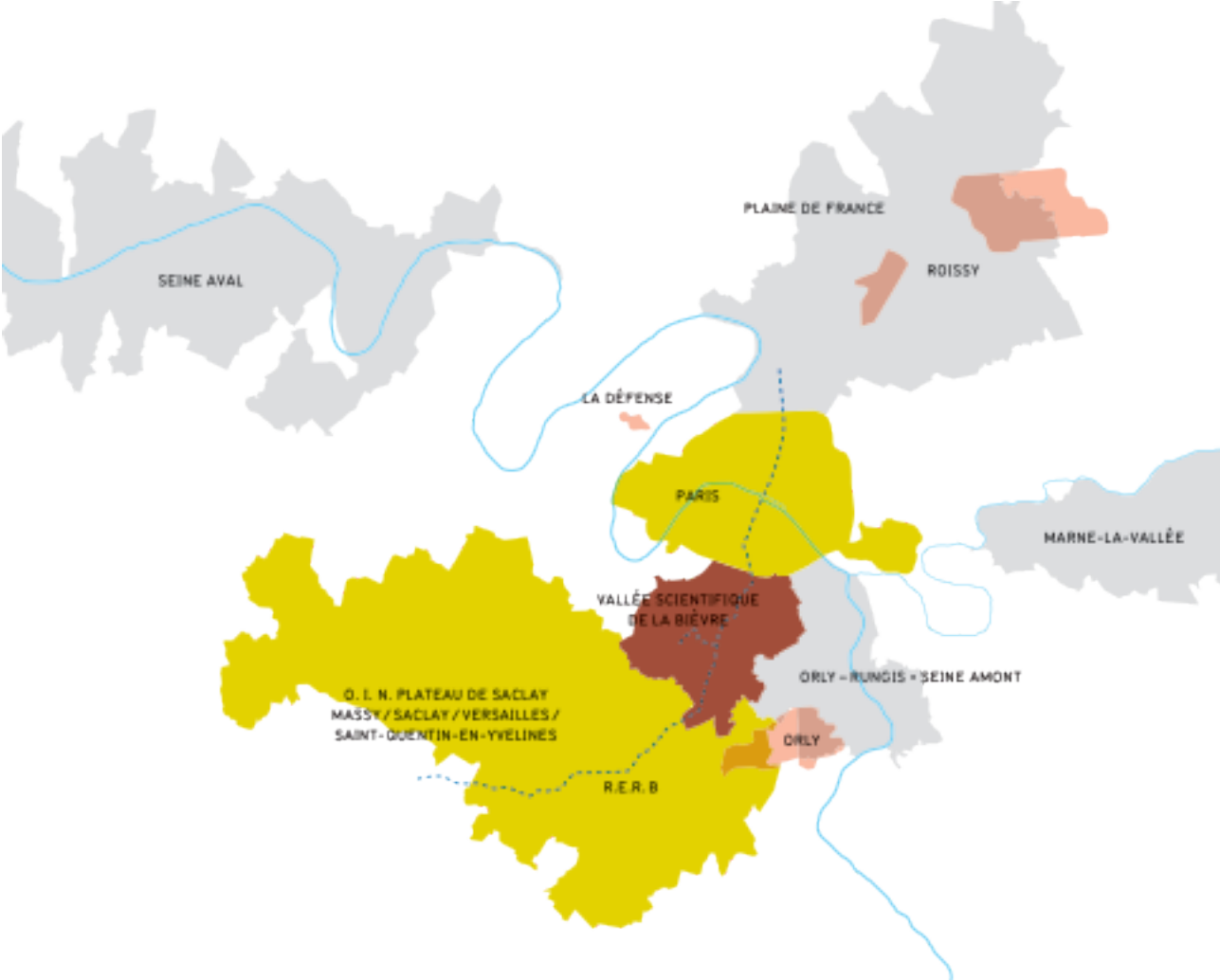


Fig. 7.1 La Vallée Scientifique de la Bièvre among the project territories in the Ile de France region.

If it is clear that La Vallée Scientifique de la Bièvre (VSB) has not been conceived to operate the geographic junction between two non-contiguous territories (Paris-Saclay Cluster and Paris – and Le Grand Paris) following the model of a valley linking a plateau to a town, this candidate territory is nonetheless compelled to position itself so as to be able to demonstrate its complementarity with the Paris-Saclay Cluster. The VSB will take the form of an *Urban Campus*.

By studying the documents produced by the VSB Round Table (the fourth Round Table was held in Fontenay-aux-Roses and led to the production of a benchmark plan for the planning and development of the VSB), the difficulties met by the subscribers to develop their line of arguments become obvious. To reach general agreement and establish the VSB as a key territory for Le Grand Paris, the plan was to offer disruptive categories and model representations adapted to the intricacy of the areas and potential stakeholders, which would open onto readable and convincing public policies.

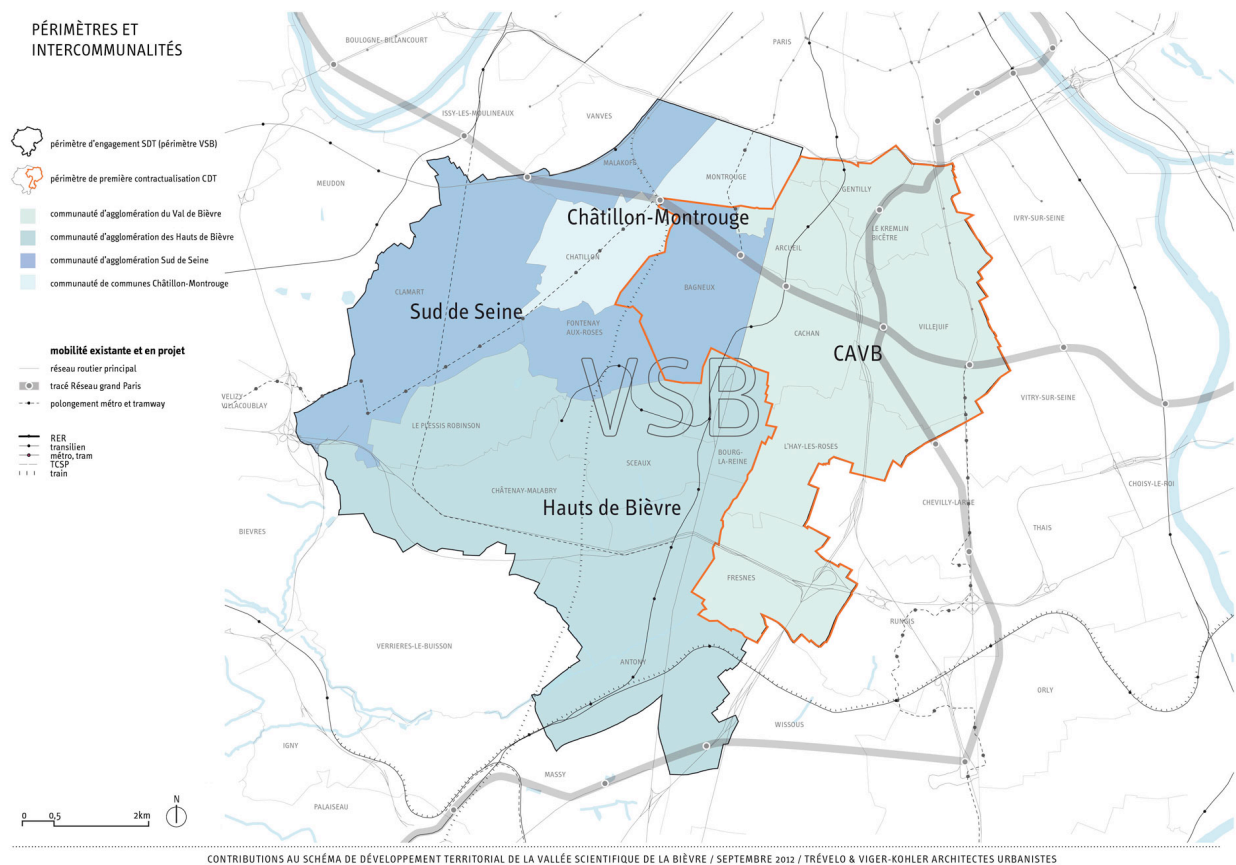


Fig. 7.2 The Project territory of La Vallée Scientifique de la Bièvre.

How to operate the shift of a sector-specific approach, refocus the debate and unquestionably demonstrate the added value of the VSB project within Le Grand Paris? For the time being, a proposal for cooperation has been made to our research group *Territorial Assemblages (Agencements Territoriaux)* by a representative of the VSB which consists of two parts:

1. Think through the scope of description categories mobilized to present the territorial projects for the Paris-Saclay Cluster and La Vallée Scientifique de la Bièvre, and offer a mode of comparison;
2. Think about controllable means to develop the VSB exploratory territory and make it gain recognition within Le Grand Paris, and to conceive a convincing enough demonstration so that Le Grand Paris take the VSB into consideration and even integrate it in its project.

2.2.2 Taonaba in the French West Indies: A Constructive Criticism on Sustainable Development?

Taonaba is the name given to the eco-tourism planning project for Belle-Plaine canal on Les Abymes territory in Guadeloupe. The municipality's main idea is to create a Mangrove Center. Indeed, the site where the project is located is typical of a coastal wetland area, remarkable both for its ecological diversity recognized as having national and international importance, and for the large stretch of its swamp forest. Moreover, there is an agricultural area adjacent to it, next to an interesting historical heritage – the remains of Belle-Plaine sugar plantation. The will to preserve and develop all these assets guided the Taonaba project⁷.



Fig. 7.3 Taonaba's Mangrove Center location on Les Abymes territory in Guadeloupe.

The key idea of the project was to improve the ecosystems present on Les Abymes coastal areas in a logic based on sustainable development, by synergizing three different tools:

- Eco-tourism development so as to be the driver of tourist activity in Les Abymes region by highlighting Les Abymes territory and its natural environment;
- Ecological conservation through education in environmental protection and a better understanding of the ecosystems (agricultural areas and coastal wetland areas);
- Local development (social well-being): by fostering the development of employment –generating

⁷ http://www.ville-abymes.fr/IMG/pdf/presentation_tاونaba_synthetique_2.pdf

activities for the local stakeholders, and by creating a space vital for oxygenation at the city's doorstep (the green lungs of the city).

Three potential axes of activities on location and three types of target audience:

- A science research center on wetlands such as mangrove swamps aimed at students and researchers;
- An educational provision, directed mainly at school groups, which allows an entertaining and yet scientific discovery of these ecosystems;
- A mass-market tourist offer, for local visitors and tourists alike, offering a wide range of indoors and outdoors activities, at the same time pedagogical, entertaining and innovative compared to the services already available in Guadeloupe.

The territorial approach - territory perceived as having a “geographical, economic, cultural or social cohesion at the level of a living or employment area”; approach aimed to express “the common economic, cultural and social interests of the territory's residents” and to allow “the study and implementation of development projects” - is directly inspired by the creative process at work in the development of ‘administrative counties’ (LOADDT Pasqua 1995 and later Voynet 1999). It is based on:

- A mission: rally together all the stakeholders, users and residents of the area around a common and coherent project;
- An economic interest: develop around the Mangrove Center ecotourism and agri-tourism activities compatible with the main development of Belle-Plaine canal;
- Resources: a territorial Charter, but also territorial contracts between the local authorities and the territory's stakeholders ensuring a legal framework and financial support for the activities developed, thanks to the development of partnerships.

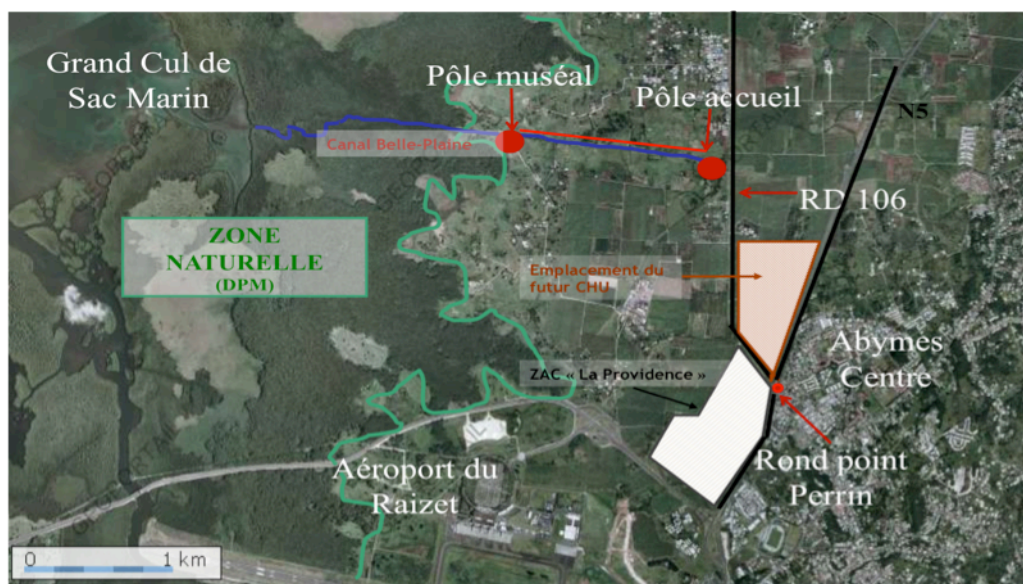


Fig. 7.4 Les Abymes mangrove swamps and marshlands areas within Le Grand Cul-de-Sac Marin in Guadeloupe.

The process was implemented as follow:

1° Carry out a diagnostic study of the territory to reveal the issues at stake.

For Belle-Plaine, the defined issues are:

- Manage conflicts and mobilize the territory's stakeholders;

- Maintain and develop agriculture;
- Control urban development;
- Act for the Conservation of the natural and historical resources and the prevention of pollutions;
- Help in the structuring of a territorial identity.

2° Determine the development axes for the concerned territory in collaboration with all the stakeholders involved.

For the Belle-Plaine case, the identified axes are:

- Use ecotourism as a driver of tourism development;
- Evolve towards the development of an integrated and sustainable agriculture;
- Create frameworks for the development of an innovative and well-suited town-planning;
- Characterize and define the specific identity of the territory.

3° Draw up a territory charter in close cooperation with all the stakeholders (yet to come in the case of Belle-Plaine).

4° Build an agenda for actions corresponding to the development axes (yet to come in the case of Belle-Plaine).

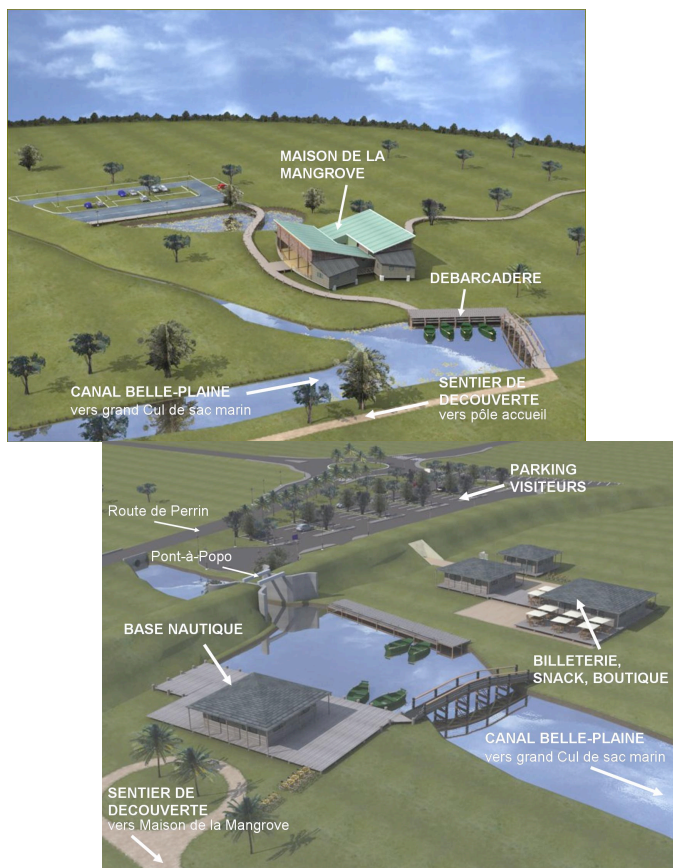


Fig. 7.5 Bird's eye view of the Mangrove Center and of the future the water sports center.

From a practical point of view, the method used was as follow:

- Consultation meetings with the different types of stakeholders (farm managers, resident owners, project managers, businesses);

- Attempt at having the town services involved in the project through the appointment of a TAONABA contact person within each department dealing with one or several issues of the project;
- Development of partnerships with the University of the Antilles and Guyana, the National Park, and the Coastal Conservation Authority;
- Fieldwork for an accurate identification of the different users of the areas;
- Cost assessment and fund- seeking for the action program;
- Launching of a call for eco-tourism and agri-tourism projects for the Belle-Plaine area (action that will be carried out by an external consulting firm);
- Establishing thematic working groups: agri-urban project, land-use planning, territorial charter, economic development;
- Concrete targeted actions: dealing with the access road, networking of actors and project managers, setting up of informative billboards on the progress of work, participation of local residents in some phases of the procedure (e.g. *logo* meeting, *trail* meeting etc.).

Les Abymes services' idea is to pursue the implementation of a sustainable development and participatory consultation approach throughout the Taonoba project life cycle, in the new context of creation of a community of municipalities comprising the town from Les Abymes to Pointe-à-Pitre, called Cap Excellence (<http://www.capexcellence.net>).

Cap Excellence intends to become the driving force of social, economic and cultural activity in Guadeloupe, and seeks the best way to pool the resources together and drive the economies of scale necessary at a time when national financial support becomes scarce. The slogan put forward is "Cap Excellence aims to build a territorial project based on values of sustainable development and social cohesion".

The Cap Excellence territory, encompassing the territories of Point-à-Pitre and of Les Abymes, turns out to be a strange cultural bi-pole made up of the conceptual coming together of Taonoba and the ACTe Memorial⁸, likely to make Cap excellence utterly original, and thus to gain substantial visibility. The tension might be seen as resulting from an opposition between nature (Taonoba) and culture (ACTe Memorial): but in fact it results entirely from the reversal of this opposition, through information sharing and mutual influence, which continues to deplete the Nature/Culture conjecture.

⁸ <http://www.cr-guadeloupe.fr/upload/documents/Macte12P.pdf>



Fig. 7.6 Future ACTe Memorial site in Pointe-à-Pitre in Guadeloupe.

The ACTe is indeed a memorial project centered on the painful issue of slavery, a very sensitive question in Guadeloupe. One thing worth mentioning at this point is the *plant-like look* of the ACTe Memorial architecture which echoes the mangrove swamp, when Taonaba (a Tainos First Nations place name) became a haven for runaway slaves (Maroons). It is also interesting to notice the tension between the sacred aspect and the desire to visit, valid both for the mangrove swamp seen as a sanctuary and for the sacred memorial. All this refers the notion of *heterotopy*, notion on which we will return in depth.

The political leaders of the Cap Excellence Corporation have asked our research group *Territorial Assemblages (Agencements territoriaux)* to help draft this Taonaba/ACTe Memorial bi-pole through innovative thinking.

2.3 Back to Conventional Spatial Management Assumptions: How to Overcome Them?

Spatial management, in its conventional sense, implies globally stable territories that only catastrophes can destabilize, apart from the periods corresponding precisely to so-called wished for and assumed planning actions carried out through planning and project management techniques. The categories that govern this constant virtual stability are most of the time not fully thought out, placed under the high spatial and temporal protection of abstract Topos and Chronos, and then developed on discrete scales corresponding implicitly to the hierarchy of territorial powers that rule over them. Added to this is the modern-day triumph of a naturalistic cosmology which, in Western or Westernized societies, validates an irreconcilable duality between Nature and Culture.

These assumptions must be overcome absolutely to raise territorial intelligence to the status of digital humanities.

2.3.1 Territories Virtual Stability Assumption

As many other municipalities, Les Abymes recently launched its local Agenda 21 (<http://www.ville-abymes.fr/spip.php?article30>). The elected representatives considered that the implementation of the Territorial Climate and Energy Plan (TCEP) and of the Agenda 21 would allow the sustainable development of the territory given the political stakeholders' great willingness to be part of a participatory eco-responsible approach. The connection of the Agenda 21 with the Local Town Planning (LTP) is under way.

According to the principles of sustainable development adopted at the Earth Summit in Rio, an Agenda 21 program has to address the economic, social, cultural and environmental aspects harmoniously, and promote the broadest possible participation in the population and civil society stakeholders (associations, businesses, administrations). These programs are strongly regulated by benchmark laws. In France, the Grenelle Environment Round Table in 2007 provided an opportunity to elaborate a long-term roadmap regarding the environment and sustainable development. A National Strategy for Sustainable Development (NSSD) called *Toward a Fair and Equitable Green Economy* was adopted on July, 27, 2010. It set the French policy as regards sustainable development for the period 2010-2013. A frame of reference for the assessment of the local Agenda 21 was built and an Observatory established. Sustainable Development Indicators⁹ were recently developed by the Observatory of the Territories managed by the DATAR.

Drawing up an Agenda 21 is a participatory process generally drafted over a 3 to 4 year period. The key steps in its composition are the *territorial diagnosis* and the writing of the *Action Plan*. We would like to highlight the fact that local sustainable development processes, and particularly the method used to draft the local Agenda 21, are consistent with today's conceptions of what the management of public policies should be (Muller 2009). And yet these « conceptions » are rather at odds with the « institutional arrangements » intending to manage common resources, as described by Ostrom (Ostrom 2005). The Agenda 21 are basically *scheduled action plans* which place the local political stakeholders in a central position to coordinate the approach, and place it in the footsteps of a strategic planning model which, as is well-known, is being increasingly criticized (Mintzberg 1994).

Thus, even when dealing with a process said to be participatory, the territories respecting the notion of sustainable development are supposed to be virtually stable in that the elected representatives ruling over them resort to project management and planning methods mobilizing functional services structured around functional areas: transport, housing, education, health, culture. However “The territory, over-impressed as it is with the marks and readings from the past, looks more like a palimpsest. In order to set up new equipment and to use some of the land more efficiently, it is often necessary to modify its substance irreversibly. But the territory is neither a disposable packaging nor a consumer product which can be replaced. Each territory is unique, hence the necessity to recycle, to

⁹ <http://www.developpement-durable.gouv.fr/-Le-referentiel-pour-l-evaluation-.html>, <http://observatoire-territoires-durables.org/>, <http://www.territoires.gouv.fr/observatoire-des-territoires/fr/node>

scratch once again the old text men have imprinted on this irreplaceable material which is the soil, so as to write a new one addressing today's needs, which, in turn, will be discarded. Thus some regions, dealt with too harshly or in an improper way, present holes, like an over-scratched parchment. In the language of the territory, these holes are called deserts" (Corboz et al. 2009).

The vocation of the territory is to induce a planning dynamics from its inhabitants, as they unfold their projects and their vision of *living together*. That is how the competitive attractiveness of the territories appears, generating migration flows difficult to reconcile with a conception of the territories as developable and virtually stable entities.

This vision has, of course, an impact on the representation and structuring of the information system. Even though the traditional tools of digital representation of data are adapted to the conception of a stable territory - with for example a conventional structure of a relational database, be it enriched with and composed of metadata - this structuring reaches its limits if the representation is also to return an evolution dynamics of the database structure.

2.3.2 How to Outsmart Territorial, Spatial and Temporal Scales, Prone to Spontaneously Organize Powers and Institutions in a Hierarchical Way?

According to Michel Foucault (Foucault 1984), "our own time might be the time of space". We would be in the epoch of simultaneity, of juxtaposition, the epoch of the near and the far, of the "side-by-side", of the dispersed. We would be at a time when the world is no longer seen as a long life that would develop through time, but rather as a network that connects points and intersects with its own skein. One could argue that some of the ideological conflicts which feed today's polemics are waged between the pious descendants of time and the tenacious inhabitants of space. However it should be noted that the notion of space which seems to be today at the heart of our concerns, our theory and our systems is not an innovation; space itself, in Western cultures, is endowed with a history, and one cannot ignore this inevitable interweaving of time and space."

So as to retrace briefly this history of space, we could say with Michel Foucault that in the Middle Ages it was a hierarchical set of places: "sacred spaces and secular spaces, protected spaces and open, defenseless spaces, urban spaces and rural spaces - so much for the daily life of men; in the cosmological theory, there were supra-celestial spaces opposed to the celestial space; and the celestial space was in turn opposed to the terrestrial one; there were spaces where things were put because they had been violently discarded and then spaces, on the contrary, where things would find their natural ground and stability. It was all this hierarchy, this opposition, this intersection of places which could roughly be called medieval space, a space of localizations.

From now on, we would be at a time when space appears to us as connections of sites, marked by concerns which fundamentally affect space, undoubtedly far more than time; time appearing probably only as one of the various distributive operations that are possible for the elements that are spread out in space.

Yet, despite all the technologies that invest it, despite all the networks of knowledge, which makes it possible to determine or formalize it, the modern space may not be fully desacralized - unlike time probably which was indeed desacralized in the 19th century.

Although there was indeed some theoretical desecration of space (the starting point of which was Galileo's work), we may not have reached the point of a practical desecration of space. Our lives may still be ordered around some infrangible oppositions, which the institutions and practice have not yet dare damage; oppositions which we take for granted: for example, between the public and the private sphere, between the family and the social space, between the cultural and the useful space, between the recreational and the work space; all these oppositions are still nurtured by a faint presence of the sacred."

Traces of this faint presence of the sacred in space can be detected in the law. Different legal regimes are enforced in places categorized differently depending on their particular use: public places - private places including digital spaces where the written words do not benefit from the same protection (freedom of the press) and will not have the same consequences (libel).

But digital technology, in so far as it allows a spatial continuum and a time continuum to be operationalized, desecrates the representations and discrete scales of time and space, and thus breaks down the assumption that territorial power has to be hierarchical and correspond legitimately to the intertwining of the spatial and temporal discrete scales.

The notion of heterotopy was introduced by Michel Foucault in a text he presented at the Cercle d'études architecturales (Architectural study group) in Tunisia in 1967¹⁰: "There are also, probably the in every culture, every civilization, real places, actual places, places that are shaped in the very fabric of society, and which are kinds of counter-sites, kinds of utopias actually achieved where the real sites, all the other real sites that can be found within a culture are simultaneously represented, questioned and inverted. Places of this kind are not part of any place, even though it may be possible to indicate their location. The places, because they are intrinsically different from the sites they reflect and speak about, I shall call them, by way of contrast with utopias, *heterotopies*."

Thus hierarchy gives way to *heterarchies*, just to the extent that topology gives way to heterotopies. Accordingly, in his speech at a seminar on sustainable cities organized by Cap Excellence, the Deputy Mayor of Cachan showed, through the real example of La Vallée Scientifique de la Bièvre, how he managed to simulate stabilized conquest situations without the depletion of resources inherent to conquests. The basic idea is as follow: when a territory wishes to promote a project, it starts by informing the neighboring territories organized in an informal and not permanently established association – as was the case with La Vallée Scientifique de la Bièvre in its early stages. As a result, a conquest is simulated which encourages the adoption of a common viewpoint, by promoting one's own views or by moving away from them for the sake of adopting better ones. If abulia could prevail when alone, it now becomes necessary to show, explain, present arguments, change so as to keep this conquest with all one's might - the conquest, which in this specific case is a virtual one, has not exhausted any of the resources. Indeed, according to Montesquieu (Montesquieu 2008), "conquests are easy to make because they are made with all one's forces; they are difficult to preserve because they are defended with only a part of one's forces".

Once the alchemy of the conquering plunge has taken place, the coherences identified and the concessions made, it remains to loosen the grip of the virtual conquest and come back to the territory *per se*. For once, there are no wounded soldiers caught up by the enemy in this retreat, because it is also a virtual one. Even failure is not a defeat. The hierarchy has given way to the heterarchies.

2.3.3 Duality Nature/Culture: How to Fight the Hegemony of Naturalistic Cosmology?

Cap Excellence is an excellent way to combine, at the level of an enlarged territory, cultural reflection and reflections on Taonaba (tourism, biodiversity). The question of preservation, of how it impacts Taonaba and the ACTe Memorial, is still to be dealt with. How to agree on a policy for cultural and natural heritage? How to respect the various ways of being into the world and define customs that could be agreed upon by all its occupiers? All the more so if we want to avoid the simplistic naturalistic view. It seems to be the case if the Guadelupian identity is consistent with Edouard Glissant's prospective views (Glissant 1996).

The Cap Excellence Territory- Guadeloupe's main territory- has to build an identity beyond Nature and Culture, but in their mutual instruction. Taonaba is a specular echo of the ACTe Memorial and vice versa. "For naturalism is just one of many ways to configure the world, that is to contrive some identifications by allotting attributes to existing beings, ascribing, starting from the available options, to an unspecified *aler* a physicality and an interiority comparable to or differing from those found in any human experiences. So that identification can go down four ontological routes. Either most existing entities are supposed to share a similar interiority whilst being different in body, and we have animism, as found among peoples of the Amazonian basin, the Northern reaches of North America and Siberia and some parts of Southern Asia and Melanesia. Or humans alone experience the privilege of interiority whilst being connected to the non-human continuum by their materiality and we have

¹⁰ (<http://foucault.info/documents/heteroTopia/foucault.heteroTopia.fr.html>). The article is published in « Dits et écrits », « Des espaces autres » in Architecture, Mouvement, Continuité, n°5, octobre 1984, pp. 46-49.

naturalism – Europe from the classical age. Or some humans and non-humans share, within a given framework, the same physical and moral properties generated by a prototype, whilst being wholly distinguishable from other classes of the same type and we have totemism – chiefly to be found among Australia’s Aborigines. Or all the world’s elements are ontologically distinct from one another, thence the necessity to find stable correspondences between them and we have analogism – China, Renaissance Europe, West Africa, the indigenous peoples of the Andes and Central-America. Yet, it can be shown that not only each of these modes of identification foreshadows a kind of community more specifically adapted to the pooling in a common destiny of types of entities it distinguishes – each ontology creating a distinctive sociology- but also that the ontological boundaries impact on the definition and on the attributes of the subject, therefore that each ontology fosters an epistemology and a theory of action adapted to the problems it has to solve. In other words, the problem we face is as follow: how can a naturalistic epistemology, bearer of universalistic values, amend so as to accept non-naturalistic epistemologies?” (Descola 2006¹¹).

		body	
		same	different
interiority	same	Totemism Aboriginal Australia <i>Absence of inheritance of class</i>	Naturalism Europe from the classical age <i>Discontinuity of the spirits</i>
	<i>The face of otherness</i>		
	different	Animism Amazonia, Northern part of North America, Northern Siberia, Melanesia, part of Southeast Asia <i>Discontinuity of the bodies</i>	Analogism China, Renaissance Europe, Western Africa, the Andes and Mesoamerica <i>Absence of analogy</i>
	<i>The face of otherness</i>		

Fig. 7.7 The different cosmologies, depending on the way to consider the other’s interiority vs. physicality (Descola 2006).

However, naturalism alone is accountable for radical expansionism, and also for sustainable development regulation. In that respect, sustainable development could be criticized, especially in cultures (Guadeloupe) claiming inherent anthropological mix.

¹¹ Translated by Janet Lloyd.

		body	
		same	different
interiority	same	Totemism Aboriginal Australia <i>The face of otherness</i> Absence of inheritance of class	Naturalism Europe from the classical age <i>Discontinuity of the spirits</i>
	different	Animism Amazonia, Northern part of North America, Northern Siberia, Melanesia, part of Southeast Asia <i>The face of otherness</i> Discontinuity of the bodies	Analogism China, Renaissance Europe, Western Africa, the Andes and Mesoamerica <i>Absence of analogy</i>

A particular **universalism**

- A model of development <-
- A positioning on sustainable development and a view on consultation <-

Fig. 7.8 Naturalistic Cosmology would be based on a particular universalism (Descola 2006).

“For naturalism recognizes the signs of otherness in the discontinuity of the spirits, as opposed to animism for example, which reads them in the discontinuity of the bodies. Is different from me the man who speaks another language, believes in other values, thinks along different lines, has another vision of the world. As such he is no longer my exact fellow creature since the “collective representations” he adheres to and which influence his actions are poles apart from mine. Strange habits, enigmatic or disgusting practices are then explained by the fact that those indulging in them cannot help believing (thinking, picturing, imagining, judging, guessing...) that this is the way they have to proceed so as to reach a specific goal. It is a question of ‘mentalities’, and if they are allegedly knowable up to a point by the traces they leave in public expressions, it is however impossible to understand their functioning in depth, because I cannot completely creep into the mind of one of my fellow creature, no matter how close. From that perspective, it is easy to understand that radical otherness lies on the side to those who are deprived of mind or who do not know how to use it: the savage in the past, the mentally-ill today, and above all, the multitude of non-humans: animals, objects, plants, stones, clouds, all this material chaos whose reality is repetitive whilst man, in his great wisdom, strives to determine their composition and operation rules.

How, then to escape the dilemma of naturalism, this far too predictable oscillation between the monistic hope of natural universalism and the pluralistic temptation of cultural relativism? Most specifically how to step back from the comforting thought that our culture would be the only one to have gained a true understanding of nature whilst other cultures would only have access to representations – rough representations, yet worth considering for benevolent spirits, false and pernicious because of their contagiousness for the positivists? This epistemological regime, which Latour calls “distinctive universalism” establishes the development of anthropology and legitimize its success, so much so that it is difficult to imagine a patient leaving his mental hospital without risking ostracism and facing a sterile wandering mesmerized by the mirages of singularities”(Descola 2006).

3 Towards a Participatory Intelligence of Territorial Dynamics

How to allow the advent of a genuine participatory intelligence of territorial dynamics? We may have to come back to an antepredicative sense of topological space and chronological time, close to Khôra and Kairos, through ecoumenal assemblages, concept developed by Augustin Berque and to which we will return later.

This question relates directly to the representation of knowledge and its structuring but also to the evolution dynamics of its representation and the interactions between the knowledge representations different stakeholders come up with. These representations are at least of three types already identified and pointed: places and infrastructure, decision-making structures and finally the stakeholders involved in the decisions which are likely to take part in the decision-making processes.

Since knowledge structuring requires separate representations taking into account several categories and the evolution and interaction dynamics, the traditional tools of knowledge representation are outdated, that is why new tools have to be developed.

As part of this deconstruction process, the question of incommensurability arises: how to arrange contents to reduce their incommensurability to its commensurable portion, or make arrangements that make them commensurable, thus allowing the interoperability of information systems that will derive from it.

3.1 Territorial Intelligence: Providing Tools for the Deconstruction of Radical Naturalism

In what follows, we present three action- researches led by our research group Territorial Assemblages (Agencements territoriaux) on the areas of La Vallée Scientifique de la Bièvre and Cap Excellence. All three try to provide tools for a deconstruction of radical naturalism, which currently prevails in Western or Westernized cultures and modify the representation at stake and the structuring of the information system.

3.1.1 Heterotopies and Heterarchies : Weakening the Arbitrariness of the Temporal and Spatial Scales Disruptions

The first part of our research on La Vallée Scientifique de la Bièvre, is built upon the heterotopies as developed by Michel Foucault. We criticize the discretized spatial and temporal scales supported by hierarchies of power that create gaps between the discrete levels, and introduce complexes of heterogeneous and fringed spaces.

We drew inspiration from Walter Benjamin in his book *The Arcades Project*, from Georges Pérec in his research on intimate space organization (Pérec 2000), Gaston Bachelard and his phenomenological investigations, from Augustin Berque and his *Écoumènes* (Berque 2000), from Gilles Deleuze (Deleuze et al. 1980) in his *Thousand Plateaus*, eventually it is Michel Foucault's thinking that has held our attention. We mobilize the heterotopies conceived by Michel Foucault as early as 1967 – with in the background Deleuze's notions of *assemblage function* and Foucault's concept of *power apparatus* - to provide a perspective on La Vallée Scientifique de la Bièvre within Le Grand Paris.

Here are the main principles Michel Foucault outlined in his *heterotopology*. We may reformulate these principles as follows.

First principle: In any given society, one or several heterotopies are created.

Second principle: Any society can remove or reorganize an existing heterotopy. It can also organize a heterotopy that did not exist before.

Third principle: A heterotopy can juxtapose several incompatible spaces in one given place.

Fourth Principle: Heterotopies open to heterochronies.

Fifth principle: Heterotopies have a system of opening and closing that isolate them from their surroundings.

Sixth principle: Heterotopies have a function as regards the remaining space.

A heterotopological reading of the Paris-Saclay Cluster territories and La Vallée Scientifique de la Bièvre territories allows to position the VSB project as complementary to the Plateau de Saclay. At first glance, the supporting documents for the two projects are rather similar. Some try to make sense of what is by building on the gains and their inner dynamics, while others try to give meaning to what the cluster will stand for – scientific supremacy, excellence, blending of functions, emergence of a

new identity exceeding the mere juxtapositions of structures. In both cases, there is a striking lack of homogeneity in the arguments put forward. No sooner have the effects of a first argument been sketched out that a second one is broached before the full implications of the first are grasped. The intricacy of the territories under scrutiny is obviously not compatible with the type of description, and the methodological tools are still lacking.

a) The VSB project struggles to step out of the tracks of Paris-Saclay Cluster Project

The methodological approaches driving the creation of the Paris-Saclay Cluster territory and La Vallée Scientifique de la Bièvre territory differ from one another first and foremost in terms of what has not been fully thought out or, to put it differently, as regards the implicit hypotheses on which they are based. In fact, the Plateau de Saclay dynamics rests on axioms that should not be taken for granted and need to be supported, and whose criticism may not be politically well-advised, at a time when the country as a whole fears for its rank in the world. The VSB creators discreetly refrain from referring to those axioms, but do not criticize them openly, nor run the risk of putting forward some others.

The following table (Table 7.1) summarizes the main implicit hypotheses present in the ONI Saclay Plateau Project, which we try to verbalize by picking out the phrases from which they emanate in the texts:

Phrases present in the text of the ONI Cluster Paris-Saclay project	Implicit hypotheses
Actualize potentialities by promoting development plans	Structural development would <i>mechanically</i> lead to the realizations of economic potentialities
Coordinate and rally around joint actions, mutualize collective equipment	Geographic proximity would lead to spontaneous coordination
Accelerate the ripening of industrial processing of scientific breakthrough and business development	The densification of potentialities would <i>mechanically</i> bring about the acceleration of the ripening processes
Promote strong interactions, technology transfer, and interdisciplinarity	The cluster organization would <i>automatically</i> prompt a boom in interactions
Encourage, at the interfaces of traditional disciplines, the emergence of future technological breakthrough and scientific revolutions	The contact of very specialized and complementary research works would <i>naturally</i> produce scientific revolutions and scientific shifts at the interfaces

Table 7.1 Main implicit hypotheses in Paris-Saclay Cluster.

The territories of Paris-Saclay Cluster and La Vallée Scientifique de la Bièvre share key characteristics:

- Both territories offer a coherent functional and spatial diversity in the making; they are project-territories that can only be understood in their dynamics, always in the backdrop of global competitiveness and necessary economic growth;
- Both territorial projects try to find reference points to their respective advantage and assessment tools for their own dynamics.

b) Differential positioning of the VSB project compared to Paris-Saclay Cluster

The positioning differences are presented in the following comparative table (Table 7.2):

Territorial projects' characteristics	Paris-Saclay Cluster	La Vallée Scientifique de la Bièvre
Benchmark	Operation of National Interest (ONI)	Reference plan, population involvement
Type of structure	Functional cluster, innovative campus, synergy and simultaneity	Urban campus with emphasis on spatiality, intermediate integration between Paris university districts and a Saclay-like cluster

Development horizon	Speed, acceleration, then progressive deploying	Slow speed ; progression
Implementation regime	Shift, exception and exemplariness, pro-active approach	Continuity, in keeping with a historical and geographical tradition
Model of integration	Interconnection through fast networks (transport, communication) of the whole Le Grand Paris area, overture, and energy integration	Overture (sharing, global, sustainable)
Rhetorics	Youth, positive announcement effect	Maturity, regularity, age of the installations
Inspiration	Innovative approach and benchmark of the best clusters worldwide	Singularity (its own scale, its own way)
Impulsion	Pro-active, massive investment	Participatory, confidence
Fields of activity	Economic and social specialization, restricted thematic areas, knowledge economy	Diversity
Topology	Densely populated concentric zone, linked to the city through fast intercity connections	Part of the Southern Ile-de-France cone for innovation, intermediate link
Ecology	Environment (plateau = metaphor of the platform and of intervisibility) ; city life and proximity to nature are reconciled; farming activities maintained; natural water resources and architectural heritage preserved	Living place (valley = metaphor of a hierarchy and intervisibility)
Local/global	Ecosystem of growth to boost the Ile –de-France Region and the nation’s economy; expect global positive effects from a local perspective, aim to be one of the world’s emblematic place, an international hub for knowledge economy	Deal with the negative effect of globalization at a local level (dual trend – co-variant yet not linked- for people to settle within the territory while not working there, and, in a globalized job market, for executives to live away from the territory)
Spatial positioning	Compact development on 7,700 ha to save space, higher density and opening-up are thought out simultaneously	Variety
Visibility	Showcase, emblem, seamless and attractive offer, reference internationally recognized on the résumé of researchers and students alike	Discrete ‘distinction’
Model of growth	Continuous innovation in knowledge economy, symbolized by the ‘knowledge triangle’- education, research and innovation-	Local growth through redistribution, try to ‘ be a local metropolis’, that is to say ward off the curse of gentrification and individualism
Points of comparison	Comparable to the most successful similar clusters worldwide with the emergence of a synthesis, of a new model	Comparable the other territories comprising Le Grand Paris
Assessment	Move up in the Shanghai Ranking, creation of wealth and innovative companies, high-performance, quality of life and functional diversity	“Time will tell”, quality of life in the long-term for the users.
Governance	Heterogeneous federation (49 municipalities, 23 higher education and research institutes, 3 competitive / competitiveness clusters)	Homogeneous federation (mayors)

Table 7.2 Different features of Paris-Saclay Cluster and the VSB.

The foreshadowing of Paris-Saclay Cluster is based on symbolic figures like the figure of the local showcase territory that has worldwide impacts, and on methods such as imitation/adaptation of practices implemented where “they work”, postulating a cause and effect relationship . Development of large clusters would lead to virtuous practices – spontaneous coordination, resource pooling and sharing, result exchanges, interactions and interdisciplinarity – which in turn would lead to the accelerated ripening of the fruit of these practices (realization of economical potentialities, innovative breakthrough, creation of dynamic companies and, appeal to the best in the world).

These symbolic figures are not called forth in the VSB, they are not criticized either for that matter, yet not the slightest substitutive figure is called forth in their stead, probably because it is not that *easy* to produce categories as elementary and powerful, whose radical criticism would be the target of serious accusations (pessimism, fatalism, lack of enthusiasm and spirit, even defeatism).

c) A possible heterotopic approach of the VSB

Paris-Saclay Cluster is somewhat like a television show: it is a showcase, visible worldwide, and appealing as is the case for any place where one can gain visibility. It is obviously the hybridization of a crisis heterotopy with a heterotopy of deviation (coming with the first principle), since the proposed solution to solve the ongoing economic crisis is a radical inversion of the set of deviation, by which all that is not conspicuously in the showcase is presented as deviant. Its rhythm is synchronous with its counterparts the new showcase territory competes with. Its pace may be even faster, in so far as the project asserts itself as mimetic in its goals - even more so than in its construction - (second principle).

Paris-Saclay Cluster is dense (scientific density and compact development but with an open lay-out, “protected and yet open”) and optimized. As such it radiates throughout the world like a hologram, thus generalizing the third principle of Foucault’s heterotopology. It is based on the principle of acceleration (fourth principle) and of the centrifugation of the slow, which is at the heart of its selection process (fifth principle).

Paris-Saclay Cluster is *a heterotopy of compensation* – maybe combined with a heterotopy of illusion (sixth principle), intended to be an allegorical embodiment of a post-crisis situation, provided the stakeholders, who *in fine* will have to determine its operational content, commit themselves to this fiction in the long term, or else it will be no more than a mere utopia.

In addition, La Vallée Scientifique de la Bièvre presents a categorical consistency coupled with sensitivity differentiators, mainly characterized by a positioning on the fringe of the showcase, marked by an unapologetic discretion - discretion which, however, has been damaged by the very creation of the VSB and accounts for the present lack of consistency in matter of communication policy and public awareness.

By probing further into its positions, one may wonder how the VSB could complete its proposals so as to make them indispensable and indisputable. La Vallée Scientifique de la Bièvre territory could work on the unthoughts of the Paris-Saclay Cluster ONI by experimenting them on a full scale, away from the spotlights (discretion), with more freedom on the choice of its speed (precision of the slow motion), away from the need for challenge simultaneity (demand for diversity), and above all at the very level of the functional operations and the stakeholders operational participations (involvement, confidence).

Thus at the level of these two contiguous territories, the heterotopy embodied by Paris-Saclay Cluster would gain strength, credibility, sustainability, and would widen its percolation surface.

While keeping its own imagination and working on a territorial identity that would preserve its other assets, the VSB can support change and capitalize on it for its own economic and social development. In other words, the VSB could be thought out as a heterotopy preventing Paris-Saclay Cluster from turning into a utopia, by working on its unthoughts, studying in depth the realistic outcomes of its opportunity requirements and practical modalities of implementation. This would mean ensuring that the five main fictions given in the table below (Table 7.3) meet controlled conditions of implementation.

N°	Fictions that need to be checked
1	Structural development would <i>mechanically</i> lead to the realizations of economic potentialities
2	Geographic proximity would <i>mechanically</i> lead to spontaneous coordination
3	The densification of potentialities would <i>mechanically</i> bring about the acceleration of the ripening processes
4	The cluster organization would <i>automatically</i> prompt a boom in interactions
5	The contact of very specialized and complementary research works would <i>naturally</i> produce scientific

Table 7.3 *The five operational fictions to master*

3.1.2 Assemblage Theory: Weakening the Naturalist Assumptions and Modeling

The second approach to our research on La Vallée Scientifique de la Bièvre, is built upon the assemblage theory (Deleuze et al. 1980, Krtolica 2009), coupled with the theory of simplicial complexes (Atkin 1974, Atkin 1977, Atkin 1981).

Both territorial projects under study present a list of *proposals*, backed by *agents*, which have *impacts* over time. At the beginning, the relational definition of the proposals is empty, then it changes when the agents get connected. The similarities they demonstrate are revealed through the extraction of the lists of agents and proposals. The proposals may be networks of cohesive facts, but what is at stake here is to try and understand the representativeness of the agents (who cogenerate the proposals) and the links between these agents and the proposals. The idea of democracy resurfaces with the possible identification of backings, strong and weak links, cohesive elements (hard to disconnect) and also of the territorial or local effects or impacts. Eventually, the structure construction and the identification of trajectories within the arrangements (Huet et al. 2008, Krtolica 2009) should make it possible to optimize the network of proposals by assessing the strength or weakness of the links that bind them together, spot the agents that have to be convinced, those whose influence should be strengthen or weaken, order the proposals depending on relational distances, increase or reduce the distance between two proposals so as to alter the relational density which determines the strength of the link.

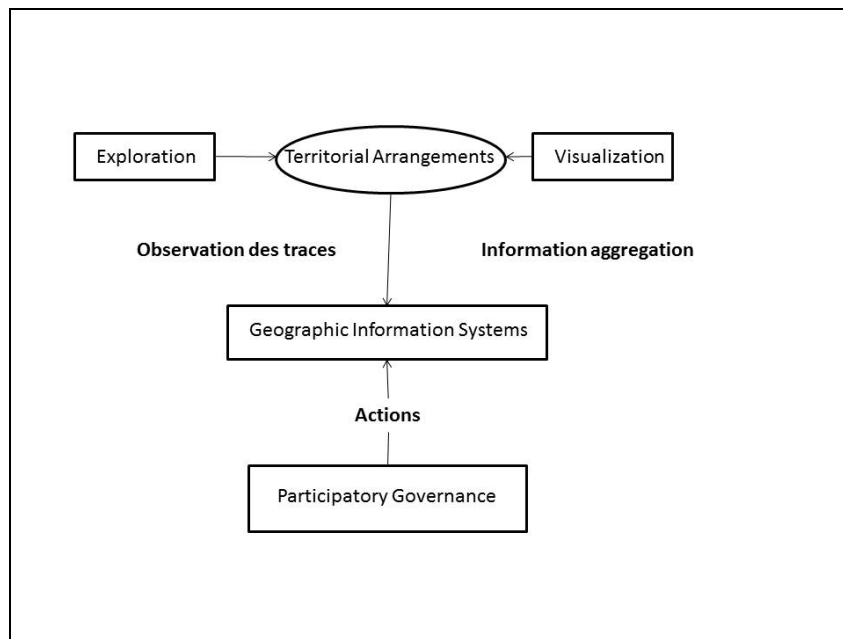


Fig. 7.9 *Architecture of a system of territorial participatory governance.*

The aim is to promote the making of a common world, an optimized view of the “best” proposals to implement. The best-supported proposals must achieve the most desired effects, but a significant place must be left to the proposals or effects that, though not backed by the majority, can turn out to be key (cf. representativeness of marginal viewpoints). Similarly, the identification of “gaps” within the arrangement allows to detecting the absence of key or intermediary agents who could back a proposal and make it more influential.

Several web content searches were carried out as part of a first experiment. The results from the query “Paris-Saclay Cluster” performed in September 2011 on Google™ are presented below by way of illustration. The ranking proposed by this search engine makes it possible for an analyst to identify the dynamic and heterogeneous entities of a given situation. We analyzed the first five pages of results

provided by Google™ so as to extract the agents and proposals of the Paris-Saclay Cluster. We present an excerpt from the results in the following table (Table 7.4) in which the proposals are bolded.

EDF confirms the setting up of its main R&D site within Paris-Saclay Cluster, in the Palaiseau district
After a long gestation period, Paris-Saclay Campus was given a crucial boost in 2007 thanks to Operation Campus launched by the French president.
The Ecole Polytechnique district, as well as Paris-Saclay Cluster as a whole, has to be exemplary as regards energy savings and energy efficiency
Paris-Saclay Cluster is created to capitalize on interactions between higher education, research and industry and to contribute to the creation of innovative start-ups and growth in general
Our municipality (Jouy en Josas), located 17 km from Paris, is now part of the 49 municipalities selected in the draft bill on the creation of the public body Paris-Saclay
Amendment to provision of Title V relating to the creation of Paris-Saclay Cluster – art.22 – composition of the governing council for the future Paris-Saclay public body
In July 2008, the French Minister for Higher Education and Research asked the different stakeholders to commit themselves and respond to the remarks of the Assessment Committee on Operation Campus
The preliminary mission for the Paris-Saclay public body plans to have a study conducted on the strategic planning of the Paris-Saclay Cluster
Renovating Paris-Sud University is listed among the important elements in this file (Paris-Saclay Campus)
The Building of the first intermediary road section from the Ecole Polytechnique to the CEA, then to Saint Quentin is planned for 2013.

Table 7.4 Excerpt from the results of the query performed on Google™ (2011 09 30).

The following table (Table 7.5) shows the links existing between the agents and the proposals. Some are quite expected, while others are less so (Soulhier et al. 2011). Besides, even if it is only an excerpt from the results returned by Google™, we can already see a certain variety in the entities and their links. The agents involved in several proposals connect these proposals and potentially modify the form and dynamics of the global arrangement.

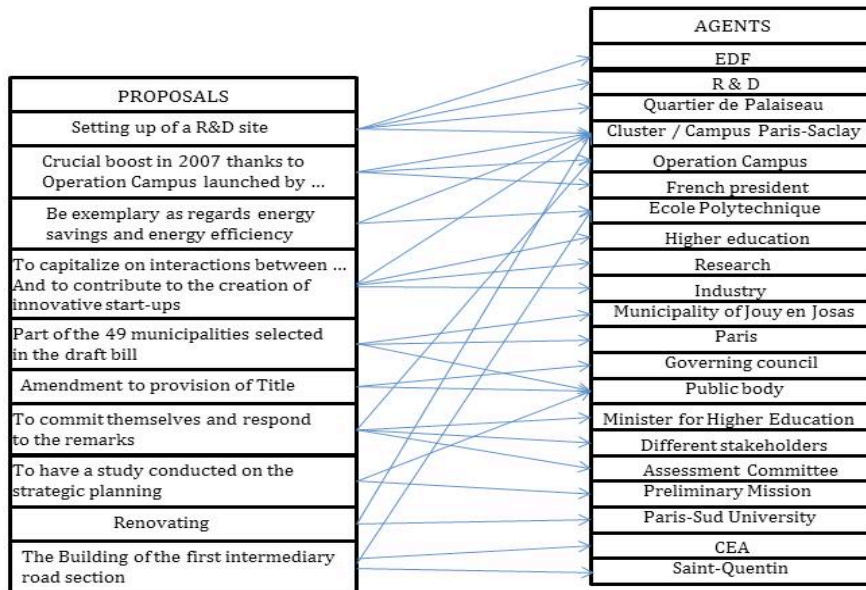


Table 7.5 Table of the connections between agents and proposals.

Let's take the example of the proposal "setting up of a R&D site in the Palaiseau district". It emerges from the interlinking of four agents: "EDF", "R&D", "Paris-Saclay Cluster" and "Palaiseau District". Moreover, it can be positioned on a map (Palaiseau district of the Cluster territory). Another example is the following proposal: "be exemplary as regards energy savings and energy efficiency". It emerges from the interlinking of the agents "Paris-Saclay Cluster" and "Ecole Polytechnique district" which can also be positioned on a map. The two clusters formed by "setting up of a R&D site in the Palaiseau district" and "be exemplary as regards energy savings and energy efficiency", peopled by the interconnected agents, share one common feature, "Paris-Saclay Cluster", and thus are strongly linked. In mathematical terms, "setting up of a R&D site in the Palaiseau district" and "be exemplary as regards energy savings and energy efficiency" form two simplices with a common apex. All the project proposals, agents and links together form a simplicial complex.

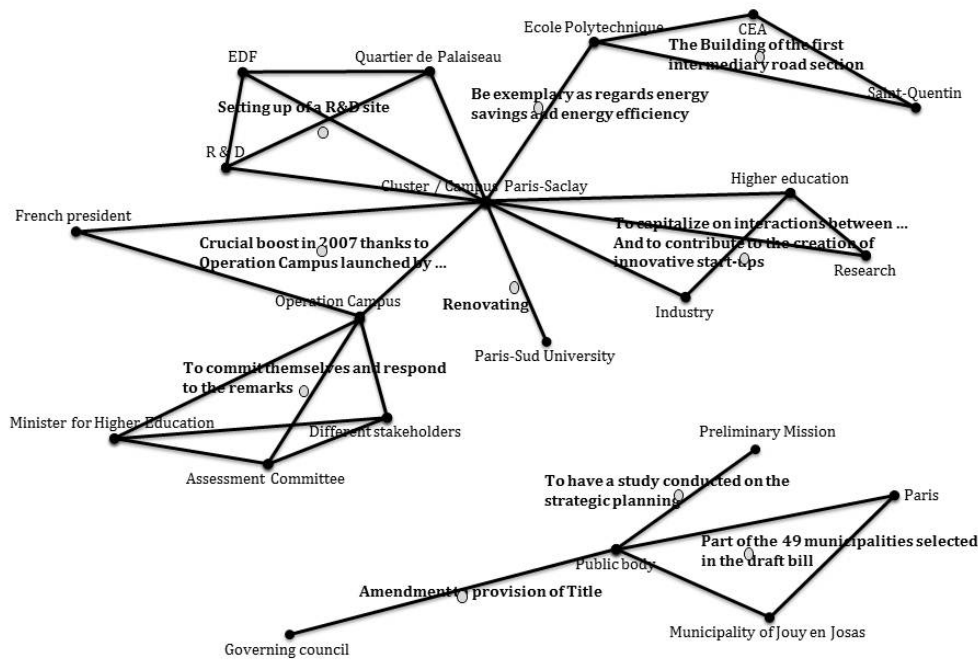


Fig. 7.10 Simplicial complex associated to the query.

The territorial arrangements modeled by simplicial complexes allow the emergence of *proposals* for the analysis of the agents and help assessing their *effects*. Using these techniques for scanning and visualization, it is possible to identify:

- Their representativeness (number of stakeholders per proposal and effect);
- Their influence (center/periphery radar);
- The minorities (amount of deviation between minority and majority/ the chance for the minority to have its way).

All this helps plan the optimization of the network thus composed to reach a common and well-balanced view of the strongest proposals by, among other things, identifying a missing key agent or, on the contrary an agent that have to be discarded, increasing or reducing the strength of some links, and so on. As an example, why would not the “building of the first intermediary road section” (transport) from the Ecole Polytechnique to the CEA, then to Saint-Quentin receive the support from the Ministry of Transport or else transport companies or citizens associations?

In the case of territorial intelligence, arrangement excluded, we would have:

- The assessment and the prioritization of the services to provide or already existing;
- The identification and ranking of the needs;
- The arbitration as regard the spatial localization of the services/ the balance between supply and demand.

Thanks to the modeling of territorial arrangements, it is possible to picture the networks of stakeholders, proposals and effects. But the reading and analysis of their mathematic representation seems abstract for most of these projects’ stakeholders. The spatial projection of the arrangements and the use of indicators – social, economic, cultural, etc. - makes the results look more concrete and give a careful interpretation of them. In this context, a GIS (Geographical Information System) can turn out to be a key element in territorial intelligence. It allows to geo-localize the data for a given territory

(services, needs, etc.) which can be coupled with marketing data or territorial indicators (social, economic, etc., for example average household income data). This, coupled with a *territorial intelligence-like* approach permits to envision the development of new services or the restructuring of old services within a framework of sustainable development, of partnerships and citizens involvement in the decision making process. By analogy, these maps could make the projects more readable and operational. They could offer a more concrete depiction of the arrangements once both the agents and proposals are “positioned” on the geographic area.

The localization of the stakeholders and proposals can be interpreted differently depending on:

- Origin and date of the web page (URI, meta-data, key words etc. promised by the semantic web whose aim is to upgrade web data);
- Origin and date of the hit itself (i.e.: creation of an apartment block in a given place);
- Absence of time and place for all which is abstract.

The analysis focuses on the hits clearly geo-localized on the digital record (in green in the figure below), or not geo-localized but easy to infer (in blue in the figure below), or else on hits too abstracts or uncertain (in italics in the above figure). The calculation function for territorial arrangement was integrated to the multi- purpose Geographical Information System Quantum™ (<http://www.qgis.org/>) as well as the resources from the OpenStreetMap project whose aim is to create free world maps under free license with the help of the GPS and other free data (<http://www.openstreetmap.org/>).

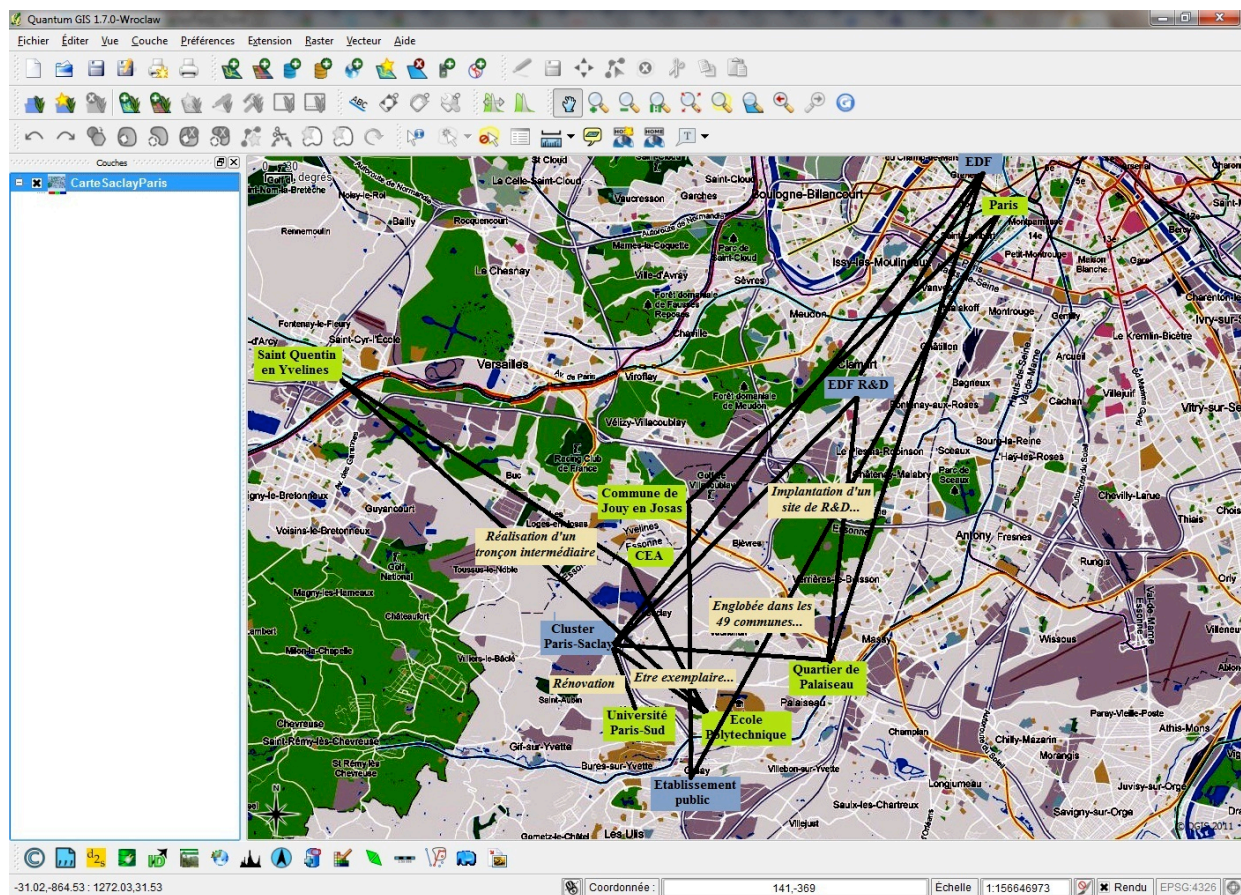


Fig. 7.11 Screenshot of an excerpt from the Paris-Saclay Cluster arrangement in the GIS Quantum™.

The above figure shows the spatial projection of geo-localized elements (in green), and inferred elements (in blue) of the territorial arrangement for Paris-Saclay Cluster. The proposals emerging from the conglomeration of stakeholders (supporters or opponents) are shown in yellow. Finally it should be noted that e-participation could allow the inferred elements (in blue) and the abstract

elements (in italics in the chart of proposals and agents) to be submitted to the community or to territorial project managers so as to dispel ambiguities, localize some of them, or else remove the “false agents” from the list.

Modeling the arrangements by simplicial complexes on the research project Taonaba-ACTe Memorial in Guadeloupe, is a way test the scalability of the approach.

3.1.3 Consultation as Driver of a Pluralistic Approach of Territorial Planning

A territory’s spatial planning reflects the vision of the world of those who implemented it. Considering the crises and controversies arising from the inconsistencies on the Guadeloupe territory, and taking into account cross-cultural issues, we will define and propose an alternative territorial approach based on cooperation and respect for the various visions of the world.

The first aim of our research on Territorial Intelligence is to prove that it is possible to link a territory’s spatial planning to its vision of the world. Then, by showing that there are not one but some territories, we will show that resorting to inadequate territorial approaches may trigger crises. The need to preserve the cohesion of these pluralist territories led up to develop an alternative approach based on dialogue.

a) A particular territorial planning after universalisms

Our investigation starts with a remark by Augustin Berque who writes in “Ecoumene” (Berque 2000):

“Our cities stand for what we are us. They pertain to our very being. Their shapes are the face of our medial body. Suffice it to see, throughout the world, the great sensitivity with which these shapes express the social structures and their evolutions”.

From this mesological assertion, the author concludes that “ontology lacks in geography and geography lacks in ontology” (Berque 2000). It thus seems essential to combine ontology (as *the study of the being as such*) and geography as a first step. We will manage this merger so as to build a model compatible with both disciplines through the parallel study of Descola’s work on universalism and the key features of the different land-use planning projects.

In his book « Beyond Nature and Culture », Descola explains that Man structures the world around the experience he has of it, following a logical two-step process, namely identification and relations/connections. If ontology and geography are co-dependent as Berque implies, then the structure of certain sites bear traces of it.

The study covers the ACTe Memorial and Taonaba, both located in the French department of Guadeloupe in Overseas France, more precisely the towns of Point-à-Pître and Les Abymes whose common desire to preserve and enhance the cultural - for one - and natural - for the other - heritage led to the establishment of two real territorial projects.

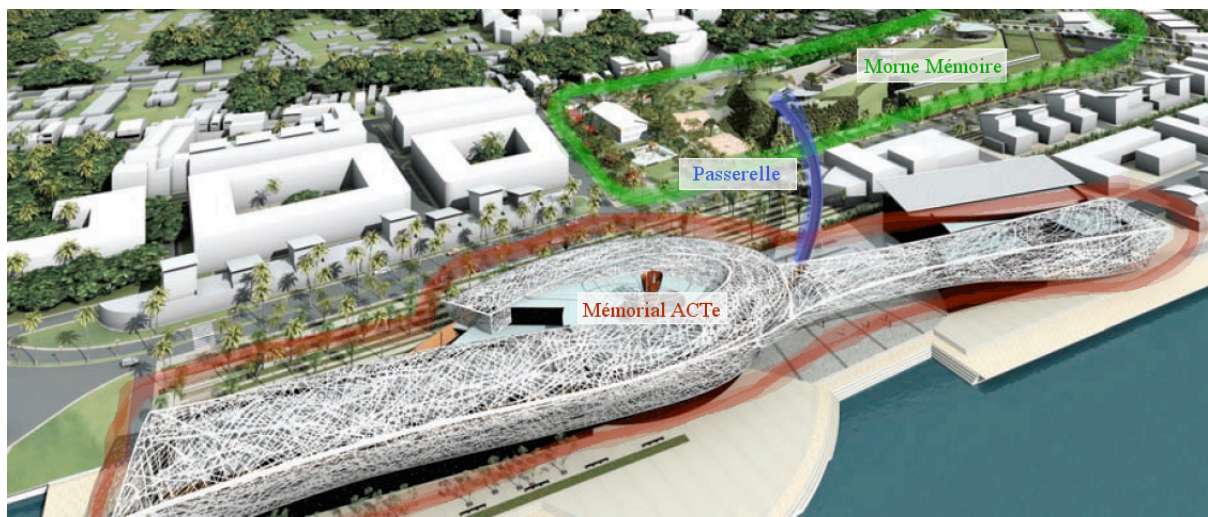


Fig. 7.12 ACTe Memorial, future Caribbean slave trade and slave life center. Original image from the brochure available at: <http://www.cr-guadeloupe.fr/upload/documents/Macte12P.pdf>.



Fig. 7.13 Taonaba, ecotourism at the natural reserve of Grand Cul-de-Sac Marin. Original picture after a Google Map satellite view.

Identification, the first step of the process defined by Descola, consists in assigning symbols related to interiority (“mind, soul, consciousness” (Descola 2005) and physicality (“external shape, substance, physiological, perceptual and sensory-motor processes” (Descola 2005), two parameters humans are endowed with and which they project onto all existing beings. A double dichotomy - interiority/physicality, difference/similarity- occurs and allows to determine the relative place of all existing beings whose aggregation form a “collective”. These various positions are thus marked by continuities or discontinuities which are typical of the related ontological pattern.

We can notice, when analyzing Western perception, how a specific set of qualities is assigned to all existing beings, but "humans are the only ones to have the privilege of interiority while being connected to the continuum of non-human by their physical characteristics"(Descola 2006).

	Humans	Dichotomy	Non-humans (banyan tree, crab...)
Physicality	atoms	similarities	Atoms
Interiority	consciousness	differences	None

Table 7.6 Table identifying the Western view on existing beings’ features depending on interiority and physicality.

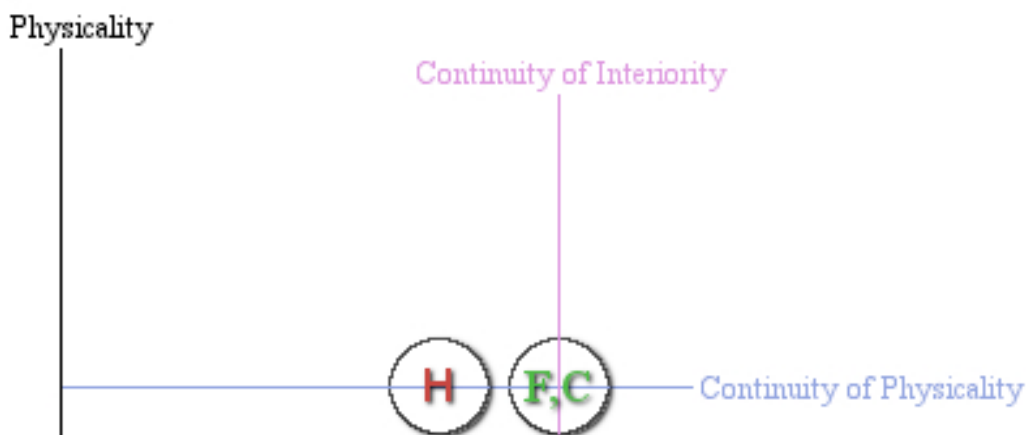


Fig. 7.14 *Ontological pattern of the Western vision: continuity as regards physicality, and discontinuity as regards interiority between the Humans (H) and Non Humans (Banyan tree, crab).*

At the end of this identification process, we get a dual ontological pattern composed of two collectives, Humans and Non-Humans, which reflects the distinction between what is called Nature and Culture. If we stick to our initial reasoning, we should find the characteristics of this particular pattern in the ACTe Memorial and Taonaba projects.

And indeed it is easy to see that the ACTe Memorial consists of a cultural building (same name) on the one hand and a park (Morne Mémoire) on the other. These two entities are consistent with the Western ontological pattern. A similar duality is to be found in the morphology of the Taonaba project, where a cultural center (the museum center) is built on the outskirts of the nature reserve of Grand Cul-de-Sac Marin.

Scale does not seem to be a limiting factor in the spatial expression of this duality, since Taonaba and the ACTe Memorial resort to structures different in size and express this specificity in themselves, the ACTe Memorial being dedicated to culture, while Taonaba is dedicated to nature.

This nature/culture opposition is for many the only and universal paradigm, while in fact it is a particular paradigm among four possibilities called “naturalism”.

	Same Physicality	Different physicality
Same interiority	Totemism	Animism
Different interiority	Naturalism	Analogism

Table 7.7 *The four modes of identification based on a double dichotomy interiority/physicality and similarity/difference.*

The second step in Descola’s method is made of “relations”. Beside the intrinsic properties of the existing beings extrinsic relations are added. They fall into two groups:

- Some potentially reversible between two equivalent terms (gift, exchange and predation) situated at the “same ontological level”(Descola 2005);
- Some univocal based on connexity (genetic, temporal or spatial) between non-equivalent terms (production, transmission and protection) “linking several ontological levels” (Descola 2005).

According to Descola, any relation can be broken down into results of these atomic relations. Thus the relations nature enjoys with culture in the ACTe Memorial project reveals a relation of production, that is to say “*the imposition of form upon inert matter [by] an individualized intentional agent using*

a model of the object he originates”¹². Nature is indeed shaped as a park where visitors will have the opportunity to wander and meditate as in “philosophical gardens”¹³. As for Taonaba, it endorses a relation of protection, “the non-reversible domination of the protector over the one who benefits from that protection” (Descola 2005), because nature gains respect through its exhibition. Both Taonaba and the ACTe Memorial projects organize hierarchical relationships between their constitutive entities with culture ruling over nature.

We have shown that these two sites reflect naturalism, a specific anthropological and mesological paradigm which implies a conception of the world divided between nature and culture, and postulates a man endowed with a consciousness opposed to all the other existing beings devoid of consciousness. Beside this intrinsic division, naturalism has affinities with extrinsic hierarchical relations because they are formed between non-equivalent existing beings. These relations are noticeable on the ground in the communication routes: a footbridge for the ACTe Memorial and the Belle-Plaine canal for Taonaba. We think, although this is impossible to prove with only two entities, that reversible relations -expressing relationships between equivalent structures - will not imply an order in their layout and their connections, and that univocal relations - hierarchizing the entities- will orchestrate their respective roles and relationships. It is possible, if we follow this two-step logical process – identification and relations – to link the development of a territory with a vision of the world on an ontological graph.

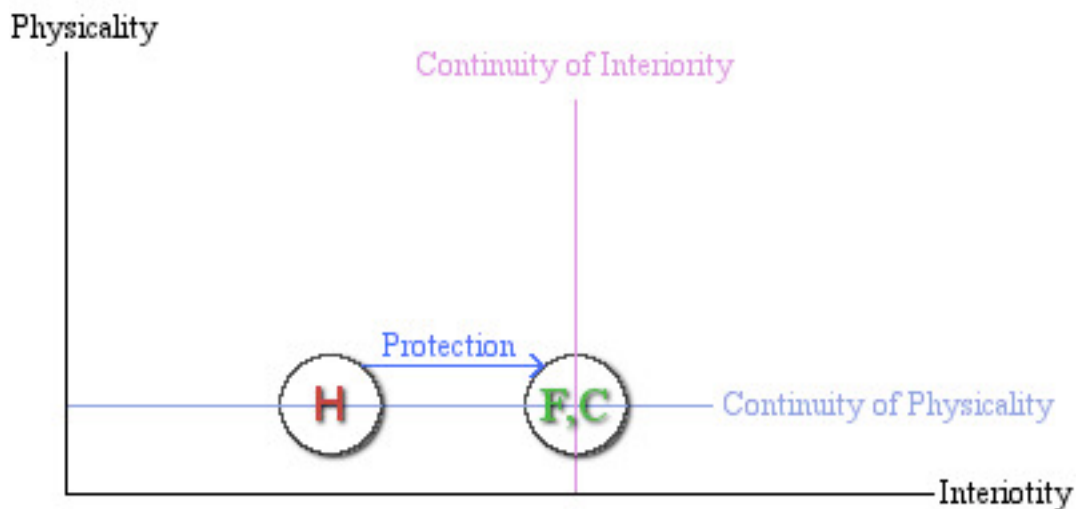


Fig. 7.15 Ontological graph functional for Taonaba’s land management, Western vision with continuity of physicality and discontinuity of interiority between the Human(H) and Non-Human (Banyan tree, crab) collectives and relation of protection between Humans and Non-Humans.

b) Critical Review on the Different Land Management Approaches

We highlighted, in the first step of our study, the intrinsic issue of the land management process, namely determine how to convey the communities’ worldviews in a given area. If the areas are singular, the territories are plural because they embody a geographic, economic, cultural, or social cohesion at different scales. Since there can be no more than a management for a given area, the

¹² Descola, http://www.college-de-france.fr/media/philippe-descola/UPL35675_descola_cours0304.pdf

¹³ <http://www.cr-guadeloupe.fr/upload/documents/Macte12P.pdf>

process leading to implement its organization is of paramount importance for the territories' coherence.

Focusing on our case study, we can distinguish several visions of the world associated to specific territories of Guadeloupe, which we will call "ontological territories":

- A French department in Overseas France , hosting the Western domineering vision;
- A geographic territory claiming an inherent anthropological mix designated as Creole;
- More specific areas, such as Belle-Plaine included in the Taonaba project, where people of slave and Maroon descent identify with a cultural territory in its own right.

We will thus analyze the Taonaba and ACTe Memorial projects in depth and assess their success in dealing with these ontological territories.

Considered by its contemporaries "as an "act" likely to instill and produce a new culture", the ACTe Memorial project echoes the quest of an identity for the Creole territory in Guadeloupe. However, it should be noted that the project complies with the dual nature/ culture pattern. This initial dual conception is nevertheless toned down by the use of the banyan tree analogy as it incorporates an analogist vision of the world. This analogist vision is conveyed by the tree, both in the architecture of the Memorial, "*literally rooted in the land of Guadeloupe as it represents roots in the proper sense, while being visible by all since these roots are those of the banyan tree enclosing ruins as it thrives, thus protecting them from destruction*"¹⁴ and in the Morne Mémoire Park with the "*landscaping of an old preserved banyan tree*".



Fig. 7.16 *Memorial Act cross, from the website "Le courrier de l'architecte" at http://www.lecourrierdelarchitecte.com/article_715.*

As such, the ACTe Memorial project, designed by the " Atelier d'architecture (BMC Jean-Michel Mocka-Celestine and Pascal Berthelot) and Atelier Gold / Marton (Marton and Michael Fabien Gold)" agencies, is a pretty conclusive test of hybrid planning. If the result is interesting, the contest that led to select this major territorial project is a risky method to use. Indeed, the development depends on the personal worldview of the architectural teams, and there is no way to know if this result is truly representative of the various national and regional territorial expectations.

¹⁴ The ACTe Memorial, a foundation for the Guadelupian society http://www.lecourrierdelarchitecte.com/article_714, on 2010/10/31.

Unlike the ACTe Memorial project in which the designers could freely decide on its development, the Taonaba project is directly inspired by the creative process at work in the development of 'administrative counties' (LOADDT Pasqua 1995 and Voynet Act n° 99-503 of 25 June 1999).

The Voynet Act has had two major consequences as regards territorial approach. First it ensures the coherence of the French territory through sustainable development, which is a variant of the naturalistic concept of the world. It also includes participatory consultation as part of the process.

We expect that all the actors involved should take part in the dialogue. However, we notice that "the project is initially developed without taking into account the population living on the Belle-Plaine area" (Lahaye 2008) and that "1) the city of Les Abymes, 2) the semi-public company in charge of land use planning in Guadeloupe 3) the architect and contractor of the project" (Lahaye 2008) alone are included in the process. Similarly, if we analyze the Western approach in planning this project, we realize that the Maroons are located in the natural zone and that the other actors are directly connected to its cultural space. It thus seems logical and coherent with the characteristics of the model of land management not to mobilize the zone of non-humans since only "people" can take part in the process. And yet, once again, if you restrict the definition of a "people" to the collective of Humans alone, it means you disregard all the other cosmologies which ascribe to non-humans interiorities similar to ours. It is thus impossible to reach a real dialogue if it is coupled with a spatial planning approach based on a particular vision of the world, as is the case in some research works in Sustainability Science such as the "participatory processes of co-construction of policy-making,"¹⁵ in which it is wrongly assumed that everyone shares the same worldview.

Using this particular Western approach has another consequence, directly linked to the plurality and coherence of the territories. If the Western vision allows for a continuity in the territory of metropolitan France, it leads to discontinuity for the Maroon and Guadeloupe territories. This ontological incompatibility of the territories, inherent to the particular vision of this approach, leads to a phenomenon of "desynchronization of the territories", meaning that on ontological level, the territory is no longer synchronous with its population. This is, in our view, the starting point of a crisis for the Taonaba project. "Dwellers feel displaced and dispossessed of a space they have appropriated for a long time; vandalism (destruction of equipment, recurring thefts) occurs regularly" (Lahaye 2008).

As we have seen the development of a country is linked to a specific conception of the world. Yet, this development is expressed in an area that can be shared by several ontological territories. It results from the approaches related to the ACTe Memorial and Taonaba projects that a risky approach may lead to better results than a particular approach including a consensus-building process. How, therefore, to set the basis of a controlled territorial approach and avoid the pitfall of a particular vision?

c) Using Relative Universalisms for Territorial Management

According to us, Descola provides some light on the question in his analysis of relative universalisms "with relative as in "relative pronoun," that is, making a connection" (Descola 2006). Their goals are, in Descola's words, to respect "the diversity of the states of the world" (Descola 2006). By studying

¹⁵ Reims University International Sustainability Science Research Center, <http://www.univ-reims.fr/site/laboratoire-labellise/habiter-ea-2076/les-axes-de-recherche/axe-amenagement-urbanisme,11231,23890.html>

the possibility of establishing relations between different universalisms, we hope to create new possibilities for territorial management.

If we consider Alain Le Pichon's analysis in mutual anthropology, mutual knowledge is "the art of discovering and producing a concise network of 'relations of relations'" (Le Pichon 2004). This, in theory, allows us to create relations between several ontological models because they are in themselves a set of relations. "Mutual knowledge is built step after step and develops through mutual acceptance and recognition of the other's models" (Le Pichon 2004). Le Pichon illustrates this acceptance and recognition with the visual play of anamorphosis, in which, by adjusting the arrangement of "these mirrors of hard, distorting glass, which is the way a given culture looks onto another, [we get] the common field of mutual knowledge"(Le Pichon 2004).

"In the game of mutual knowledge, players, partners have to gradually adjust their respective positions until they find the right arrangement and harmony that allow for the emergence of mutual recognition"(Le Pichon 2004).

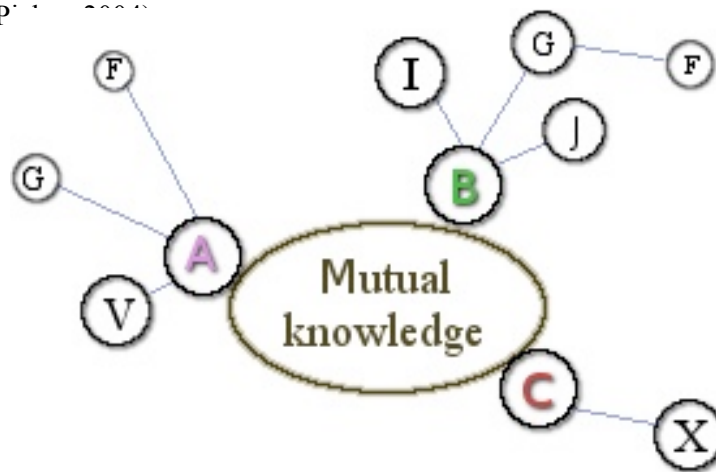


Fig. 7.17 Graph of mutual recognition: reciprocal knowledge as driver of new relations between the ontological graphs (models) of existing beings.

In this example:

- A, B and C are humans;
- X is a collective including the collectives V, G and F;
- V is a collective including the collectives I and J;
- The blue links are undefined relations.

Consultation, which implies the will of several people to reach agreements (to adjust with each other) for a joint project in which they could mutually identify with, would be nothing but the expression of

mutual knowledge in a single object. Consultation could thus lead to ‘harmonia’¹⁶ in a really pluralist Spatial Planning project.

Consultation, by merging all the visions of the world associated to territories rallied around a common spatial management, could theoretically generate a place where all these visions would merge.

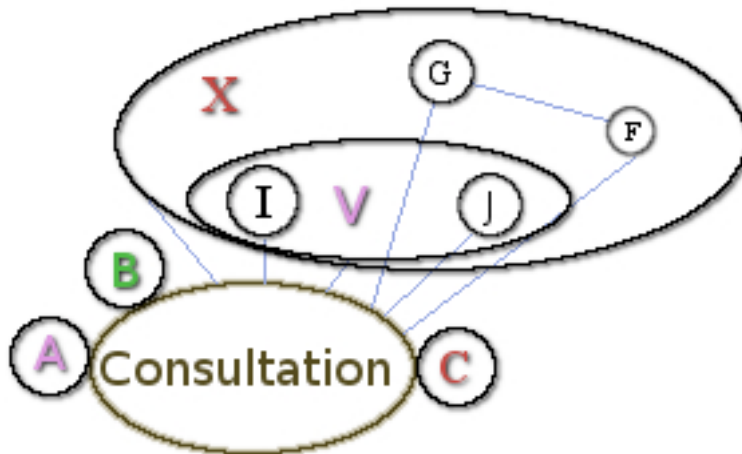


Fig. 7.18 Fusion of various ontological graphs, resulting from consultation transposable to a common project of spatial planning.

Is it possible then, using this method, that all the different territories acknowledge one another? Because, at the end of the day, if planning is the result of all stakeholders, it does not match up any, as Michel Foucault’s reasoning makes us understand.

“[Land Planning] functions as a heterotopy in this respect: it makes this place that I occupy at the moment when I look at myself [through its organization], at once absolutely real, connected with all the space that surrounds it, and absolutely unreal, since in order to be perceived it has to pass through this virtual point which is [my vision of the world]” (Foucault 1984).

Thus including in a single project all the different visions of the territories at stake is not a problem in itself, since each stakeholder will see a coherent planning that matches their vision of the world. Consultation in territorial planning allows the creation of heterotopic places that ensures the coherence of the territories thanks to a pluralist territorial planning.

Our research on Territorial Intelligence was built around an ontological approach of the territory. It is possible, as we have seen, to link a territory’s spatial management to a way of perceiving the world but the basis for an alternative approached both controlled and neutral have to be set. Dialogue has turned out to be the driver of this new open-minded territorial approach as it allows the expression of the territories’ ontological plurality thanks to the development of heterotopic places.

3.2 Social Construction of Human Territories

According to Guy Di Meo (Di Méo 1998), the territory reflects - beyond its strictest definition of an administrative and political entity - an “appropriation of space simultaneously economic, ideological and political (hence social) by groups who present a particular image of themselves, their history and their singularity”. In this highly subjective context, the characterization and understanding of the

¹⁶ From the Greek, meaning “arrangement”.

perception of a same territory by the stakeholders are difficult indeed, but nevertheless particularly interesting from the standpoint of spatial planning and public territorial policy process. The search for related information including groups of stakeholders resorting to the same territorial rhetoric represents a multidisciplinary scientific problem.

It is high time we came back to the central political philosophy which enables us to think through the question of the territory without oversimplifying it.

3.2.1 **Ecumenes, Traces, Repetitions, Reminiscences, the Distance Problem**

The spatial and temporal scales, discretized by the former territorial managers now look artificial and arbitrary. They give way to original choreographies which are baffling for the political authorities: Chronos and Topos surrender to Khôra -the existential place in so far as it is not a mappable place -, Ecumene (see below) and Kairos – the opportune and decisive moment, which cannot be reduced to a chronological moment – the physical ways of being into the world in one’s singularity. The traces, reminiscences, repetitions, problems of distance are once again the basic features of a territory which condition remembrances, the combining of traces and living together. In short, the territory is the condition of possibility of culture. Indeed, culture is the memory of culture, the revival of culture. Culture is what makes the world work: the steps of the donkey charting the Greek Khôra driven by the interplay of light and shade, slopes, grass, a spring, prevailing winds, sea swell. It is all of this, the earth and the sun. The path is repeated, sameness is charted, engraving the route. Traces become collective, collectable, coupled with signages, signposts, landmarks, tags, directions, junctions. Then, spaces are enclosed (heterotopy of the museum, the garden, the cemetery) which form special and separate places, whether specialized or not (territorial facilities such as hospitals and cultural centers), themselves symbolized as cultural attractors (cultural venues).

“The geographicity of the being is indeed nothing but the relation by which the stretch of land is so little alien to the thinking thing that it pertains to its very being. This relation is inextricably geographical and ontological. I call this Ecumene, returning the old Greek word *oikoumenê* its feminine form, making it both the earth and mankind; that by which the earth is human and mankind is terrestrial. The ecumene is the whole set and the condition of human environments, in their very humaneness, but no less in their physicality and ecology. This is what the Ecumene is, the human being’s dwelling place (*oikos*). The ecumene is the bond of mankind with the earth, bond which is simultaneously ecological, technical, and symbolic.” (Berque 2000).

George Perec (Perec 2000) perhaps best knew how to make us feel the intimacy between the question of territory and that of the mnemonic trace, through rituals “I would like there to exist places stable, motionless, intangible, untouched and almost untouchable, immutable, rooted; places that would be references, points of departure, sources. My native country, the cradle of my family, the house where I was born, the tree I would have seen grow (which my father would have planted on the day I was born), the attic of my youth filled with intact memories... Such places do not exist and it’s because they do not exist that space becomes a question, ceases to be an evidence, ceases to be incorporated, ceases to be appropriated. Space is a doubt. I must continually mark it, designate it, it never belongs to me, it’s never given to me, I must conquer it. My spaces are fragile: time is going to wear them away, to destroy them. Nothing will resemble what was any longer, my memories will betray me, oblivion will infiltrate my memory, I shall look at a few old yellowing photographs with broken edges without recognizing them. Space melts like sand running through one’s fingers. Time bears it away and leaves me only shapeless shreds. To write: to try meticulously to retain something, to cause something to survive, to wrest a few precise scraps from the void as it grows, to leave somewhere a furrow, a trace, a mark or a few signs.”¹⁷

3.2.2 **Violence vs. Mediation**

American anthropologist Lawrence Keeley (Keeley 1996) is specialized in the study of prehistoric wars. He has shown that if violence contrasts with mediation – immediateness making it impossible to

¹⁷ Translated by John Sturrock.

deter confrontation – this state of affairs is as old as the hills: “After exploring war before civilization in search of something less terrible than the wars we know, we merely arrive where we started with an all-too-familiar catalog of deaths, rapes, pillage, destruction, and terror. This is a brutal reality that modern Westerners seem very loathe to accept. They seem always tempted to flee it by imagining that our world is the best of all possible ones or that life was better when the human world was far simpler. During this century, anthropologists have struggled with such complacent and nostalgic impulses, even in themselves. Their ambition was and is to explore the human condition at all times and in all places, to enlarge the narrow view of it that the written records of civilized life provide and to, in every sense, “arrive where we started and know the place for the first time”. But these goals and the raw subject matter of anthropology—the origins of humans and their various cultures, social life before cities, states, and historical records — are in every culture but our own the province of mythology. Myths are a consequence of many impulses and serve many purposes, but chief among these are didactic and moralizing ones”[...]“The facts recovered by ethnographers and archaeologists indicate unequivocally that primitive and prehistoric warfare was just as terrible and effective as the historic and civilized version.” *Ibid.*

According to him, this scientific reality is difficult to admit because it is at odds with the great Western myths: “Even today, most views concerning prehistoric (and tribal) war and peace reflect two ancient and enduring myths: progress and the golden age. The myth of progress depicts the original state of mankind as ignorant, miserable, brutal, and violent. Any artificial complexities introduced by human invention or helpful gods have only served to increase human bliss, comfort, and peace, lifting humans out of their ugly and hurtful state of nature. The contradictory myth avers that civilized humans have fallen from grace – from a simple and primeval happiness, a peaceful golden age. All the accretions of progress merely multiply violence and suffering; civilization is the sorry condition that our sinfulness, greed, and technological hubris have earned us. In the modern period, these ancient mythic themes were elaborated by Hobbes and Rousseau into enduring philosophical attitudes towards primitive and prehistoric peoples.” *Ibid.*

This issue relates directly to the question of living space and to Deleuze’s concept of becoming-animal, spreading in a deterritorializing territory and whose keys are to be found in the *Lebenswelt*, as specified by Von Uexküll (Uexküll 1956) among others.

3.2.3 Animal Territory, Borders: *Khôra* and *Kairos*

“The nomad has a territory; he follows customary paths; he goes from one point to another; he is not ignorant of points (water points, dwelling points, assembly points, etc.). But the question is what in nomad life is a principle and what is only a consequence. To begin with, although the points determine paths, they are strictly subordinated to the paths they determine, the reverse of what happens with the sedentary. The water point is reached only in order to be left behind; every point is a relay and exists only as a relay. A path is always between two points, but the in-between has taken on all the consistency and enjoys both an autonomy and a direction of its own. The life of the nomad is the *intermezzo*. Even the elements of his dwelling are conceived in terms of the trajectory that is forever mobilizing them. The nomad is not at all the same as the migrant; for the migrant goes principally from one point to another, even if the second point is uncertain, unforeseen, or not well localized. But the nomad goes from point to point only as a consequence and as a factual necessity; in principle, points for him are relays along a trajectory. Nomads and migrants can mix in many ways, or form a common aggregate; their causes and conditions are no less distinct for that (for example, those who joined Mohammed at Medina had a choice between a nomadic or Bedouin pledge, and a pledge of *hegira* or emigration). Second, even though the nomadic trajectory may follow trails or customary routes, it does not fulfill the function of the sedentary road, which is to parcel out a closed space to people, assigning each person a share and regulating the communication between shares. The nomadic trajectory does the opposite: it distributes people (or animals) in an open space, one that is indefinite and non-communicating. The *nomos* came to designate the law, but that was originally because it was distribution, a mode of distribution. It is a very special kind of distribution, one without division into shares, in a space without borders or enclosure. The *nomos* is the consistency of a fuzzy aggregate: it is in this sense that it stands in opposition to the law or the polls, as the backcountry, a mountainside, or the vague expanse around a city (“either *nomos* or *polis*”). Therefore, and this is the third point,

there is a significant difference between the spaces: sedentary space is striated, by walls, enclosures, and roads between enclosures, while nomad space is smooth, marked only by "traits" that are effaced and displaced with the trajectory.[...] With the nomad, on the contrary, it is deterritorialization that constitutes the relation to the earth, to such a degree that the nomad reterritorializes on deterritorialization itself. It is the earth that deterritorializes itself, in a way that provides the nomad with a territory.[...] The variability, the polyvocality of directions, is an essential feature of smooth spaces of the rhizome type, and it alters their cartography” (Treatise on Nomadology, A Thousand plateaus, [Deleuze et al. 1980¹⁸]).

The territory concretizes, in the words of Gilbert Simondon (Simondon 2012): first overloaded with many contingencies – spatial and temporal like the notions of border and enclosure, but also cognitive like memory which, we assume, is inscribed in places and turns out to be inscribed in human and non-human relationships as well – these contingencies slowly fade away partly under the influence of digital technology, and the territory gradually radicalizes its essence, by deterritorializing all which is not consubstantial with it. The territory soon emerges as the condition of possibility of remembrance, of reminiscence, of traces, of living together and collective resilience, and goes well beyond mere spatial and temporal contingencies.

4 Conclusions: a Well Thought out Knowledge Engineering for Digital Humanities Integrating Differentiated Cosmologies

The territorial intelligence we outline resort to complex systems.

Complex systems are systems with a large number of differentiated entities which interact in complex ways: nonlinear interactions, feedback loops, memory of past interactions. They are characterized by the emergence, at a global level, of new properties unobservable at the level of constituent entities. The local level generates organized forms emerging at the global level, which in turn influences the local level (this is the notion of immergence). Local and global interactions can be combined in the description of their dynamics. In human societies, entities can be agents highly sophisticated themselves, endowed with cognitive, representation and intention faculties, able to develop strategic behavior taking into account the strategies of others crossways.

Complex systems are structured on several levels of organization, composed of heterogeneous entities that may themselves be complex. They cover both physical and natural systems, from the cell to the ecosphere, as well as sophisticated artificial systems - more and more inspired by natural systems men surround themselves with. The foundations for the science of complex systems (Institut des systèmes complexes de Paris Ile-de-France (<http://www.iscpif.fr/AAP2013>)) are both ambitious (reconstruction, modeling and simulation of the systems' dynamics at different scales of observation) and rigorous (confrontation to measures at these different scales).

Understanding complex systems requires their modeling. The models thus constructed are doubly restrained by the usual science rules: they must provide a reconstruction of observable inputs and must be as uncluttered as possible. The reconstruction in itself raises difficult problems - known as inverse problems-: given a phenomenological corpus, which modeling of the entities and interactions are compatible with the corpus. Which are, among the compatible modeling, the simplest? These inverse problems are further complicated when the reconstructions and their associated modeling generate more than one level of emergence. This complication culminates in social sciences and humanities models, in which agents both model and picture the system in which they are themselves included. With the rapid growing mass of more and more sophisticated data, the reconstruction processes tend to form a large class of inverse problems common to all disciplines.

¹⁸ Translated by Brian Massumi.

4.1 Scientific Challenges of Knowledge Engineering for an Enactive Intelligence of Territorial Dynamics

Human interventions in complex systems often produce counter-productive effects, at odds the intentions they stem from. They are highly dependent on how the stakeholders model these complex systems. Complex-system engineering thus comes down to the first class of inverse problems which is their modeling and reconstruction. But it also refers to a new class of difficult problems: finding among the possible actions, those whose consequences are most desirable, or most qualitatively viable over a certain period of time. Once again, this is a large class of inverse problems which raises conventional questions of global control (acting on global interactions), but also new questions and paradoxes on distributed control (acting on local interactions). Is it possible to organize self-organization, to plan emergence? These issues are even more intricate when engineering covers several levels of organization that is the control of systems of systems.

4.1.1 Tools for a Collective Intelligence

In a recent e-book, Jean-François Noubel (Noubel 2007) writes that Collective Intelligence is the study and optimization of emergent properties - be there internal-subjective or external-objective - of the groups, so as to increase their ability to live and evolve fully. It would thus invent tools for a universal governance (global, local, interdisciplinary, cross-cultural ...) while also developing skills useful and immediate for today's organizations through an ethic of collaboration. Collective intelligence is the ability of a group of people to work together to express their own future and achieve it in a complex background.

He advocates collective intelligence -which he distinguishes from its archetypes he refers to as original collective intelligence, pyramidal collective intelligence and collective intelligence swarm- so as to better assert that in the present situation when an economy of abundance (vs. scarcity), of contribution (vs. production) and functionalities (vs. equipment) is possible, it is time to create the holoptic systems needed to operationalize this collective intelligence.

According to him, a holoptic apparatus is a physical or virtual space whose architecture is intentionally conceived to give its stakeholders the faculty to see and perceive the whole of what unfolds in it. "Holopticism is the means by which any participant perceives, in real time, the manifestation of other members of the group (horizontal axis) as well as the superior emerging organization (vertical axis). Thus a sports team works in a holoptical situation because each player perceives what the other players are doing, and each player perceives the emerging figure of the team. Each player then reacts accordingly, which in itself modifies the global pattern, and so on. In this case, the holoptical architecture is organically defined by the 3D space in which our basic organic senses communicate. The opposite of holopticism is panopticism. It consists of a spatial architecture organized so that all information converges toward a central point, while it is partially – and even totally – inaccessible to the others. Video surveillance systems, banks, intelligence services, and jails are examples of panoptical-based environments. This type of organization occurs sometimes in physical space, and sometimes as a result of the way information is distributed. In most companies information systems are a hybrid mix of panoptical and holoptical. While these may offer a certain level of transparency, it is still true that access rights diminish at lower levels in the hierarchy. Information systems in most companies still very much reflect such hierarchies. Absolute holopticism is a necessary but not sufficient condition for the emergence of original collective intelligence. This is also the case for global Collective Intelligence environments. From a technical perspective such artificial spaces can be built for communities having many participants by inventing knowledge and exchange spaces that are accessible and available to everyone in real time, do not overwhelm people with too much information, but provide each one with 'angled' artificially synthesized information (offering an angle, a pertinent point of view that fits with the individual user's situation, and not generalist views), allow materialization (as a perceptible object for our senses, even if virtual), namely

the visualization and circulation of objects-link destined to organize the convergence and the synchronization of the community”¹⁹(Noubel 2007).

Still according to Noubel, once the holoptic visualization tools are more accomplished, it will be easier for an individual to know how to make his individual interests and those of the community converge. This evolution will have a strong impact on the economy as it evolves from a context of swarm intelligence (everyone does the same thing without knowing where it leads) to one of a collective intelligence (everyone builds their benefits depending on the information the community returns).

“A question remains: what allows us to know whether an action is beneficial or not for oneself as well as for the community? Apart from extreme and evident cases, and despite our best intentions, forecasting the outcome remains an act of faith to say the least, a form of research into equilibriums. But one thing seems certain. We make better predictions when collective experience is solicited, precise holistic evaluation methodologies are implemented (including qualitative and quantitative metrics), and actions are clearly accepted and supported by the community. Today, actions undertaken in public life that go through a preliminary evaluation based on these three steps are rare. Products are launched on the market, companies are created, policies are conducted, and social actions are initiated without the moral and ethical consent of the public and the citizens and without applying any methodologies that evaluate the advantages for and threats to the community. Let's anticipate that collective information and evaluation systems will one day be at the disposal of all who wish to weigh, support and invest in projects that are estimated to be beneficial for the community. From an entrepreneurial point of view, this will not only be a guarantee of sustainability but also a source of enhanced upstream support from the marketplace. For the public, this is a guarantee of more safety. For investors, it is a way to bet in an ethical and social dimension on sustainable development, the very foundation of the economy. These financial bets on the future can be rewarded in proportion to the precision of the estimates and the risk over time.” *Ibid.*

Noubel's vision is in perfect synergy with the theory of complex systems mentioned above.

4.1.2 Modeling an Economy of Functionalities and Public Web Services

Web-Content Retrieval and Extraction is a key issue for territorial intelligence so as to provide efficient and convenient Web services. How to and why use Web content mining?

All the discovered traces could allow, beyond the use of official documents as participatory systems, to reconstruct the list of stakeholders involved in a process. According to Eddie Soulier (Soulier et al. 2012), Web content mining is used to collect traces of the action and provides the data for its analysis. Simplicial complexes can be the archetypal mathematical support for this analysis, which must not be taken as a form of data analysis in the usual sense. It is a complementary and enriching form of visualization, which is not subjected to the same constraints as regard data-gathering nor to the same axioms.

It should be noted that the representation by simplicial complexes provides multidimensional networks. They are no longer graphs, or even hypergraphs. A geometric perspective presents the arrangements obtained as a "collage" of polyhedra of all sizes, like Robert Rauschenberg's *Combines*²⁰. Their contacts (the 13 possible connections between attributes) can form chains of adjacencies. Not only is the notion of path used in graphs generalized, but a whole set of quantitative and qualitative data on the structure becomes available (Atkin 1977). Thus, the separate parts, more or less closely connected, and the length the paths ahead, even the closures or “missing” parts are indicators of participation.

Thus the experimentation of web content mining for La Vallée Scientifique de la Bièvre or the Taonaba site in Guadeloupe aims to prepare a full-scale capture. Illustrative examples would give

¹⁹ Translated by Franck Baylin.

²⁰ “The objects I use are most of the time trapped in their ordinary banality. No quest for rareness. In New York, it is impossible to walk the streets without seeing a tire, a can, a cardboard. I only take them and make them their own world...”

way to demonstrative examples meant to assess the performativity of these multidimensional networks. The term full-scale should not be understood as an underlying desire for the absolute or exhaustiveness.

In short, the experimentation of Web content mining is used to initiate a specification for a possible resort to automation, and to clarify how the semantic interpretation of the mathematical model can impact the search and vice versa. The most difficult problem during a search is to discriminate between substances and attributes. In the absence of a predefined nomenclature, the hits surface from targets that range from a blog entry to a thematic collection of documents, the entire archives of an institutional website or even a dedicated journal.

Thus the experimentation raises the following typical questions:

- What benefits can be drawn from a quantified assessment of a full-scale search?
- What are the advantages in using multiple search engines and / or several types of search engines?
- What are the effects of searches extended over long periods of time, in terms of updates, archiving, evolution, and stability?

4.2 Digital Humanities Integrating Differentiated Cosmologies: a new Eldorado for Knowledge Engineering?

If computer science and digital technologies started their meteoric career in the industry, even before seducing the public, the explanation probably lies in the combination of two distinct reasons. First, engineering, much more than the humanities, is based on formal and computable models which are particularly well adapted to be operationalized on Turing machines. Secondly, the very culture of engineers is, even before being a scientific culture, the quest for empirical result, open to experimentation, provided it leads to economies of scale.

Yet, the possibility for digital humanities was there from the start of computer science as Turing's work on artificial intelligence and his imitation game (Turing 1950) shows. The digital has not only conquered engineering, but also people's everyday lives. Digital humanities still has to take off. This will, no doubt, be the revolution of the twenty-first century.

Digital humanities are no doubt in need for knowledge engineering to become scientific disciplines, but the reverse is perhaps even more blatant. The epistemologies underlying today's knowledge engineering are often sketchy and therefore without nuance, and even at times radically hegemonic – as field researchers did not get a chance to ponder over ontological differentiation, engrossed as they were by the technical challenges their new discipline posed them. Thus, digital humanities integrating differentiated cosmologies, capable of structuring a cultural dialogue within a globalized humanity, will most likely be a real Eldorado for second-generation knowledge engineering.

Territorial intelligence is no doubt a prototype of this new knowledge engineering. One of the main obstacles it has to deal with is the confrontation of the different possible representations of the territory involved in this territorial intelligence: representation through places and structures, representation stemming from the structuring body, the ruling body, and the decision makers and eventually representation by the actors and agents impacted by the decision.

It is only after a comprehensive confrontation of these different representations has taken place that structuring will be effective and the information system fully operating.

A representation that would be but a digitization of the territories falls prey to the expectations of the information systems it faces. Interactions between these systems are real and effective. A preliminary conception of this confrontation and of the dynamics that bear it is necessary to ensure a representation that would be not immediately or too quickly challenged. This condition is essential to make it acceptable.

Providing tools to make the confrontations between the three main forms of identified representations operating would, on the contrary, ensure their projections onto each plane, and particularly onto the plane of the territory, and complement the traditional information systems based only on the plane of the territory.

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6 Bibliographie

[Ahrens 97]. Ahrens, T., Talking accounting: An ethnography of management knowledge in British and German brewers. *Accounting, Organizations and Society* 22(7): 617-637, 1997.

[Alvesson 98]. Alvesson, M. Review: The Politics of Management Knowledge. by Stewart Clegg and Gill Palmer. *Administrative Science Quarterly* 43(4): 938-942, 1998.

[Amabile & al. 05]. Amabile, T. M., S. G. Barsade, J. S. Mueller and B. M. Staw, Affect and creativity at work. *Administrative Science Quarterly* 50(3): 367-403, 2005.

[Argyris & al. 94]. Argyris, C. and R. S. Kaplan. Implementing new knowledge: The case of activity-based costing. *Accounting Horizons* (September): 83-105, 1994.

[Argyris 77]. Argyris C. Organizational learning and management information systems. *Accounting, Organizations and Society* 2(2): 113-123, 1977.

[Argyris 88]. Argyris, C. Producing knowledge that is generalizable and usable for practice: A review. *Accounting, Organizations and Society* 13(1): 101-106, 1988.

[Arnstein 69]. Sherry Arnstein, *A Ladder of Citizen Participation*, Journal of American Institute of Planners, 35 (4), pp. 216-224, 1969.

[Atkin 74]. Ron Atkin, *Mathematical Structure in Human Affairs*, London, Heinemann, 1974.

[Atkin 77]. Ron Atkin, *Combinatorial Connectivities in Social Systems*, Basel, Birkhäuser Verlag, 1977.

[Atkin 81]. Ron Atkin, *Multidimensional Man: Can Man Live in 3-dimensional Space?*, Penguin Books, 1981.

[Atwood 09]. Atwood, C. G. *Knowledge Management Basics*. (ASTD Training Basics Series). ASTD Press, 2009.

[Awad & al. 10]. Awad, E. M. and H. Ghaziri. *Knowledge Management: Updated 2nd edition*. International Technology Group, LTD, 2010.

[Bailey & al. 89]. Bailey, A. D. Jr., A. B. Whinston and P. T. Zacarias. Knowledge representation theory and the design of auditable office information systems. *Journal of Information Systems* (Spring): 1-28, 1989.

[Becerra-Fernandez & al. 10]. Becerra-Fernandez, I. and R. Sabherwa. *Knowledge Management: Systems and Processes*. M. E. Sharpe, 2010.

[Berque 00]. Augustin Berque, *Écoumène, introduction à l'étude des milieux humains*, Paris, Belin, 2000.

[Bhimani & al. 04]. Bhimani, A. and H. Roberts. Management accounting and knowledge management: In search of intelligibility. *Management Accounting Research* (March): 1-4, 2004.

[Birkinshaw & al. 02]. Birkinshaw, J. and T. Sheehan. Managing the knowledge life cycle. *MIT Sloan Management Review* (Fall): 75-83, 2002.

[Blondiaux & al. 11]. Loïc Blondiaux, Jean-Michel Fourniau, *Un bilan des recherches sur la participation du public en démocratie : beaucoup de bruit pour rien ?*, Revue de sciences sociales sur la démocratie et la citoyenneté Participations, n°1/2011, Edts de Boeck, 2011.

- [Boland & al. 01]. Boland, R. J. Jr., J. Singh, P. Salipante, J. D. Aram, S. Y. Fay and P. Kanawattanachai. Knowledge representations and knowledge transfer. *The Academy of Management Journal* 44(2): 393-417, 2001.
- [Bonner 90]. Bonner, S. Experience effects in auditing: The role of task-specific knowledge. *The Accounting Review* (January): 72-92, 1990.
- [Bouleau 11]. Nicolas Bouleau, *Risk and Meaning: Adversaries in Art, Science and Philosophy*, Springer, March 2011.
- [Brown & al. 01]. Brown, J. S. and P. Duguid. Creativity versus structure: A useful tension. *MIT Sloan Management Review* (Summer): 93-94, 2001.
- [Bukowitz & al. 97]. Bukowitz, W. and G. Petrash. Visualizing, measuring and managing knowledge. *Research Technology Management* (July/August): 24-31, 1997.
- [Bunderson 03]. Bunderson, J. S. Recognizing and utilizing expertise in work groups: A status characteristics perspective. *Administrative Science Quarterly* 48(4): 557-591, 2003.
- [Callon & al. 01]. Michel Callon, Pierre Lascoumes, Yannick Barthes, *Agir dans un mode incertain. Essai sur la démocratie technique*, La couleur des idées, Seuil, 2001.
- [Chen & al. 10]. Chen, A. N. K., Y. Hwang and T. S. Raghu. Knowledge life cycle, knowledge inventory, and knowledge acquisition strategies. *Decision Sciences* 41(1): 21-47, 2010.
- [Corboz & al. 09]. André Corboz, Giordano Tironu, *L'espace et le détour, Entretiens et essais sur le territoire, la ville, la complexité et les doutes*, Editions hepia, l'Age d'Homme, Lausanne, 2009.
- [Coyne & al. 07]. Coyne, K. P., P. G. Clifford and R. Dye. Breakthrough thinking from inside the box. *Harvard Business Review* (December): 70-78, 2007.
- [Dalkir & al. 11]. Dalkir, K. and J. Liebowitz. *Knowledge Management in Theory and Practice*. The MIT Press, 2011.
- [Daniell & al. 10]. KA Daniell, I. White, N. Ferrand, P. Coad, IS. Ribarova, J-E. Rougier, M. Hare, A. Popova, NA. Jones, S. Burn, P. Perez, *Co-engineering Participatory Water Management Processes: Theory and Insights from Australian and Bulgarian Interventions*, Ecology and Society, vol. 15, no. 4, art. 11, IF 3:3, 2010.
- [Davenport & al. 98]. Davenport, T. H., D. W. DeLong and M. C. Beers. Successful knowledge management projects. *Sloan Management Review* (Winter): 43-57, 1998.
- [Davis & al. 97]. Davis, L. R., M. D. Dwyer and G. M. Trompeter. A note on cross-sectional tests for knowledge differences. *Behavioral Research In Accounting* (9): 46-59, 1997.
- [Deleuze & al. 80]. Gilles Deleuze, Felix Guattari, *Mille Plateaux*, Paris, Minuit, 1980.
- [Deleuze 89]. Gilles Deleuze, *Qu'est-ce qu'un dispositif ?*, Rencontre internationale « Michel Foucault philosophe », Paris, 9/11 Janvier 1988, Seuil, 1989.
- [Descola 05]. Philippe Descola, *Par-delà nature et culture*, Gallimard, 2005.
- [Descola 06]. Philippe Descola, *Anthropologie de la nature*, exposé à l'Unesco le 16 juin 2006.
- [Di Méo 98]. Guy Di Méo, *Géographie sociale et territoires*, Paris, Nathan, 1998.
- [Dilnutt 02]. Dilnutt, R. Knowledge management in practice: Three contemporary case studies. *International Journal of Accounting Information Systems* 3(2): 75-81, 2002.
- [Dixon 00]. Dixon, N. M. *Common Knowledge: How Companies Thrive by Sharing What They Know*. Harvard Business School Press, 2000.
- [Dyer & al. 00]. Dyer, J. H. and K. Nobeoka. Creating and managing a high-performance knowledge-sharing network: The Toyota case. *Strategic Management Journal* (21): 345-367, 2000.
- [Easterby-Smith & al. 03]. Easterby-Smith, M. and M. A. Lyles. Editors. *The Blackwell Handbook of Organizational Learning and Knowledge Management* (Blackwell Handbooks in Management). Blackwell Publishers, 2003.
- [Elias & al. 06]. Elias, N. and A. Wrigh. Using knowledge management systems to manage knowledge resource risks. *Advances in Management Accounting* (15): 195-227, 2006.

- [Ericsson & al. 07]. Ericsson, K. A., M. J. Prietula and E. T. Cokely. The making of an expert. *Harvard Business Review* (July-August): 114-121, 2007.
- [Foucault 84]. Michel Foucault, *Dits et écrits* 1984, Des espaces autres (conférence au Cercle d'études architecturales, 14 mars 1967), in *Architecture, Mouvement, Continuité*, n°5, pp. 46-49, octobre 1984.
- [Geerts & al. 00]. Geerts, G. L. and W. E. McCarthy. Augmented intensional reasoning in knowledge-based accounting systems. *Journal of Information Systems* (Fall): 127-150, 2000.
- [Geisler & al. 09]. Geisler, E. and N. Wickramasinghe. *Principles of Knowledge Management: Theory, Practice and Cases*. M. E. Sharp, 2009.
- [George & al. 11]. George J. and A. George. An integrative approach to planning and control using a stakeholder-based knowledge management system. *Journal of Applied Management Accounting Research* (Winter): 1-20, 2011.
- [Gibbins 05]. Gibbins, M. and S. Q. Qu. Eliciting experts' context knowledge with theory-based experiential questionnaires. *Behavioral Research in Accounting* (17): 71-88, 2005.
- [Girardot 00]. Jean-Jacques Girardot, *Principes, Méthodes et Outils d'Intelligence Territoriale - Évaluation participative et Observation coopérative*, Séminaire européen de la Direction Générale de l'Action Sociale du Portugal « Conhecerc melhor para agir melhor », EVORA (Portugal), DGAS 7-17, 3-5 mai 2000.
- [Girardot 04]. Jean-Jacques Girardot, *Intelligence territoriale et participation*, Actes des 3^{ème} rencontres « TIC & Territoire : quels développements ? », Enic et Cies, ISDM, n° 16, 13 p., Lille, 14 mai 2004.
- [Glissant 96]. Edouard Glissant, *Introduction à une poétique du divers*, Gallimard, 1996.
- [Goodman & al. 76]. Goodman, R. A. and L. P. Goodman. Some management issues in temporary systems: A study of professional development and manpower - The theater case. *Administrative Science Quarterly* 21(3): 494-501, 1976.
- [Govindarajan & al. 04]. Govindarajan, V. and C. Trimble. Strategic innovation and the science of learning. *MIT Sloan Management Review* (Winter): 67-75, 2004.
- [Hammer & al. 04]. Hammer, M., D. Leonard and T. Davenport. Why don't we know more about knowledge. *MIT Sloan Management Review* (Summer): 14-18, 2004.
- [Hansen 99]. Hansen, M. T. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly* 44(1): 82-111, 1999.
- [Helmer & al. 59]. Helmer, O. and N. Rescher. On the epistemology of the inexact sciences. *Management Science* (October): 25-52, 1959.
- [Hennion 10]. Antoine Hennion, *Vous avez dit attachements ?*, in Akrich M., Barthe Y., Muniesa F., Mustar P. (ed.), *Débordements Mélanges offerts à Michel Callon*, Paris, Presses des Mines, p.179-190, 2010.
- [Hislop 09]. Hislop, D. *Knowledge Management in Organizations*. Oxford University Press, USA, 2009.
- [Huang & al. 98]. Huang, K., Y. W. Lee and R. Y. Wang. *Quality Information and Knowledge Management*. Prentice-Hall, 1998.
- [Huet & al. 08]. Frédéric Huet, Pergia Gkouskou Giannakou, Hugues Choplin, Charles Lenay, *Entre territoire et apprentissage, les dynamiques d'agencement*, De Boeck Université, *Revue internationale de projectique* 2008/1, pp. 55-67, 2008.
- [Jouvenel 02]. Bertrand de Jouvenel, *Arcadie, Essais sur le mieux-vivre*, Tel gallimard, 2002.
- [Keeley 96]. Lawrence H. Keeley, *War before Civilization*, Oxford University Press, 1996.
- [Kogut 00]. Kogut, B. The network as knowledge: Generative rules and the emergence of structure. *Strategic Management Journal* (21): 405-425, 2000.
- [Krtolica 09]. Igor Krtolica, *Diagramme et agencement chez Gilles Deleuze : L'élaboration du concept de diagramme au contact de Foucault*, *Filozofija i društvo*, Volume 20, Issue 3, pp. 97-124, 2009.
- [Kuhn 83]. Thomas Samuel. Kuhn, *La Structure des révolutions scientifiques*, Paris, Flammarion (Champs), 1983.
- [Lahaye 08]. Nathalie Lahaye, *Evaluation de la participation et graphe d'influence pour une gouvernance participative en éco-tourisme. Le cas du projet écotouristique Taonaba, en Guadeloupe*, XLVème colloque de

l'ASRDLF <http://asrdlf2008.uqar.qc.ca/Papiers%20en%20ligne/LAHAYE-evaluation.pdf>, Rimouski, Canada, 2008.

[Latour 10a]. Bruno Latour, *Cogitamus. Six lettres sur les humanités scientifiques*, La Découverte, 2010.

[Latour 10b]. Bruno Latour, *Avoir ou ne pas avoir de réseau : That's the question*, in Madeleine Akrich et al. (sous la direction de) *Débordements. Mélanges offerts à Michel Callon*, Presses de l'École des Mines, pp. 257-268, 2010.

[Le Pichon 04]. Alain Le Pichon, *Stratégies transculturelles pour un monde multipolaire*, Alliage n°55-56, pp. 17-28, <http://revel.unice.fr/alliage/index.html?id=3586> mars 2004.

[Leech & al. 02]. Leech, S. A. and S. G. Sutton. Knowledge management issues in practice: Opportunities for research. *International Journal of Accounting Information Systems* 3(2): 69-73, 2002.

[Leitner & al. 04]. Leitner, K. and C. Warden. Managing and reporting knowledge-based resources and processes in research organisations: Specifics, lessons learned and perspectives. *Management Accounting Research* (March): 33-51, 2004.

[Lévy & al. 09]. Jacques Lévy Michel Lussault, *Dictionnaire de la géographie et de l'espace des sociétés*, Paris: Belin, 2009.

[Majchrzak & al. 06]. Majchrzak, A., D. Logan, R. McCurdy and M. Kirchmer. Four keys to managing emergence. *MIT Sloan Management Review* (Winter): 14-18. (Continuous discourse with potential participants, continuous updating of knowledge maps, blurring the boundaries between participants inside and outside the organization, and governing through reputation networks), 2006.

[Malone 03]. Malone, J. D. Shooting the past: An instructional case for knowledge management. *Journal of Information Systems* (Fall): 41-49, 2003.

[McCall & al. 08]. McCall, H., V. Arnold and S. G. Sutton. Use of knowledge management systems and the impact on the acquisition of explicit knowledge. *Journal of Information Systems* (Fall): 77-101, 2008.

[Merino 93]. Merino, B. D. An analysis of the development of accounting knowledge: A pragmatic approach. *Accounting, Organizations and Society* 18(2-3): 163-185, 1993.

[Meunier 12]. Jean-Guy Meunier, *Humanités numériques, enjeux et méthodes*, Texto!, Volume XVII n°1&2, Coordonné par Jean-Louis Vaxelaire, 2012.

[Mintzberg 94]. Henry Mintzberg, *Grandeur et décadence de la planification stratégique*, Dunod, 1994.

[Mizruchi & al. 99]. Mizruchi, M. S. and L. C. Fein. The social construction of organizational knowledge: A study of the uses of coercive, mimetic, and normative isomorphism. *Administrative Science Quarterly* 44(4): 653-683, 1999.

[Monnoyer-Smith 11]. Laurence Monnoyer-Smith, *La participation en ligne, révélateur d'une évolution des pratiques politiques ?*, *Revue de sciences sociales sur la démocratie et la citoyenneté Participations*, n°1/2011, Edts de Boeck, 2011.

[Montesquieu 08]. Charles-Louis Montesquieu, *Considérations sur les causes de la grandeur des Romains et de leur décadence*, Gallimard, 2008.

[Muller 09]. Pierre Muller, *Les politiques publiques*, Presses universitaires de France, 2009.

[Mullin 96]. Mullin, R. Knowledge management: A cultural evolution. *Journal of Business Strategy* (September/October): 56-61, 1996.

[Nag & al. 07]. Nag, R., K. G. Corley and D. A. Gioia. The intersection of organizational identity, knowledge, and practice: Attempting strategic change via knowledge grafting. *The Academy of Management Journal* 50(4): 821-847, 2007.

[Noubel 07]. Jean-François Noubel, *Intelligence collective, la révolution invisible*, TheTransitioner, <http://www.thetransitioner.org/wikifr/tiki-index.php?page=La+r%C3%A9volution+invisible>, 2007.

[O'Dell & al. 98]. O'Dell, C. and C. J. Grayson. If only we knew what we know: Identification and transfer of internal best practices. *California Management Review* (Spring): 154-174, 1998.

[O'Leary 00]. O'Leary, D. E. and P. Selfridge. Knowledge management for best practices. *Communications of the ACM* (November), 2000.

- [O'Leary 98]. O'Leary, D. E. Knowledge management systems: Converting and connecting IEEE Intelligent Systems (May-June): 30-33, 1998.
- [O'Leary 98]. O'Leary, D. E. Using AI in knowledge management: Knowledge bases and ontologies. IEEE Intelligent Systems (May-June): 34-39, 1998.
- [O'Leary 99]. O'Leary, D. E. REAL-D: A schema for data warehouses. Journal of Information Systems 13(1): 49-62, 1999.
- [Ostrom & al. 06]. Elinor Ostrom, Charlotte Hess, *Understanding Knowledge as a Commons: From Theory to Practice*, The MIT Press, Cambridge, Massachusetts, 2006.
- [Ostrom 05]. Elinor Ostrom, *Understanding Institutional Diversity*, Princeton, NJ: Princeton University Press, 2005.
- [Perec 00]. Georges Perec, *Espèces d'espace*, Galilée, 2000.
- [Plumlee 01]. Plumlee, D. Discussion of "The effect of task complexity and expert system type on the acquisition of procedural knowledge: Some new evidence". International Journal of Accounting Information Systems 2(2): 125-129, 2001.
- [Reagans & al. 05]. Reagans, R., L. Argote and D. Brooks. Individual experience and experience working together: Predicting learning rates from knowing who knows what and knowing how to work together. Management Science (June): 869-881, 2005.
- [Renard 09]. Jean Renard, *Territoires, territorialité, territorialisation, Controverses et perspectives*, Norois, n°210/2009, Dir. M. Vanier, pp. 109-110, 2009.
- [Rose 07]. Rose, J. M., A. M. Rose and B. McKay. Measurement of knowledge structures acquired through instruction, experience, and decision aid use. International Journal of Accounting Information Systems 8(2): 117-137, 2007.
- [Rousseaux & al. 12]. Francis Rousseaux, Eddie Soulier, Pierre Saurel, Houda Neffati, *Agencement multi-échelle de territoires à valeur ajoutée numérique, Politiques publiques, Systèmes complexes*, D. Bourcier, R. Boulet, P. Mazzega (eds), Hermann, pp.169-193, 2012.
- [Rousseaux 95]. Francis Rousseaux, *Contribution à une méthodologie d'acquisition des connaissances pour l'ingénierie des Systèmes d'Information et de Communication : l'exemple de CHEOPS pour l'aide à la gestion de crises collectives à caractère géopolitique*, Habilitation à Diriger des Recherches, Université Paris 6, 22 février 1995.
- [Sauvé 09]. Lydie Sauvé, *Being Here Together*. In McKenzie, M., Hart, P., Heesoon, B. and Jickling, B. *Fields of green: restorying culture, environment, and education* (p. 325-335). New Jersey: Hampton Press, 2009.
- [Schulz 01]. Schulz, M. The uncertain relevance of newness: Organizational learning and knowledge flows. The Academy of Management Journal 44(4): 661-681, 2001.
- [Sgard & al. 10]. Anne Sgard, Marie-José Fortin et Véronique Peyrache-Gadeau, *Le paysage en politique*, Dossier « Paysage et développement durable », Revue électronique Développement durable & territoires, Vol.1, n°2, Septembre 2010.
- [Simondon 12]. Gilbert Simondon, *Du mode d'existence des objets techniques*, Aubier, 2012.
- [Simonin 97]. Simonin, B. L. The importance of collaborative know-how: An empirical test of the learning organization. The Academy of Management Journal 40(5): 1150-1174, 1997.
- [Singh 05]. Singh, J. Collaborative networks as determinants of knowledge diffusion patterns. Management Science (May): 756-770, 2005.
- [Smedley & al. 04]. Smedley, G. A. and S. G. Sutton. Explanation provision in knowledge-based systems: A theory-driven approach for knowledge transfer designs. Journal of Emerging Technologies in Accounting (1): 41-61, 2004.
- [Smedley & al. 07]. Smedley, G. and S. G. Sutton. The effect of alternative procedural explanation types on procedural knowledge acquisition during knowledge-based systems use. Journal of Information Systems (Spring): 27-51, 2007.
- [Soulier & al. 11]. Eddie Soulier, Jacky Legrand, Francis Bugeaud, Francis Rousseaux, Houda Neffati, Pierre Saurel, *Territorial Participative Agencement: a Case Study of Vallée Scientifique de la Bièvre as*

Multidimensional Network, Workshop “Les effets de la participation”, Congrès Démocratie & Participation, 18-21 octobre, Paris, 2011.

[Soulie & al. 12]. Eddie Soulier, Francis Rousseaux, Houda Neffati, Jacky Legrand, Florie Bugeaud, Pierre Saurel, Philippe Calvez, *Performativité organisationnelle des outils d'agencements territoriaux : vers une intelligence territoriale à base d'engagements ?*, Conférence internationale ACFAS, Organisations, performativité et engagement, Montréal, pp. 150/173, 7-11 mai 2012.

[Tan & al. 97]. Tan, H. and R. Libby. Tacit managerial versus technical knowledge as determinants of audit expertise in the field. *Journal of Accounting Research* (Spring): 97-113, 1997.

[Turing 50]. Alan Turing, *Computing Machinery and Intelligence*, *Mind*, Vol. 59, n°36, pp. 433-460, 1950.

[Uexküll 56]. Jakob Von Uexküll, *Mondes animaux et mondes humains*, Denoël, 1956.

[Wang 09]. Fei-Yue Wang, *Is Culture Computable?*, *IEEE Intelligent Systems* 24(2): 2-3, 2009.

[Wenger & al. 02]. Wenger, E., R. McDermott and W. M. Snyder. *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Harvard Business School Publishing, 2002.

[Wright & al. 04]. Wright, W. F., N. Jindanuwat and J. Todd. Computational models as a knowledge management tool: A process model of the critical judgments made during audit planning. *Journal of Information Systems* (Spring): 67-94, 2004.

[Yayavaram & al. 08]. Yayavaram, S. and G. Ahuja. Decomposability in knowledge structures and its impact on the usefulness of inventions and knowledge-base malleability. *Administrative Science Quarterly* 53(2): 333-362, 2008.

[Zadrozny 06]. Zadrozny, W. Leveraging the power of intangible assets. *MIT Sloan Management Review* (Fall): 85-89, 2006.