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Theoretical and practical approaches to the study of spatial diffusion of religious ideas: Relationships between actors and the circulation of information

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This study seeks to examine the different modalities of spatial circulation and the diffusion of one current of thought, the creationism. This religious idea makes a literal interpretation of the Scriptures, as the Bible or the Koran. Moreover, with time, this movement appears with some irregularity. Indeed, it was a very important authority when Charles Darwin published his work, *Origin of Species*, and its power declined during the twentieth century to re-appear over the last decades. So in this study, it is suitable to analyse the places and practices – at different scales in time and space – linked to this current of thought.

In Geography, Torsten Hägerstrand's[2] works allowed us to observe the diffusion of innovations as well as some temporal and spatial regularities. As a result, it will be interesting to introduce the actors according to four notions which were developed by T. Hägerstrand in his works: information, strategies, adoption and the stake in contact. This theoretical initiative implies the development of new methodologies allowing the analysis of creationism. Therefore, the relationships between the actors are at the heart of this thesis. Indeed, the production, transmission, and reception of information are central. Consequently, three steps are suggested to get in touch with the subject.

The first step is dedicated to graph theory and network analysis in order to work on the technical network Internet. This network must not only be viewed as a simple technical network, but as a – virtual – space, where some spaces of information exchange are being created. The next step consists in structural analysis, that is to say on the one hand a semantic analysis of information, which is diffused in the network and on the other hand the study of the formal organization through reading grids and criteria. The last step will create a survey field for the analysis of strategies of adoption and of symbolic places.

1. Studying Internet thanks to the graph theory and network analysis.

The Web is a wide space. It must be considered with a great strictness under penalty of being lost amidst a massive flow of information. Thus, creating the database is delicate and takes a long moment, during which each website is examined in order to know if it has an interest for the study. However, it is possible to use a freeware, created by the association WebAtlas, called Navicrawler. This software helps us to choose and classify the sites.

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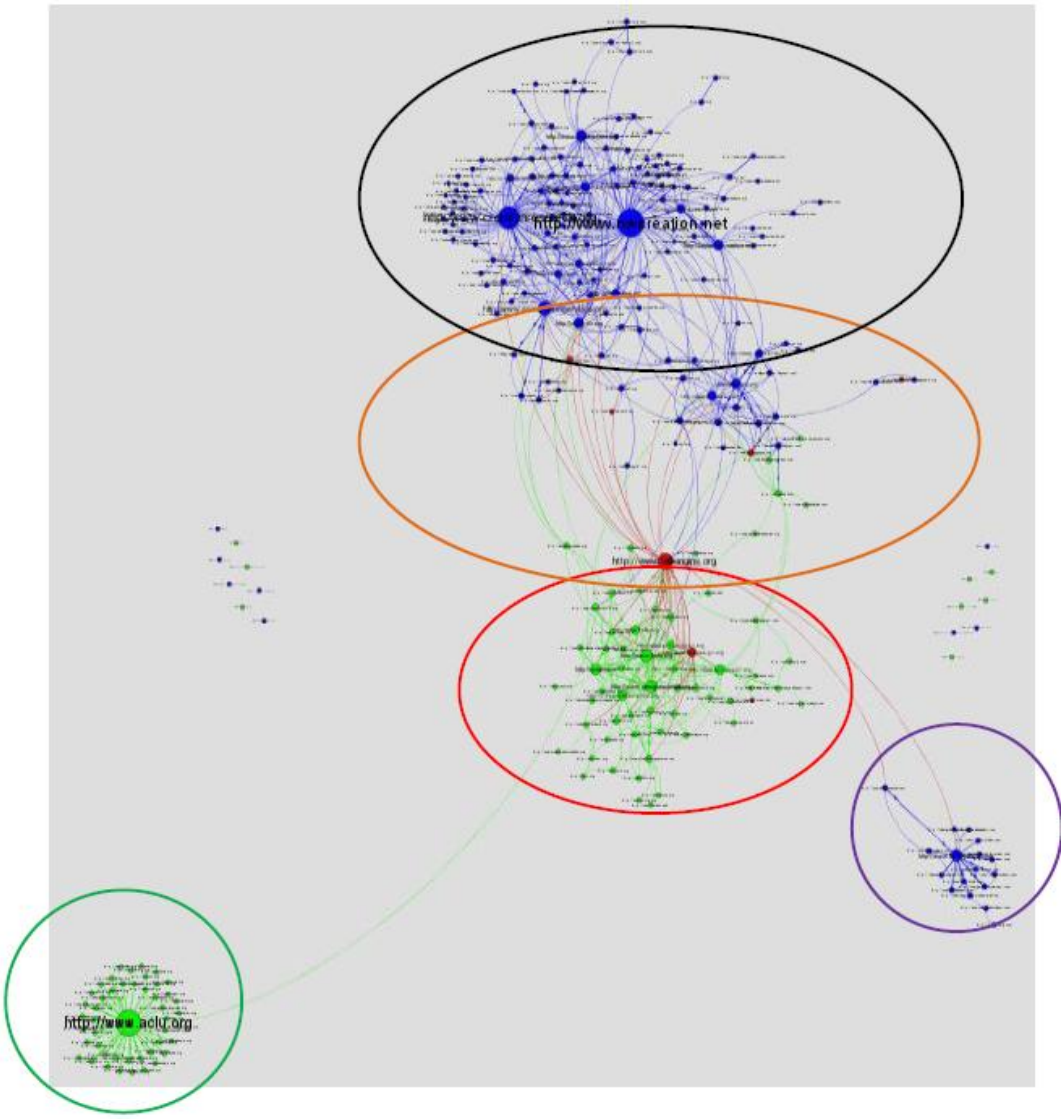
[1] Identité et différenciation des espaces, de l'environnement et des sociétés.

[2] HÄGERSTRAND T. (Published in1953 and translated in 1966 by A. Pred) *Innovation diffusion as a spatial process*, Chicago, University of Chicago.

	Groups			
Wording	***kind of groups***	***kind of website***	***location by country***	***other scale?***
	creationist	NGO - Association	Turkey	internal scale of the country
	anticreationist	blog	United States of America	
	neutral	think tank		
		research centre		

The websites are classified by their affiliation, i.e. whether the actors are considered as creationist, neutral or diffusion breakers. They are classified by categories (associations, think tanks, research centres¼). There is also the location which is divided in two parts: the scale of the country, and the internal scale of the country.
So, we use the graph theory to study internet. Thus, when we observe the organizational structure in a graph, we can feel that the different structures cannot operate similarly, as it is possible to observe on the figure below. Besides, to analyse and observe the different relationships, it is important to create many shapes at different scales to reflect different situations in order to allow a complete and realistic analysis. It seems necessary to describe the graph below. Indeed, the three colours define three actors groups. In blue, we have creationist actors; in green, anti-creationist actors and in red, neutral actors. Therefore, we can observe the flow of information between actors. It will be observed through the hyperlinks which exist between websites. In other words, if some sites refer to another, then the latter must have some influence and an important weight in our network of exchanges and of information flows. It is also important to show the different subgroups on the graph.

● The first subgroup – black circle – is composed of creationist actors.
● The second – orange circle – is a mix of creationist, anti-creationist and neutral actors.
● The third – red circle – is essentially composed of anti-creationist actors.
● The fourth – green circle – is formed of anti-creationist actors from the same association, *American Civil Liberties Union (*ACLU)
● The last subgroup – purple circle – is composed of Turkish and Koranic creationist actors. It is interesting to remark that, even if the location has no importance in a graph we have a subgroup from another country which is separated of the rest of the graph.



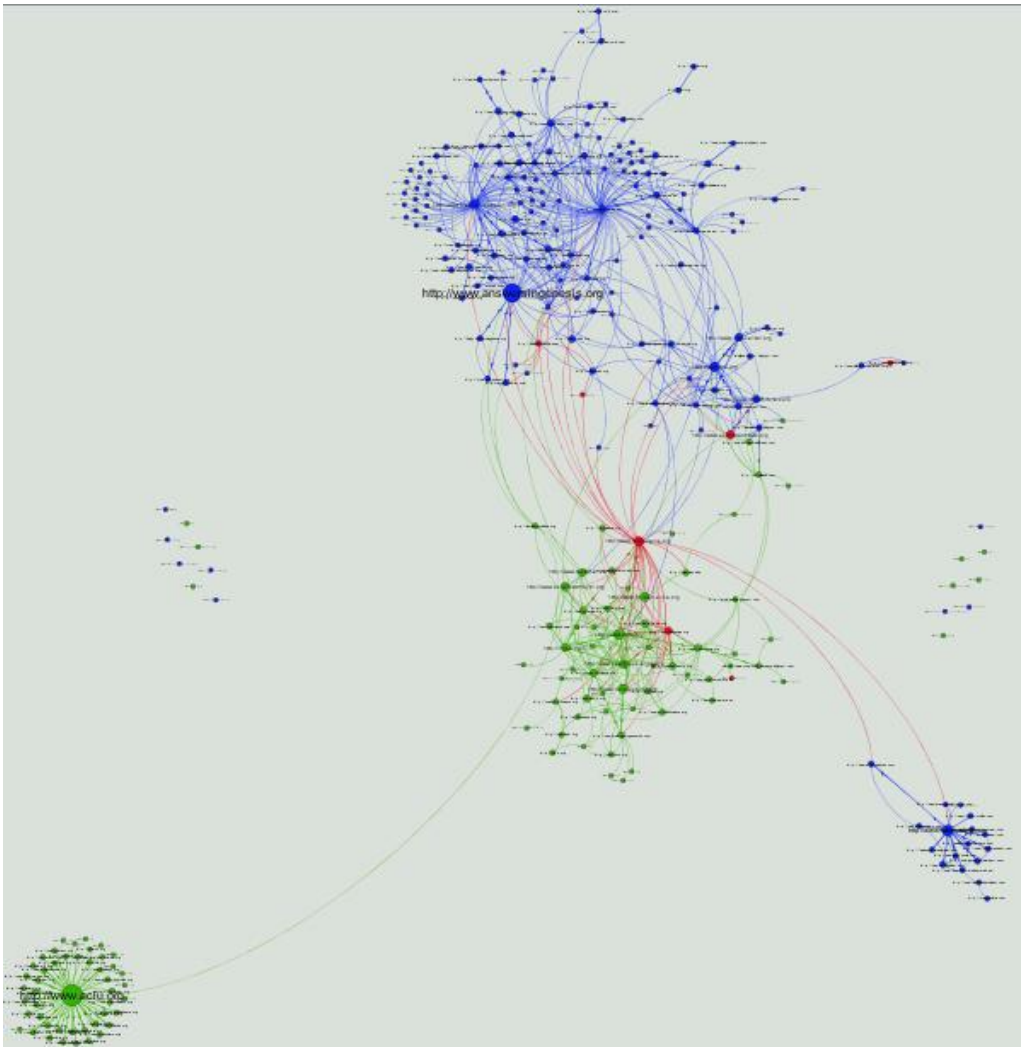
Through a graph we want to study a set of relationships between a set of actors and explore the idea of explicit rules or not, that is to say the actors understand these rules, read them, follow them or skirt them to achieve their own goals and realise their project[3].

Nevertheless, a graph does not just have an illustrative function. Indeed, the method is intended for an investigation on the evolution and organization of groups together with the position of individuals in these groups. Therefore, the issue of power is central, so are the authority, potentiality and the measurement of influence. Thus, to study the internet network and the relationships between actors must allow the observation of informal links, which enable some actors to achieve a "hierarchical jump". "This translates the idea of skirt, which would allow an individual, through an intermediary or playing on a relational register, to achieve a hierarchy while the possibility is not structurally and formally given."[4]

[3] MERMET L., *Stratégie pour la gestion de l'environnement : la nature comme jeu de société*, L'Harmattan, Paris, 1992.

[4] LARRIBE S., « Des réseaux sociaux au sociographe pour l'analyse des jeux d'acteurs » in MATHIS Philippe (dir.), *Graphes et réseaux : modélisation multiniveau,* Paris, Hermès Science, 2003, p.160.

We have to take two steps. The first one allows us through indicators to examine the phenomena partially thanks to centrality, status, density, etc. This method gives rise to the determination of cohesive subgroups, that is to say groups of actors who interact more together than the other actors in the network. For example, when we use in graph theory the nodes degree, it will be useful to interpret the result as centrality indicators in the context of actor network. Indeed, we can see on the graph below, different results when we use another algorithm. This algorithm measures the transmission of information. Thus, we can compare the different graphs between them. It is important to observe different hierarchies, and the apparition of a hierarchical jump, with a small association, *Answer In Genesis* located in Petersburg, Kentucky, which has used TIC to develop its authority and centrality. Moreover, through these maps, which represent a compilation of results of different algorithms, we can observe that this small association is still present. The other associations are more classical, because they are historical centres of the current of thought or a big association which protects civil liberties.



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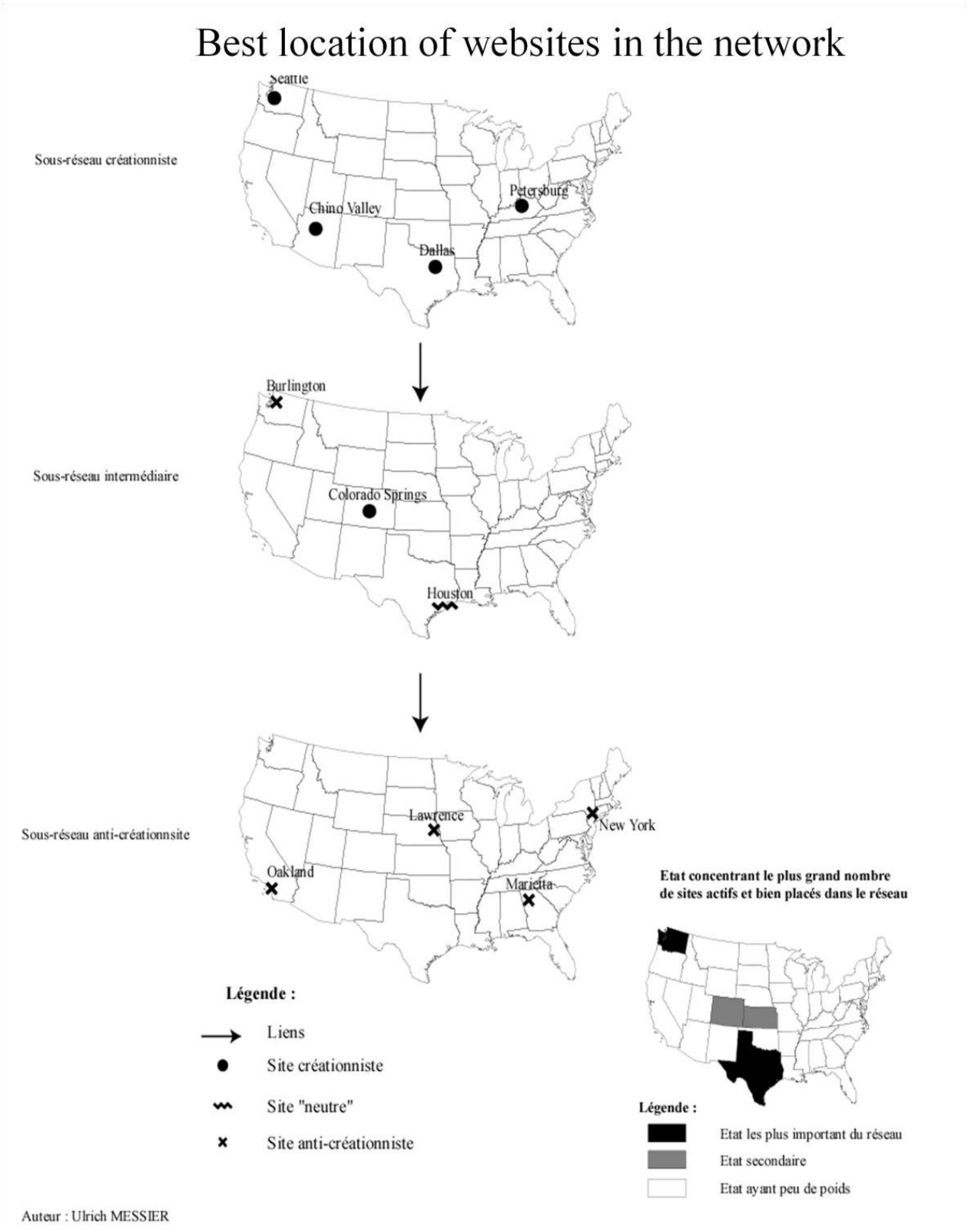

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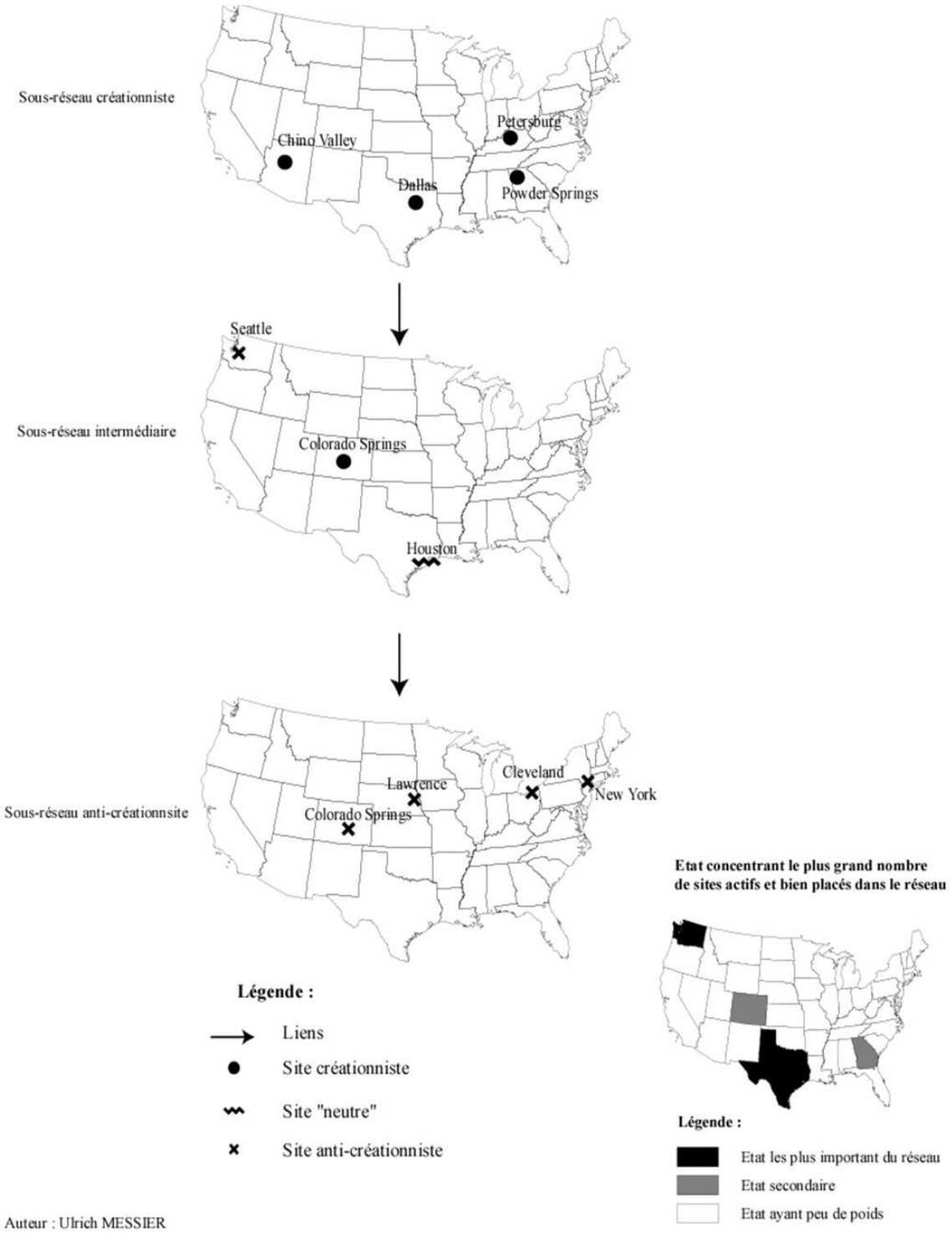
Exchange and circulation in the network: hierarchy and location of important websites



Auteur : Ulrich MESSIER

The next step is trying to connect this structure with behavioural phenomena that are observed in using eventually relative information to attributes. Rigorously, we qualify the first step of network analysis, the second of structural analysis. They are inseparable from our point of view, and it gives all its specificity to the process. Above all, it reminds us that in this approach, the network analysis is here to serve the structural analysis[5].
Thus, in reasoning on spatial diffusion and circulation, it seems essential to understand, analyse, or try to anticipate the actor's behaviour. Otherwise, we understand behaviour as an exercise of power, meaning the faculty or disposition to be able to make and impose a decision. Studying behaviour allows a better appreciation of the logical establishment and strategic choices undertaken by the actors.

2. Structural analysis

Structural analysis is essential to apprehend the spatial production together with spatial practices stemming from a current of thought. It will be enlightening to study organizational forms from the actors' network. Besides, network analysis is very useful for the following work. Indeed, this analysis allows the identification of essential actors in the network. Afterwards, it seems imperative to prefer the subgroups, and actors who seem central in these groups. This investigation is based on reading grids which help us get answers about the different subgroups.

<table>
<tr><td colspan="8">name of the actor network :</td></tr>
<tr><td rowspan="2">Geography</td><td colspan="4">Scale</td><td colspan="3" rowspan="2"></td></tr>
<tr><td>Local</td><td>Regional</td><td>State</td><td>International</td></tr>
<tr><td rowspan="3">Actor</td><td colspan="3" rowspan="2">Institutional</td><td rowspan="2">research institute - University</td><td rowspan="2">NGO - association</td><td rowspan="2">Private actor - enterprise</td><td rowspan="3"></td></tr>
<tr><td>State</td><td>Regional</td><td>Lpcal</td></tr>
<tr><td colspan="3"></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Object</td><td colspan="2">grouping around a project</td><td colspan="2">information or experiences exchange</td><td colspan="2">having more power - Lobbying</td><td rowspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Duration</td><td>recent partnership</td><td>for a specifed duration</td><td>Long term</td><td colspan="2">Renewal</td><td colspan="2" rowspan="2"></td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="3">Financing</td><td colspan="2" rowspan="2">self-financing</td><td colspan="3" rowspan="2">received funds</td><td colspan="2" rowspan="2">received private funds</td></tr>
<tr><td></td></tr>
<tr><td colspan="2"></td><td>national</td><td>regional</td><td>other</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Organisation</td><td colspan="2">one leader</td><td>hierarchical</td><td colspan="3">equality between partners</td><td colspan="2" rowspan="2"></td></tr>
<tr><td colspan="2"></td><td></td><td colspan="3"></td></tr>
<tr><td rowspan="2">Themes</td><td>Education</td><td>Politics</td><td colspan="2">Science & Ethic</td><td>Society</td><td>Religion</td><td>Social</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Purpose</td><td colspan="2">scientific result</td><td colspan="2">putting pressure on decision maker</td><td colspan="2">intensifying cooperation</td><td>Building a structure</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td></td></tr>
</table>

[5] LARRIBE S., « Des réseaux sociaux au sociographe pour l'analyse des jeux d'acteurs » in MATHIS Philippe (dir.), *Graphes et réseaux : modélisation multiniveau,* Paris, Hermès Science, 2003, p.160.

The reading grid is created to analyse subgroups. For example, we can use the subgroups from the left corner, which is composed of anti-creationist actors from ACLU association. This subgroup seems to have an organisational form with one leader. Indeed according to our graph, we can remark that this subgroup has an organisational form which looks like a star network. So, it is important to know if what we observe in the graph represents the reality. Thus, we use the reading grids to observe one subgroup. Through our reading grids, we want to know the geographical location, and influence scale; which kinds of actors compose the network (institution, association, research centre, etc.)? Why do these actors have links with other actors? Since when has this network been operational? How is it financed? How are they organized (one leader, hierarchy, equality between partners)? Which themes are preferred in this network (education, policy, science & ethic, religion, social, etc.)? What is the purpose of such networks?

Nevertheless, a network and structural analysis – with internet as a support -is not sufficient. Indeed, it is essential to develop a field survey to gather more information and complete the study. Otherwise, this structural analysis will be completed with interviews on the field so that our reading grid will be confirmed and filled in. However at this time of our project, this step is still theoretical.

This step is combined with the other analysis. Indeed, the field survey is a good tool to examine strategies which allow us to get in touch with the population and try to study the role of TIC in the diffusion of the current of thought. However, the survey also leads to measure the neighbourhood effect and adoption process. Indeed, when we have started to examine strategies, we saw the development of new strategies. The actors found new foundations, which have the role of symbolic places in the space. Indeed, it is important to note that since the 1980, a new strategy has been developed by creationist actors. They decide to establish new foundations with a special role. They want to share their values with members of their community but also with the population to attract them. The first foundation was built in Abilene, Texas. Today, we identify about twenty museums or theme parks which are built or in project in the USA. So, we can suppose that these places have a role of signpost and that they establish a territory. Otherwise, the current of thought would have a great strength around this structure. A symbolic place is defined as a place which limits the territory and gives it a meaning, it structures it. People consider this place as a symbol of their identity.

They are both symbols and values in space. They produce and build the cultural and political territory[6]

The field is chosen thanks to our precedent analysis. Besides, the number of organisations by state is a significant element in our choice, as much as their activity in the exchange and production of information. On the map below, we have located a hundred and fifty-seven structures. It is not an exhaustive map, but we can already observe some specificity. Thus, we will focus on the State of Washington and Kentucky for their number of creationist structures (mainly for Washington) and their weight in the exchange and production of information.

[6] Bonnemaison J., « Voyage autour du territoire », *L'espace géographique* 1981, 4, pages 249-262.

Consequently, our methodologies explore public information broadcast by media, such as the technologies of information and communication, particularly employed by these actors. The central question will be to perform a comparative approach of geographical areas on the Web and on the field. The first study area is located in the United States. It is the original place of diffusion of biblical creationism. Besides, this country possesses a strong spatial anchoring. The second area is Turkey. It is the place of birth of Koranic creationism, which has been gaining ground since 1998. Its specificity is an anchoring that is more virtual than spatial. The third area is Europe through countries such as the United Kingdom, Germany, and Switzerland, where both versions of creationism are beginning to be adopted. Thus, spatial productions and practices will start to be observed.