Toward a socio-cognitive approach of spatial data co-production

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Summary: The abilities of territorial communities to understand and control their development in a sustainable and equitable way, depend on territorial information sharing. In this context, the paper intends to understand and analyse the issues of spatial data co-production process. It provides understanding and operation elements so that spatial data sharing can progressively evolve into geomatics learning networks, also termed "communities of practice". This communities of practice offer, in our view, one of the most important component of Territorial Intelligence.

Résumé : Les capacités des communautés territoriales à maîtriser leur développement de façon équitable et durable dépendent notamment du partage de l'information territoriale. Dans ce contexte, l'exposé vise à analyser les enjeux des processus de co-production de données géographiques. Cette proposition fournit ainsi des éléments de compréhension et d'intervention pour accompagner la transformation des dispositifs collaboratifs autour de l'information géographique en réseaux géomatiques apprenants, que nous qualifierons également de communautés de pratique. Ces communautés de pratique constituent, selon nous, l'un des fondements de l'Intelligence Territoriale.

Keywords: co-production, spatial data, community of practice, learning networks.

Mots clés : co-production, donnée géographique, communauté de pratique, réseau apprenant.

I. The context : collaboration dynamics around geographic information (GI)

The abilities of territorial communities to understand and control their development in a sustainable and equitable way, depend on territorial information sharing. Geographic Information Technologies are now widespread. Geomatics tools are no longer restricted to a small number of technicians but impact on all of the actors within the land management sector (planners, geologists, foresters…). Many partnerships (fig.1) have emerged due to the increasing number of GIS expert as well as the increasing needs of integrated land approaches.
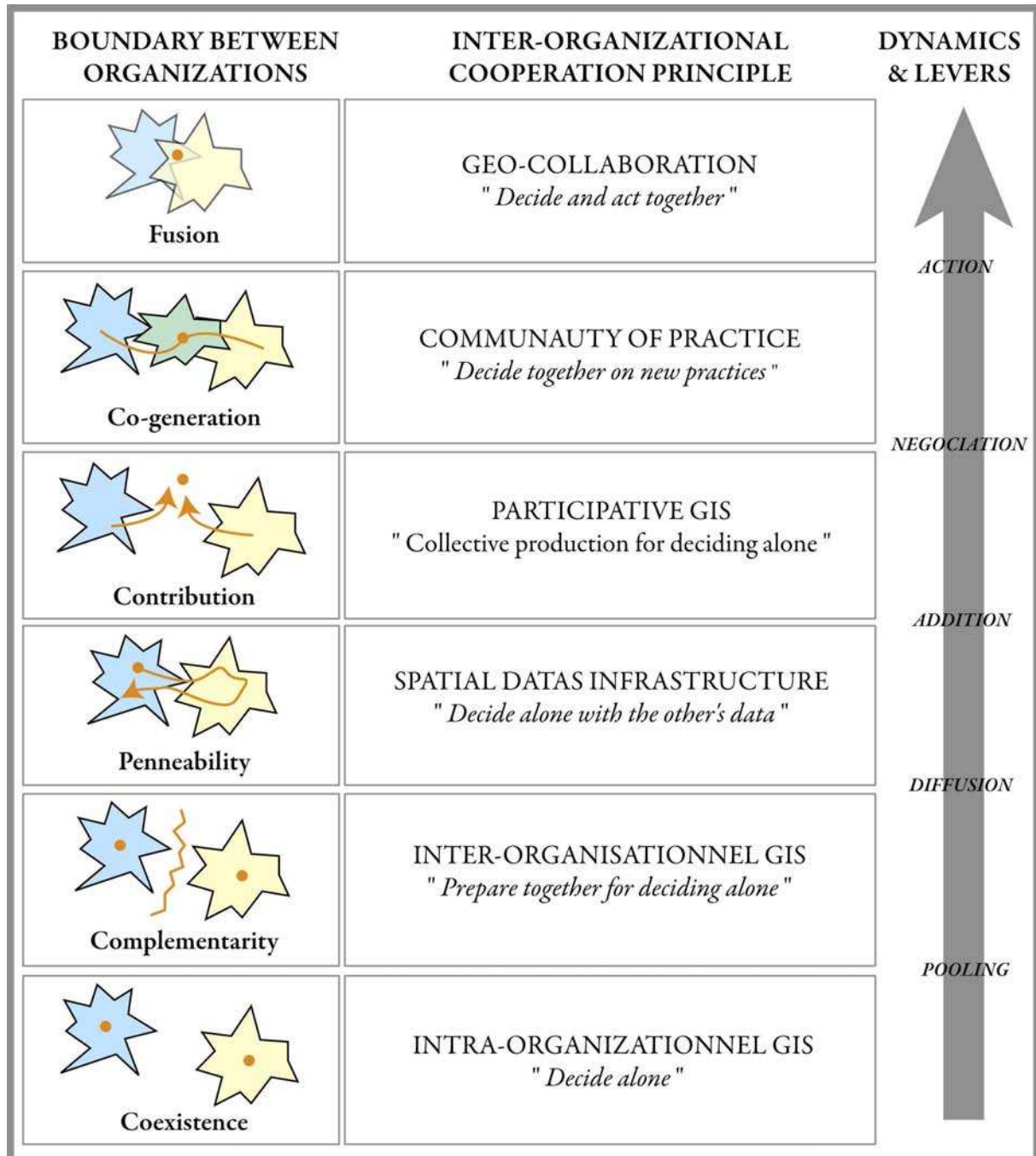

Fig. 1 : A Typology of geographical information collaboration dynamics

Beyond their original purpose of basic map dissemination, these groups require, in the first time spatial data infrastructures (SDI) and, then, communities of practice (CoP) in order to organize thematic data co-production (Noucher, de Sède-Marceau, Golay et Pornon, 2006). That is the reason

why a switch is occuring : from spatial data sharing to spatial knowledge sharing. Consequently, beyond technical, political or legal questions of spatial data diffusion (from Directive 2007/2/EC of the European Parliament - INSPIRE), we also need a new way of thinking in order to analyse spatial data reception (or appropriation). A first level of spatial knowledge sharing follow from spatial data co-production. That's why the contribution of knowledge theories will be very beneficial to understand and improve all the spatial data co-production activities.

II. Problematic and theorical anchors : spatial data as a boundary object

In this new context, the paper intends to understand and analyse the issues of spatial data co-production process. Spatial data build a territorial reality reflecting experience and expectations of its producer (Major, 1999). That is the reason why the issues are numerous. How might the hydrologist give sense to the forest manager's data ? How to produce data together without restricting them to their smallest common factors ? Does geographic information sharing unveil shared meanings, or does it exacerbate irreconcilable differences ? Finally, how can spatial data be simultaneously the result of collective negotiation as well as the object of individual representation ? So, the aim of this research is to understand the role of spatial data on the cooperation process of land managers (and stakeholders in land management).
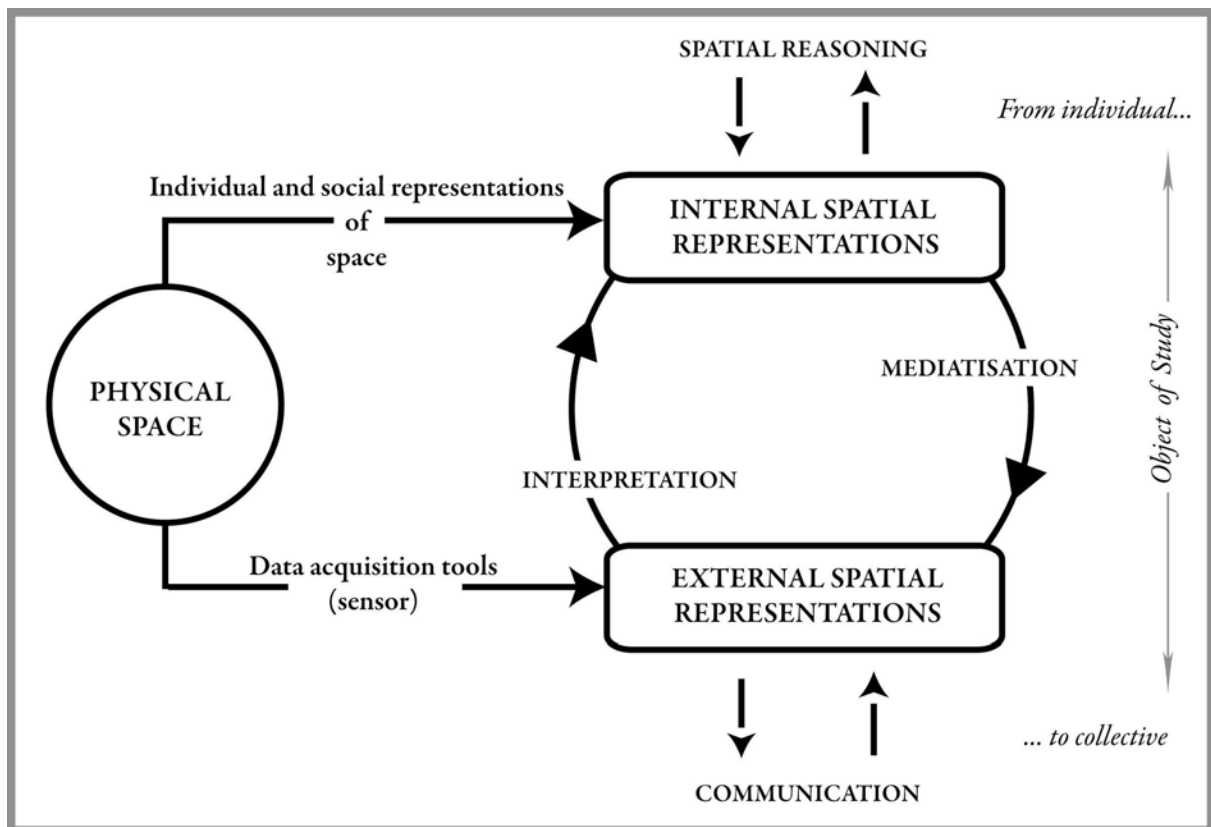

Fig. 2 : From individual (internal) to collective (external) spatial representation (Maurel, 2001)

In order to give an answer, we choose to study the spatial data appropriation process. This process opens the analysis of how data can be used by a group that has not produced the data itself, as well as in a multi-actor and multi-scale context. We adopt a qualitative, inductive and exploratory methodology, called "grounded theory" (Glaser and Strauss, 1967), based on eight case studies. Eighty interviewees and twenty observations *in situ* allow a "roundtrip" process between empirical observations and theoretical analysis thus progressively exploring different aspects of explanation.

A socio-cognitive approach, supported by observations, analyzes spatial data as a boundary-object (Star and Griesemer, 1989) in a socially and cognitively distributed actor network. Geographical information may be interpreted as boundary objects (Harvey & Chrisman, 1998) : Information content robust enough to have its own identity, but also adaptive enough to support coordination among actors from different backgrounds. But : avoid « suitcase objects (objets valises) » into which every actor is putting his own expectations, but lead to totally disjoint representations!

III. Case studies and prototypes of appropriation trajectories

Distributed cognition theory (Hutchins, 1995) offers a framework to understand data as a cognitive and collaborative artefact. Eight exploratory case studies were focused on collective negotiation process (by more than 20 group observation) and individual use observation (by more than 80 interviewes). For example, we study the production process of a land use database from a regional community. The eight case studies help to identify typical appropriation trajectories, factors and socio-cognitive processes. Especially, we have shown that the individual and collective involvement in geodata appropriation processes relies on 2 different dialectic processes : the individual projection based on expectation and experience process and the collective negotiation based on participation and reification process (Noucher, 2009).
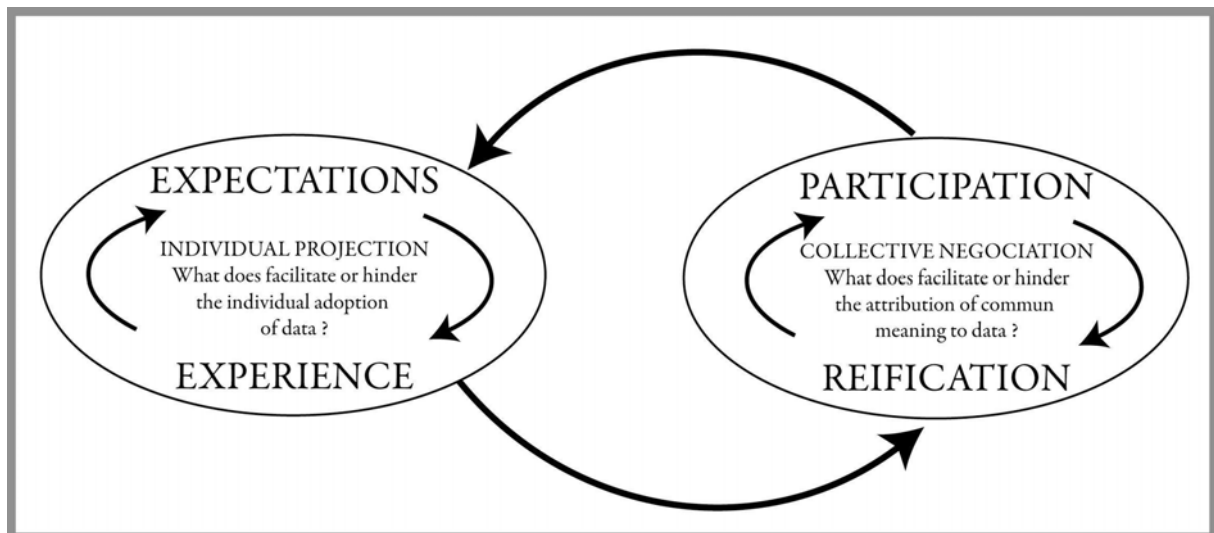

Fig. 3 : Individual and collective dimensions

This two dialectic processes explain the prototypes of appropriation trajectories (Noucher, 2009) we will present in the conference.
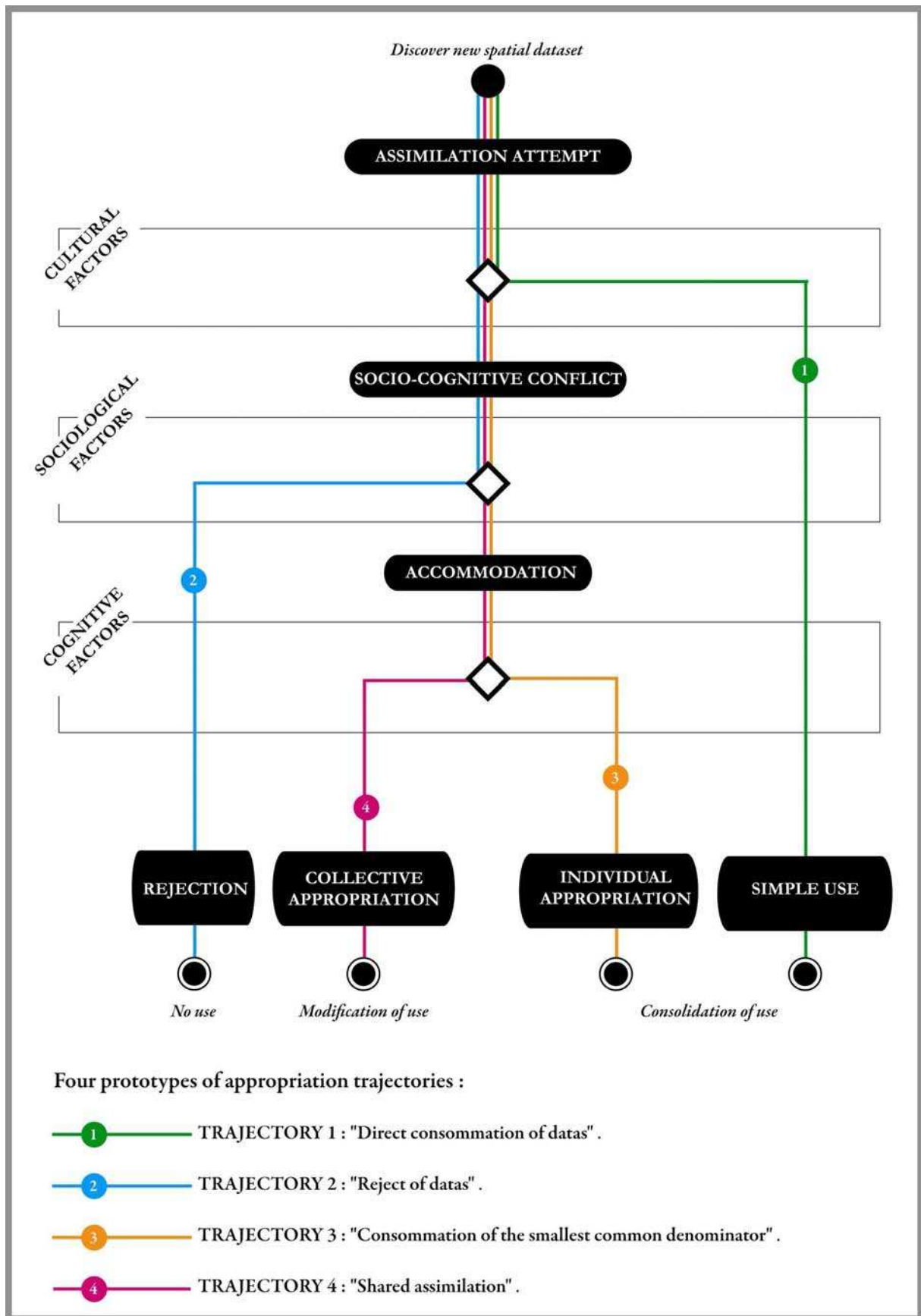
Fig. 4 : Prototypes of appropriation trajectories

IV. Conclusion : toward an action agenda

Finally, an action agenda can be emerge from an assessment of this new way to analyze the inter-organizational geomatics. This agenda comprises organisation (from consensus or compromise to an argumentative consensus process), actors (from animator to a facilitator competence) and technology (from standardizing ontologies to negociating ontologies). This research offers a different vantage point on the spatial data question. Systemic and socio-cognitive approaches suggest a new integration of knowledge and information in the context of geographical information technologies. The thesis therefore provides understanding and operation elements so that spatial data sharing can progressively evolve into geomatics learning networks, also termed "communities of practice" (Wenger, 1998) and describe in our systemic model of the appropriation process.
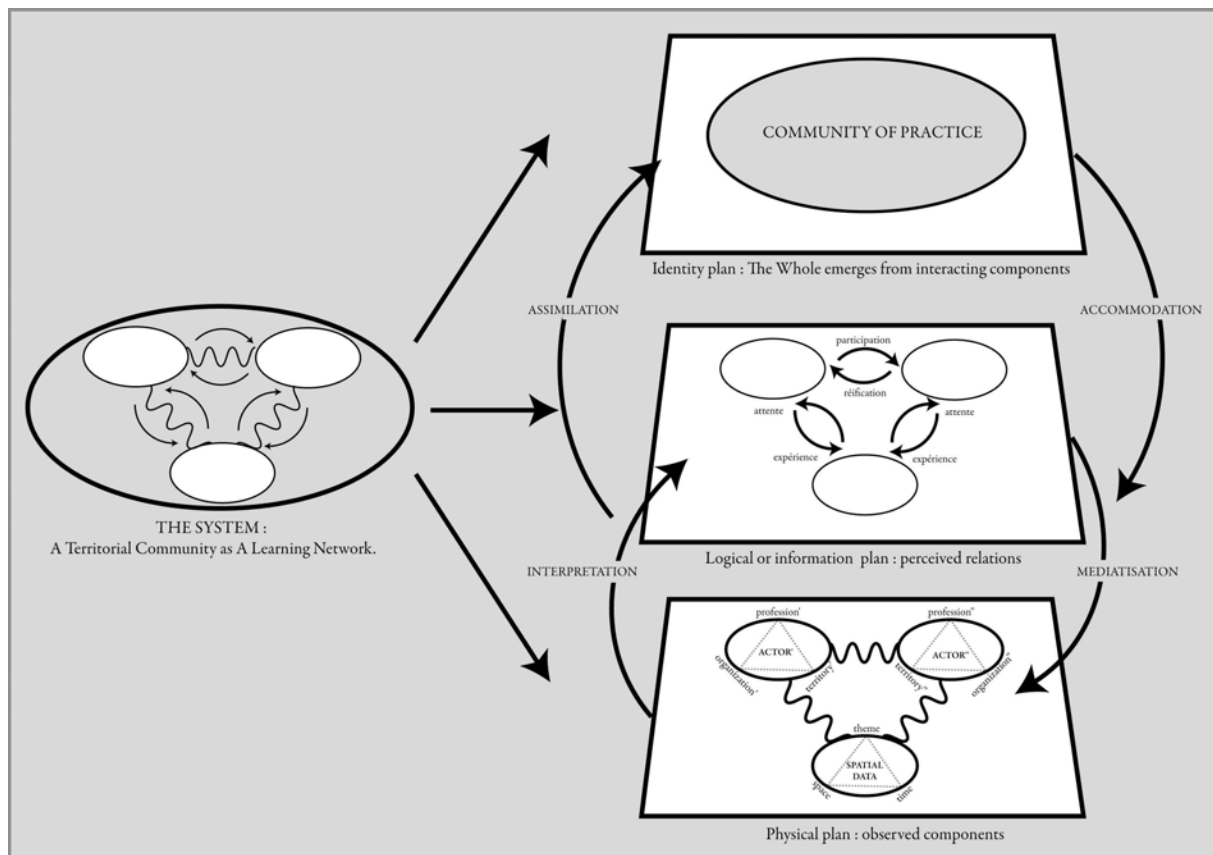

Fig. 5 : Systemic model of appropriation process

This community of practice as a learning network, offer, in our view, one of the most important component of Territorial Intelligence.

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