Territorial Intelligence & Artificial Intelligence : On Discussion

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ABSTRACT----
Aims: As we have been working for almost twenty years on territorial intelligence at different scales, subjects, contents, responsibilities and with stakeholders in charge of, we need to discuss how such research fields, Territorial Intelligence (TI) & Artificial Intelligence (AI) in appearance so distinct, even separated without any connections, could meet with each others in order to imagine space for both applications and may be cooperation between them.
Study design: This specific research, based on precedent researches, aimed identifying how Territorial Intelligence (TI) & Artificial Intelligence (AI) in appearance so distinct, even separated without any connections, could meet with each others in order to imagine space for both applications and may be cooperation between them.
Place and Duration of Study: University of Toulon, International Institute of Territorial Intelligence (3IT), SITIV Syndicate (France) and College for Teaching and Education (ESPE) from between 2010 and 2016.
Methodology: We begin to examine our paste, published works, extract propositions (totally or partially) from artificial intelligence authors we think they are able to include calibrated information as we suggested, in association with precise territorial intelligence assumptions and for the use on organizing such meeting.
Results: For all spatial functionality we are considering for our purpose, we are positioning, their content, Territorial Intelligence Process, Artificial Intelligence, high Focus/low Focus spectrum.
Conclusion: Along the paper we are displaying figures to pave the way of our discussion and, finally, we suggested through a table for each spatial functionality studied, functionality title, description, T.I.P (territorial intelligence assumptions), A.I Focus.

Keywords--- artificial intelligence, human consciousness, information, mind, non human, territorial Intelligence process

1. INTRODUCTION. GENERAL CONSIDERATIONS ABOUT OUR IN CASE SUBJECT

1.1. A wide range of technology innovation and information flow

Everywhere into the old industrial countries and on the former industrial manufacturing sites, where so many activities were located, then lost jobs vanished, and to replace past activities, we can see all kind of the followings activities (in other part): polymer companies, specialty-chemical industry, semiconductors, robots (robotics), 3-D printers and of course, everywhere IT.

Klaus Schwab [1]. (TIME January 25, 2016), founder of the World Economic Forum in Davos gave us .a resume of the year big subject "We are at the tipping point of a whole variety of interconnected technological breakthroughs: robots, drones, intelligence cities, artificial intelligence, brain research." And he added "What differentiates the fourth industrial revolution is that it's not a product revolution. It's a system revolution."

At this particularly point of technology evolution, we can't put aside the question of men domination by technology because in such system revolution (combination of human and non human) we can first of all no master all these technologies |2] and, finally, because men, made of brain, soul, heart, are part of human society, we need more human, by the end of this revolution and the robot will never the ability to believe in something. Human free will could be the difference.

But, in relation with Alan Turing (1912-1954) theory which put there might be no difference between human minds and machines power advance, the distinction could result of the free will exercise for humans. Turing in "Computing Machinery and Intelligence" [3] (Turing, 1950, p.433) in section 1 entitled *The Imitation Game* started his paper with

such a question "Can machines think?" and by comparison we may write if humans have "free will", consciousness, heart, soul (perhaps) they are, at first consideration, fundamentally different from a computer machine. At this stage of our paper, in association with our mixed object, Territorial Intelligence and Artificial Intelligence, we will not write (as Turing initially done) "*from a programmed machine*" point of view.

1.2. A brief of contemporary considerations on both jobs lost, recreation jobs due to of the future factory

Due to economic transition for the old industrial nations in search of competiveness (maintaining it) and transformation of industrial economies into development-oriented in so-called tertiary activities, Ian Bremmer [4] (Time, April 25, 2016, page 8, The Risk Report) presented the Future Factory "Future factory jobs will go to those who can program, run and maintain fast-evolving high tech equipment in the age of robotics, and those flexible and resourceful enough to succeed in many different roles." Following this sentence, and at this step of our thinking, we have to convoke Artificial Intelligence due to its role, present and future, into such a deep movement.

1.3. Artificial Intelligence: definition and fields of applications

A general definition of AI, among others, shows research on that subject aims on both foundation AI and applied AI areas so a research team engaged in can focus its research in knowledge representation and reasoning, intelligent agents, information security, image processing and data mining [5];[6]. Nature of AI research projects may be: data-intensive knowledge representation and query answering, logic based strategic reasoning, and policy reasoning and update.

We noted, through all scientific publications we read, that the most contested and potentially *dynamic* frontiers in tech is so-called machine learning or reaching computers to teach themselves because by aggregating huge information storehouses with the help of so called machine learning companies make profit with (see Microsoft's LinkedIn buy cited by *TIME*). We'll see later how, where and then we are concerned by, because of our try to imbricate AI with Territorial Intelligence, we present in the following section, as we suggested through past publications.

1.4. The Territorial Intelligence frame: definition, project, systemic approach, meaning, assumptions, formal capital

1.4.1. Territorial intelligence as Information and Communication process of collective action for endogenous territorial development

Through previous works lead by Bertacchini by the end of the 90s, he defined territorial intelligence as "an information and anthropological process, regular and continuous, initiated by local actors, physically present and / or distant, who intend to appropriate land resources by mobilizing and transforming the energy of the territorial system into a project capacity"[7,p3], [7a]. This approach requires a change of attitude from the local stakeholders in terms of their treatment of signs and information [5]. Local stakeholders need to abandon their communication routines to adopt the logic of a shared project. Attitudinal change also implies the adoption of a collective territorial intelligence stance to anticipate the risks of breakdown [8],[9].

1.4.2. The territory, object of complexity, calls for a systemic approach, a shared territoriality made of meanings.

The territory is considered here through a systemic approach [9],[10] as "a set of interacting dynamic components organized towards a goal"[11, p.93]. Its representation can be done with the meta model of Schwarz [12],[12a] which has previously been adopted by several authors in business intelligence and territorial intelligence. Schwartz's meta-model is based on three nested and interrelated levels: the physical level of materiality and energy, the logical level of information and representations, and the identity level of territoriality and self-reference.

In a territorial intelligence process, a territory, considered simultaneously at the three intertwined levels, is self-organizing, becomes autonomous, acquires capacity of self-analysis and monitoring, and develops a shared awareness of its own image and a self-identity. Such a process cannot just be announced, it is always rooted in a specific territorial culture in terms of its governance. It requires a deliberate collective will, a networking process and specific resources in order to spread out. Meaning emerges from informational and communicational processes at work between local stakeholders which help to develop a system of shared representations, a certain culture [13].

From a territorial intelligence perspective, the question of meaning can be assimilated to that of territoriality, a true informational and communicational phenomenon at transforms a given space into a territory for a local society[14].Meaning emerges in each of the three levels of the meta model: (i) the physical space, when actors appropriated resources of this shared area for their activities, a more or less regulated, recognized and negotiated process within the network of stakeholders concerned by these resources, (ii) the logical space, when actors produce, exchange and adhere to shared representations of the territorial reality (made of physical or conceptual interrelated objects) as well as to negotiated agreements for the use of land resources in the physical plane, and (iii) the identity space, when actors refer to shared symbols and social norms, to a common vision of the future expressed in a specific project which constitutes the main symbolic resource to consolidate the identity.

When a territory chooses an endogenous development based on territorial intelligence, it will seek to develop a substrate, called "formal capital" [14], necessary for this development: it is a set of values, codes, rules, forms of interaction and coordination, explicit knowledge contained in digital documents, identified and shared by local actors to formulate or implement a collective local development project.

A shared territoriality, as described above, is the main vector for strengthening this type of capital and policies can enrich the formal capital of a territory by bringing new habits of public participation, regulation of social relationships, use of shared territorial resources, and new symbols strengthening the territorial identity. Indeed, these new public policies force local territories to organize themselves to formalize local realities in diagnosis documents and to express political choices in development projects. These top-down statutory requirements mechanically increase the formal capital of the territory. However, the formal capital will be more or less significant and its use will depend on whether planning is conducted as a technocratic mandatory exercise, or as a broad, collective and meaningful process to forge a common destiny.

After this short presentation as we above made of territorial Intelligence as an informational process imbricate with communication features, we can stress that the question of meaning take a central position and role of meaning deserve special attention. In that way and without any consideration to complexity as a result of deluge of information we will not find the needed attention in order to capture information data, put a credit to collected information data and then make exchanges with other local stakeholders to participate to the territorial project. But through the deluge of information we can meet a chaos of complexity [15].

2. AFTER THE DELUGE OF INFORMATION, A CHAOS OF COMPLEXITY

If in the past information was hard to find, or at many times detained by a few, we now live in a world where information is everywhere, in huge quantities and cognitively we are not evolved to manage it [16]. An expression is both qualified this information deluge and phenomena, info-obesity, to explain how human facing such amount of information it becomes harder to extract meaning from it. In fact, we see that beyond an excess of information the analysis and comprehension capacity diminishes in the same way in case of a lack of information. The range covered by the question of meaning is between the lower limit, lack of information, and the upper limit, excess of information [17]. Territorial Intelligence is not limited into this range because position of humans along the phenomena and Artificial Intelligence process could not ideally (precisely) be calibrated in relation with the needs of local stakeholders due to their cognitive capacities or their position along the territorial process engaged by the territory. At this step of our paper, we have to cite the concept of attention developed by Simon.

If Herbert A.Simon (Simon, 1971) [18] was, may be, the first author has introduced the concept of attention [https://en.wikipedia.org/wiki/Attention_economy] because in a contemporary digital society a wealth of information creates a poverty of attention, he noted that many designers information systems incorrectly represented their design when what was really needed were systems that excelled at filtering out unimportant or irrelevant information [19] (Simon, 1996 pp. 143–144).In other side of the attention concept as a resource, behavioral economist Benartzi [20] (Benartzi, 2015) highlights strategies web designers should deploy to treat attention as a resource. We suggest with the help of figure 1 how we, in relation with a range of volume of information, put in position Artificial Intelligence power gain and Territorial Intelligence power.

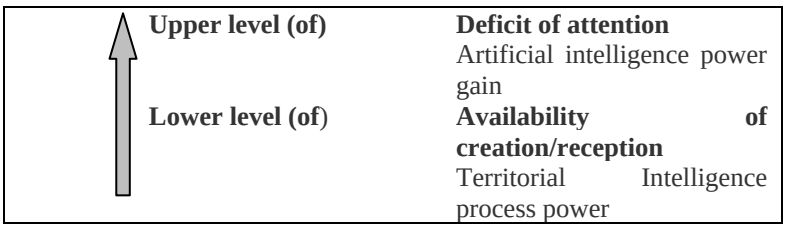

Figure 1: Range of Volume of Information level

2.1. Information produced by the human intention and actions

Along the day, working/searching/chatting and so, when we use a Smartphone, this communication device is offering a large range of uses, simply to take a photo or a video of, for example, our immediate environment and then to upload it into the cloud or by sending to a family member despite a synthetic description of such actions, we engage a data processing, transforming the world in bits and bytes. We also have to think about numerous tweets exchanged by people, photos shared on Instagram, videos watched on Facebook, new videos content uploaded to Youtube (*TIME*,Op.cit).

2.2. Information flow produced by something we qualified as "non human" and amount of data generated

There is another sector where human intention and action is not necessary, the internet of Things, the global network of objects, from cars to pacemakers, equipped with sensors and transmitters in communication with the cloud and with each other.

Both, about information produced by human and by non human, Lev Grossman [21] in Time (April, July 6-13, 2015, page 36) gave us some facts by citing a 2014 study by the market-research firm IDC the world of digital data would grow by a factor of 10 from 2013 to 2020 to 44 trillion gigabytes.

In order to meet requirements of such data information volume (and to create another data) a multitude of Apps was launched to combat Data Overload, users more and more complained about and in order to tackle data deluge through email box, for example, full of receipts, social-media updates, date to remember given by agenda, promotions, etc. Exposed to data overload ITs users (simple, project member, local stakeholder, etc) are lost.

With the help of figure 2 (enriched Figure 1 of territorial intelligence process assumptions) we cross within the range of information data volume, upper/lower level of information, deficit/availability and precise the position/power of Territorial Intelligence and Artificial Intelligence.

Table 1: Enriched Figure 1 with Territorial Intelligence Process assumptions

Range of information	**General Attitude**	**Territorial IT assumptions**	**Result obtained** (*if*)	**Capacity of IT and AI**
Upper level of information	Deficit			**AI power to deliver**
		IT assumption 3	Mobilize	AI power
		IT assumption 2	Credit	AI & IT
		IT assumption 1	Exchange	IT
Lower level of information	Availability			**IT power to engage**

2.4. On transition: This is always the question of meaning. Data visualization extracts meaning from complexity and Territorial Intelligence can become as process of collective action

As people overloaded with information, and already lost in the ocean immensity of information, and despite, or, in response to the accumulation of more and more data and because we need to make complexity comprehensible from inert, static data, visualization change the way of giving meaning to make it *visible.*

We'll see in this part of our paper, how accumulation of available, dispatched ICTs tools don't engage use of them in a way of setting up, stimulate the citizen participation how this one must be call for within a sustainable development program. We discuss all results obtained through territorial intelligence process.

As we lead a PhD research at regional level on how within sustainable development programs ITs are used to push citizen participation, we tried to make understandable (visible) the collected information from surveys and trying to obtain that result, as Playfair (Playfair, 1786) done, we used some graphs [22].

3. ILLUSTRATION OF COLLECTED INFORMATION DATA FROM REGIONAL USE STUDY OF ITCS SEEN THROUGH TERRITORIAL INTELLIGENCE PROCESS AND DISCUSSION

This research, whose main results were published and we used in our present paper, had for objective to analyze how new technologies of communication (ICTs), in a process of territorial intelligence, defined as "An informational and

anthropological, regular and continuous process initiated by local actors physically present or remote who appropriate a space resources by mobilizing then transforming the energy of the territorial system in project's ability." [7] are able to take a dynamic role for implementing a citizen participation in connection with sustainable program deployed by municipalities and inter-communalities level within three kind of sustainable development project designed by the following expression and acronym: local Agenda 21 (A21L), climate, energy territorial plan (PCET) and the regional global program for innovating action (A.G.I.R) analyzed through all the territorial communities of the PACA region (South East France) its sub territories involved, in at least, one of the 3 projects [23], [24]

Furthermore, following the inventory of the territorial communities located into the region engaged in one or more projects, we have implemented a watch monitoring process on Internet: do communities have an official or not website? What are the kinds of use done? For the institutional world that makes sense for our study, the communication approach and reporting is the same as that which was practiced offline. There is no change of approach: shortly we can say the information is top-down and the interaction has not yet existence. The web is only used instead of archiving digitized content because we are in media logic where the web is only used as a means of dissemination. There is a real publication but without any publicity and the website has no web link pointing to him and almost no link exists so not in the territory of the web. Without binding, blind, his unpopularity condemn it to oblivion.

We can clearly say, despite a lot of available ICTs in relation with official web site used by local authorities, they are not put in front and involved in order to create such citizen participation conditions and consequently, a territorial intelligence process does not really exist. We discuss later, in conclusion of this section, our main purpose, how can we connect Territorial Intelligence with Artificial Intelligence due to results obtained.

3.1. Research Results and Discussion: census of initiated projects, web site & ICTs ways of using to show the gap between available ICTs and Territorial Intelligence Process

We encountered a number of 67 towns bearing AGIR label, against 46 A21L (local agenda) and 16 CFEP (energy climate). All of them (or nearly) use an official web site to present the sustainable development program they are engaged in.

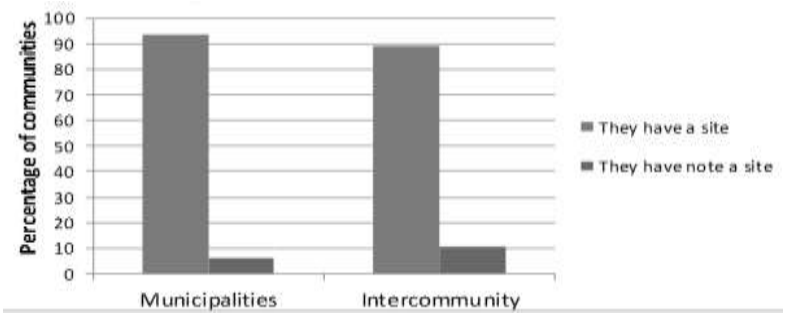

Figure 2. Percentage of the territorial communities of the PACA region with an official or non-official web site
(From Bertacchini & alii, 2013)

3.2. Quantitative Surveys on Territories Using ICT's and first qualitative Hypothesis

Following the census of 119 territorial communities of the region involved in at least one of the sustainable development program, we also conducted a watch on Internet to assess the percentage of official web site dedicated to municipalities and inter municipalities of our study. When the web site does exist, we quantitatively analyzed the presence or not of different tools selected on the basis of the previously described categories of Web.

For the Web of Information category our choice fell on services as newsletter, RSS feeds and e-mail or online contact form tab. Concerning, the Semantic Web category we selected Search engine, *folksonomies*, and pages dedicated to the project (s) as well as the process of debate. Finally, for the Social Web category we identified social networks as Facebook and Tweeter. Once our analytical grid completed in function of each selected tool for our field study, we performed a statistical and graphical analysis. We note that 93.9% of municipalities and 89.5% of the inter municipalities rely to this socio-technical system to inform and communicate on municipal action. Therefore, we can say that the use of this technology is widespread across local authorities.

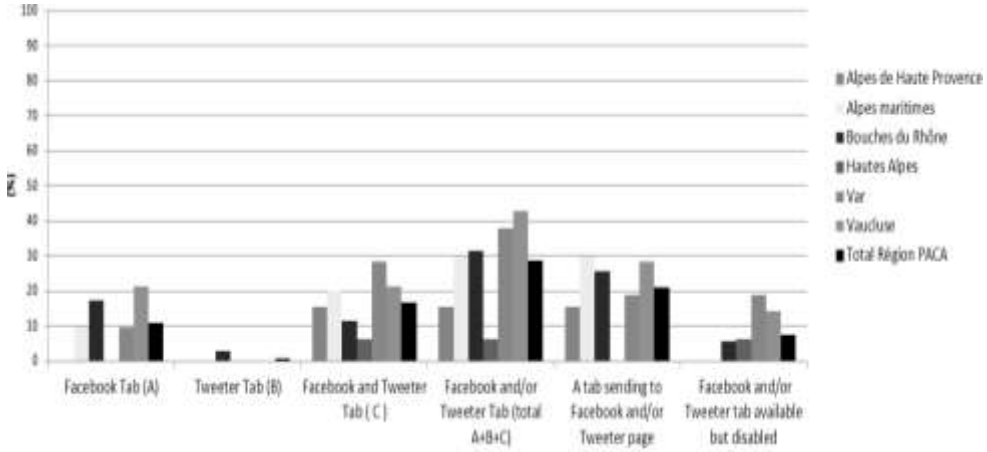

Figure 3. Percentage of the territorial communities of the PACA region using the tool(s) Facebook and Tweeter through their website (Bertacchini & alii, 2013)

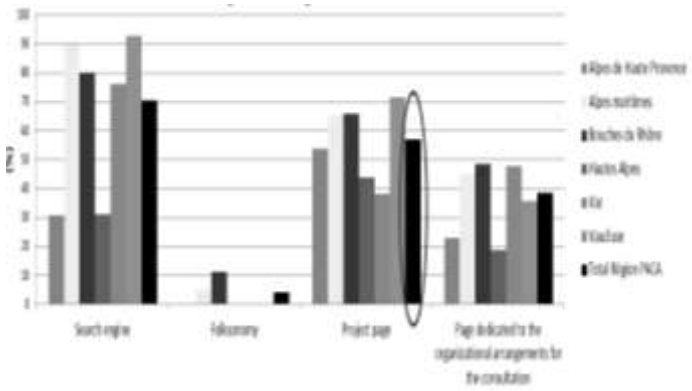

Figure 4. Percentage of the territorial communities of the PACA region with a search engine, folksonomy, a project page and dedicated to the organizational arrangements for the consultation (Bertacchini & alii, 2013)

We continued beyond the quantitative analysis on the basis of categories defined previously.

We note that French South territories (departments in French) named Alpes de haute Provence and Hautes Alpes present local authorities with little functional web sites with tools few mobilized (search engine, RSS feeds, social networks) see nonfunctional or absent: Newsletter, Folksonomy (Figures 3 et 4). Organization of the informational content stated that little explanation dedicated to the project(s) and associated consultation process (Figure 3). Moreover, a certain trends occur also at a regional level since only 4.2% local authorities make use Folksonomy (Figure 3), 65.6% presents a newsletter subscription that does not work (Figure 4) and only 7.6% (Figure 5) reference using social networks (Facebook and/or Tweeter profile).

However, we note that the Search engine function is a service usually offered by all the local web sites authorities (Figure 3) with 70.6% on the whole region and that approximately 58% intend to dedicate a page explaining their project. However, less than 40% of the web site show a page dedicated to collect the expression of secular actors and make available information through spaces for debate and confrontation of opinions (Figure 3).

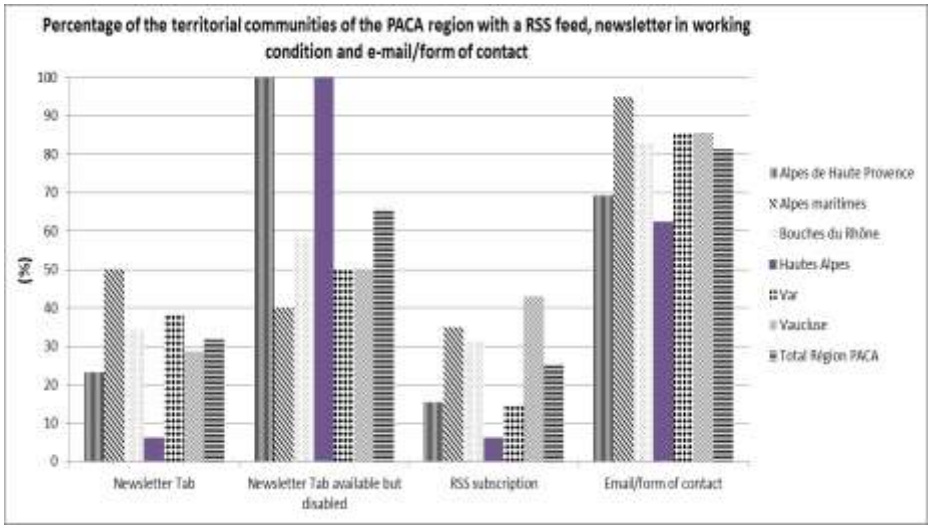

Figure 5. Percentage of the territorial communities of the PACA region with a RSS feed and newsletter in working condition (Bertacchini & alii, 2013)

To temporally conclude this section (we used again already published works), we think thus compromising clarification, approval and appropriation by collective partnership of the objectives, sought into the context of territorial cooperation, as mediation of local knowledge detained or not by relevant territorial stakeholders and met in what we called the local history, or otherwise described, the local or territorial information widespread.

For the situation we above exposed we have to stress that internet web sites of territorial communities surveyed have a low-visibility, weak readability and do themselves at a low level on about using, practicing the social uses of ICTs. In that such poor/bad conditions, how to engage citizen in participation? So far we put a question "Was in that case Artificial Intelligence able to reach that point?"

In this specific case, with made conclusions issued from all the information data collected and concerning our main purpose, how connecting Territorial Intelligence with Artificial Intelligence or more precisely can we use Artificial Intelligence in a Territorial Intelligence Process? We have to return to the page 434 (section 2) of Turing paper [2] "The new problem has the advantage of drawing a fairly sharp line between between the physical and the intellectual capacities of a man."

We may advance the fact that if, despite all the available ICTs through web site of territorial localities, we concluded our survey with low visibility, weak readability and low level about the social uses of ICTs. It means we have to look at characteristics contained by the local history and stress that local history (or territorial information widespread) is made by the local stakeholders themselves, as humans, and not as a "programmed machine" at this stage [25],[26]. Humans obviously exposed to more and more signals, frequently solicited by computers more and more powerful, variety of devices and apps, but humans at all, they build up local history (or territorial information widespread) with each other.

In relation with the latter point, we have seen in 2015 publication [24],[26] how to set up the Informational Perimeter Study of a 21 Local Agenda for Building (or to shape) an Ecology System of Communication. In another range not far from our subject, we could also use babelnet.org (http://babelnet.org/) to enclose semantic connections between local stakeholders for drawing or being regarded as their local history. We need to say at this stage of our thinking how Territorial Intelligence process is incrementing the way to territorial development and the occupied position of Artificial Intelligence in relation with all three plus one (the final step of territorial development project), Territorial Intelligence process assumptions (Figure 6).

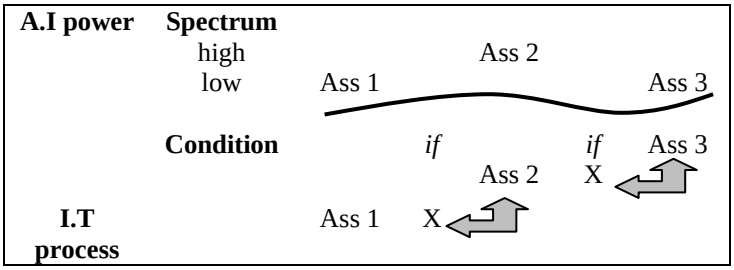

Figure 6: AI/IT crossed with step of Territorial Intelligence process assumptions

The figure 6 means that if AI could be available (in absolute terms, we can write, regardless of the resource mobilized for artificial intelligence) at each step of a Territorial Intelligence process it mainly depends what kind of consideration we put into: "whether our machine is indeed behaving intelligently? [27] declined to say or human minds, their memories and personalities, will be downloadable to computers.

In the following section we are positioning what we called a learning territory in order to pursue our main goal within the present paper, is Territorial Intelligence Process able to meet Artificial Intelligence? For that purpose we plan to explore, on a basis of previous works and Artificial Intelligence experts suggestions (or remarks), what the verb 'learn', so crucial in the so called learning-machine field in connection with the huge amount of collected data this time, could bring to our thinking and how due to Territorial Intelligence Process assumptions.

Before entering into the following part of our paper, we have to recall and consider some facts. Turing' 1950 seminal paper Computing Machinery and Intelligence drew a fairly sharp line between the physical and the intellectual capacities.[2]. Herbert Gelernter (project leader) creating a computer capable of excelling at high school geometry declined to say "whether our machine is indeed behaving intelligently."[27] A.I theorists stopped treating the human body as an overwhelming problem to set aside. Today proposition in A.I field is: "there is no meaningful difference between the human brain, with its networks of neurons and axons and computer powered by exploitation system. By analogy, deducting from the above, the human mind is the equivalent of software running on the brain computer: no difference exists and we can make three observations.

a) Human minds, their memories and personalities will be downloadable to computers;
b) Human brains, meanwhile, will become almost infinitely upgradable by installing faster hardware as the equivalent of better apps;
c) In theory, the blending of human and machine (Singularity, Kurzweil, 2005) may be less than 30 years off [28],[28.a]. (Von Drelhe, D in *Time*, VOL.187, N0.8 | 2016, p.34) even if the exponential evolution of technology is accompanied by the exponential erasing memories (Von Foerster, 1950)

Before starting the following main part of the present paper we do expose two questions:

1- What emotions and the physical body?
2- Can we replace *singular form* of intelligence available?

In the following part, we expose the link between sharing information for a learning territory in Territorial Intelligence process and some consideration on functionalities of spatial representations connected to Artificial Intelligence.

4. SHARING INFORMATION FOR A LEARNING TERRITORY IN TERRITORIAL INTELLIGENCE PROCESS AND CONSIDERATION ON FUNCTIONALITIES OF SPATIAL REPRESENTATIONS CONNECTED TO ARTIFICIAL INTELLIGENCE

As we noted earlier in this paper we use parts of previous published works in order to treat our subject "Territorial Intelligence and Artificial Intelligence". We seen that Territorial Intelligence Process in our design highlights an endogenous approach as outlined above assumes that the territory itself is potentially holding all the knowledge and skills necessary to its own development. Mobilizing them in a territorial intelligence process needs to inform and to communicate, which implies the conjunction of three phenomena [4]: (i) Local actors share information (energy generation at individual and / or collective level), (ii) They give a credit to the received information because they gain a benefit(capture and exchange of information), (iii) These assumptions are subject to conditions but along such a process we can say the communication process is established, actors set up appropriate networks and transfer their skills in the service of a development policy (mobilization and transfer of energy: formulation of a development project).Local mediation arrangements can facilitate communication among stakeholders, both to establish first contacts, to make the most of existing skills or to develop new ones required for the design and / or the implementation of the project.

Problem formulation, implementation of the project and solving require collaborative learning, both cognitive and relational, a kind of "*joint conceptualization*" [29]. Indeed, these procedures go hand in hand with governance arrangements, information and communication processes, steps more or less imposed by a logic of project-based management, all of them providing opportunities for exchanges and interactions. The statutory requirement to build up a "territorial project", also helps local actors to develop and express a strategic vision strengthening their identity at the third level of the meta-model (see above). These procedures require the availability of a "territorial engineering" team [30] mixing different capacities, logics which masters regulatory planning procedures, and also be able to fulfill the aspirations of a local society symbolized by a singular political project and to translate aspirations in the normative frameworks imposed by regional, national and European territorial bureaucracies. In this case, territorial engineering concerns all local stakeholders, including civil society. It covers not only the understanding of territorial phenomena and the development of technical projects, but also all organizational institutional, social and individual changes which allow the territory to gain in reflexivity, autonomy, adaptability and affirmation of its own identity. This kind of territorial engineering requires a broad range of skills and tools because it addresses various actors with heterogeneous representations and codes. Informational, communicational and mediation issues occupy a central place, either in micro-events which mark the life of a "learning territory" [31], or in more permanent macro-arrangements for sharing information, signs and their interpretation, or for building and perpetuating the symbols of the territorial identity.

4.1. Singular form of intelligence, STICA, in general, and STICA Spatial for territorial decision-making processes, in particular

On opening this section and for presenting STICA characteristics, in general, and STICA spatial, in particularity, we have to put forward a number of asserts, facts that we identified as crucial considering about our article. As David Von Drelhe (2016) mentioned in article already cited “In Gelernter’s opinion, we already have a most singular form of intelligence available for study and we scarcely understand its workings. We’re blundering ahead in ignorance when we talk about replacing it.”Because of the limits of the machines we should speak about, we also should remember the human mind is also a product of feelings and not just a creation of thoughts and data.”

In consequence from what we have seen above considering intelligence and uses of available ICTs through web sites of public administration, we must give the content and functions of “the Mind’ and “the Body”.

-**the mind**: emerges from a specific person’s experience of sensations, images and ideas [32]

Memories of sensations are worked and reworked over a lifetime through conscious thinking and also in dreams.

> “The mind” is in a particular body, and consciousness is the work of the whole body.” (Human Being in Descartes)

-**the body**: not just the brain is part of consciousness; the mind alters with the body’s changes.

Gelernter’s position: engineers may build sophisticated robots but they can’t build human bodies.

In the following section, we’ll see the presentation of STIC, in general, and STICA Spatial for territorial decision-making processes, in particular.

4.2. STICA, in general, and STICA Spatial for territorial decision-making processes, in particular

A Distic[1]‘*(in english STICA:*’ socio-technical information and communication arrangements) can be defined as "*a place of mediation made up of multiple semiotic, aesthetic and technical factors in interaction which link up social actors through sensory and mediated means*[2].” It consists of three inseparable entities in a relation of reciprocal co-determination: (i) The "media product(s) which require the mastery of specific languages (e.g. a mapping language). Media products are disseminated by means of agents of mediation, either technical(channel, display device, etc.) or human (expert, intermediary, etc.), (ii) the "area of social cooperation for production” «characterized by the intentionality of the designers of the STICA and the media products, (iii) the “area of social cooperation for reception” «in which the participants are not just receivers, not simple message decoders, but autonomous and reflexive social subjects, with multiple resources, who can divert the interpretations and uses of the media products originally expected by the designers [33].

Different forms of mediation can take place within a STICA: technological mediation between the individual and the technique, social mediation between actors, and semio-cognitive mediation between the thoughts and media products. [34]

Among the media products within a STICA, we are particularly interested in spatial representations [35], both mental and material (maps, aerial photographs or field pictures, satellite images, 3D models, etc.), of land features and territorial phenomena in the role of boundary object between heterogeneous social groups [36]. The spatial dimension of territorial reality seems indeed to offer real potential of mediation and creation of meaning.

[1]Distic : Dispositif SocioTechnique d’Information et de Communication

[2]http://i3m.univ-tln.fr/Seminaires-DISTIC.html?var_recherche=distic

In fact, the issue of territorial development concerns, by essence, phenomena with spatial roots. As such, they affect the field of private property and sensitive dimensions, both individual and collective, such as identity, territoriality, and attachment to place, familiar spaces and emotions, as has been shown by many researchers in social geography [28-29]. Communicating on space and territories can be done, of course, through words and verbal languages. But there are also phenomena we cannot easily speak about due to a lack of appropriate words. However, these phenomena can be shown using imagery or spatial representations to allow actors to discuss them.

In the field of spatial planning, the decision making process is directly related to a cyclical process, organized in several iterative phases, in response to a problem, either identified locally or imposed externally: (i)the organization of actors affected by the problem (ii) a phase of intelligence (inventory, diagnosis, prioritized issues) (iii) a prospective phase to imagine the future to address these issues, (iv)a modeling and choice phase (comparison of scenarios) (v) a phase of development and implementation of an action plan (vi) a phase of monitoring and evaluation to measure the effects of actions and possibly redirect the remaining ones.

Public policies are also accompanied by specific "policies of representation" (in the cognitive, informational and communicational sense of the term), that is to say arrangements of formal representations of reality, as it has been highlighted by the sociology of quantification [37] and illustrated for instance in the field of flood risk management [38].

These representations can take the form of measurements, numbers, statistics, databases with their associated conceptual models and semantic description, maps and their legends, indicators, and model results. The representations play a fundamental role for the public policy promoter. Indeed, they can impose analytical frames, especially through mapping, for the interpretation of a complex reality to develop shared representations, both of the object to manage and of the stakeholder community. They also reinforce the authority of the policy maker, legitimate public actions and regulate the practices of local actors.

Within multi-actor decision-making processes, we distinguish ephemeral STICA, and STICA that have a greater permanence in time (online newspapers, websites, steering committees, municipal councils, etc.). In this second case, we emphasize two perennial STICA, used to manage the formal capital, that we call "*Heritage-type STICA*" and "*Observatory-type STICA*".

The "*Heritage-type STICA*" aims to fuel various ephemeral STICA with cartographic supports (maps and aerial or satellite images used as background layers) and information content (data, reports, thematic maps, etc.) from the beginning of the decision cycle till the choice of a project and its translation into an action plan. In return, it receives, classifies (through metadata cataloging), archives and makes accessible the media products produced by ephemeral STICA or the perennial STICA of the partners.

The "*Observatory-type STICA*" supplements the first type from the moment the territory has determined a development project which provides a horizon of meaning, legitimized by the local political authorities and implemented by those involved in the action plans. Based on monitoring and warning indicators which make sense to local actors, this STICA allows measurement of changes at the physical level of the territory meta-model. Such an arrangement requires a preliminary analysis and design phase with all stakeholders to identify relevant media products [39]. In the "area of social cooperation for reception", sharing and interpreting this information and their associated signs allows assessment of the progress of the territory towards the desired horizon in relation to the actions which have been implemented.

Following what we have seen above about representations, in the cognitive, informational and communicational sense of the term, and before showing potential functionalities of spatial representations, we must represent how the mind operates. (Figure 7)

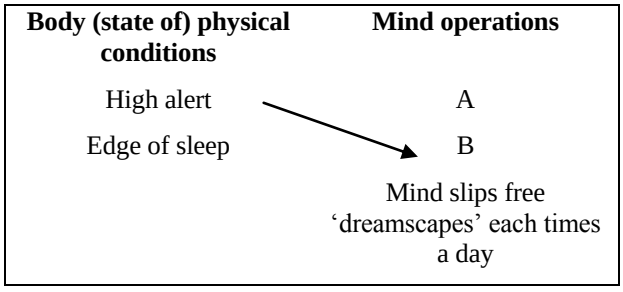

Figure 7: A.I/I.T crossed with step of Territorial Intelligence process assumptions

The mind operates in different ways through the course of each day.

4.3. Potential functionalities of spatial representations, gaps with current practices in territorial engineering and connections with Artificial Intelligence

Defining and designing STICA based on spatial representations call for questioning the roles that these media products can play to establish purposely specific communication situations between participants of a development project, whether in the "area of social cooperation for production" or in the "area of social cooperation for reception".

Analysis of the scientific literature has highlighted six major categories of functionality that can be performed by various spatial representations, each within a particular register [39],[25]: (i) analytical (understanding) (ii) creative (imagining) and (iii) cognitive (learning), (iv)relationship - between individuals, social groups, institutions - (connecting), (v) decision (changing) and (vi) operational (acting).

Understanding these six major categories of functionality requires understanding the full expression of the entire spectrum of mental activity: at high focus using logic, at low focus inventing stories. As we said before, we have to remember that the mind operates in different ways through the course of each day, up and down, back and forth many times.

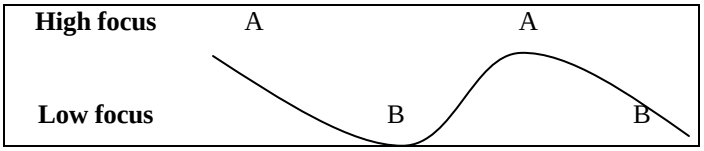

Figure 8: Human consciousness spectrum operations

From Gelernter, at 'A' High focus level, the mind uses logic, works as a computer (mental activity under control, thinking on purpose), and identifies problems and tasks. At 'B' Low focus level (down-spectrum) the mind largely out of control is wandering off on its own. The dreaming mind churns up images, memories and patch together, not according to a rational blueprint (Gelernter in *TIME*, Op.Cit).

Below, we synthesize all functionalities that have been identified within each of these six broad categories. We see that using all functionalities call for High and Low focus level activity of the Human Mind. At this point we can stress that territorial Intelligence Process could match Artificial Intelligence in what we described "the full expression of the human mind requires the entire spectrum of mental activity."

Table 2: Functionalities of spatial representations in *STICA* (from Bertacchini & Alii, 2013)

F.1.	**Analytical**: **Understanding**
F.1.1.	Represent and understand the territorial complexity
F.1.2.	Detect a problem situation and its spatial extent
F.1.3.	Monitor changes, detect weak signal
F.2.	**Creative**: **imagining**
F.2.1.	Imagine the future of the territory
F.2.2.	Build up scenarios
F.2.3.	Imagine innovative solutions
F.3.	**Cognitive**: **learning**
F.3.1.	Provide shared spatial background data
F.3.2.	Access to mental representations
F.3.3.	Express and articulate multiple relations to the world
F.3.4.	Reframe perspectives
F.3.5.	Develop awareness, make an impact on thinking
F.3.6.	Access available information
F.3.7.	Ensure a collective memory, visualize, explore, explain the available information
F.3.8.	Simplify the territorial complexity
F.3.9.	Create an epistemic community
F.4	**Relational** : **connecting**
F.4.1.	Identify stakeholders
F.4.2.	Develop awareness of diversity of mental representations
F.4.3.	Legitimize institutional actors
F.4.4.	Engage and legitimize local actors
F.4.5.	Objectivize the words of actors

F.4.6.	Generate openness between social groups
F.4.7.	Create a community of destiny

F.5.	**Decision-making**: **choosing**
F.5.1.	Validate the diagnosis and associated stakes
F.5.2.	Prioritize and select issues to be addressed
F.5.3.	Consult, discuss, compare
F.5.4.	Negotiate, convince, select
F.5.5.	Show an agreement, a political intention

F.6.	**Operational**: **acting**
F.6.1.	Specify action plans
F.6.2.	Frame works execution
F.6.3.	Guide, prescribe, prohibit, legitimate actors and practices
F.6.4.	Create a community of action

Even map as spatial representation is by far the most cited, the analysis of thirteen guideline documents used by territorial engineering practitioners demonstrates that half of the guides do not refer to any spatial representation. In the other guides, map spatial representation-type. On the other hand, representations such as block diagrams, graphic models, maps based on local knowledge, or mental maps are never mentioned. 3D physical models, sometimes mentioned as cognitive tools, are always presented as a tool to represent localized urban projects but never larger areas.

Images (satellite, aerial photography, field pictures) are not included in these guides, except in their analytic function. Their potential of mediation, of common spatial reference frame, is never mentioned. Several functionalities identified above are also not included in these handbooks, at least not in relation to the roles of spatial representations: perspectives reframing, expression of mental representations, commitment and legitimacy of actors, objectivation of actor's discourses, increasing openness between actors, creation and upholding of a shared vision. The co-construction of territorial knowledge between heterogeneous actors and the importance of local knowledge are not addressed and, in our point of view, reflect the need of discussion between Territorial Intelligence process and Artificial Intelligence.

Our results also show that cognitive and relational functionalities of spatial representations are not taken into accounting territorial mediation practices, thus confirming observations already made by territorial development specialists [41]. It points out that facilitation and communication skills remain poorly developed among practitioners since they are poorly paid and recognized [42], whilst they are nevertheless considered as decisive [43].

We are now positioning on conclusion for each spatial functionality and their content Territorial Intelligence Process, Artificial Intelligence, high Focus/low Focus spectrum.

5. CONCLUSION: TERRITORIAL INTELLIGENCE PROCESS, ARTIFICIAL INTELLIGENCE POWER THROUGH SPATIAL FUNCTIONALITY

In parallel with our initial intention i.e. to discuss the matter between Territorial Intelligence and Artificial Intelligence, we are both referring to Turing (Turing, 1950, in paragraph 7, p.25) "learning machine" (structure/changes/natural selection) considering Territorial Intelligence assumptions, and Gelernter's assertion *in* TIME, 2016 "A logical argument and a story are two ways of putting fragments in proper relationship and guessing where the whole sequence leads and how it gets there." Considering the way the stakeholders, when they are willing to set up a territorial development project, and using spatial functionalities, they have to keep in mind even how spatial functionality potential can help designing the territorial project.

Table 3: Spatial functionality potential read through Territorial Intelligence assumptions & Artificial Intelligence focus

Functionality Title	Functionality description	T.I.P assumptions	A.I Focus
F1.Analytical	understanding	Exchange	High & Low
F2.Creative	imaging	Idem	Low
F4.Relational	connecting	Credit	High/Low
F5.Decision making	choosing	Mobilize	High
F6.Operational	acting	Mobilize	High

6. AUTHORS' CONTRIBUTIONS

Yann Bertacchini conducted as Advisor, from 2010 to 2016, five PhD Researches based on the assumptions of territorial intelligence paradigm we have been studying for several years and the work we also have been driving for several years. With Yannick Bouchet CEO of SITIV'Syndicate we have worked in collaboration through his PhD research, 3IT (international institute of territorial intelligence, base in Lyon (France) and we have in commun professional ground on how to drive digital project in connection with stakeholders and local communities.Due to that shared background we both studied ambidexterity phenomenon and artificial intelligence.

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