Knowledge and praxis of networks as a political project

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Modern-day society is increasingly described as an extensive web of networks, but as such, it is often perceived and experienced as elusive. In light of this paralysing description, this paper aims to highlight the potentially political dimension of network analysis, namely as defined in the social sciences, and of the notion of networks itself. It will be shown that a political project could, in this case, be built on the desire to know this reticular world better, but also to be able to act appropriately towards it. Three steps are proposed to specify how such a political project could be built. The first step aims at deploying knowledge of networks and emphasises the usefulness of a procedure to trace them. The second step shows the possibilities that this knowledge offers, particularly in allowing one to find one's bearings in a world which is frequently described as veering towards an increasing complexity, and by helping to rebuild the selection criteria for connections in this world, thanks to an additional degree of reflexivity. The third step draws on these points to extend them and bring out potentialities with regards to the intervention capacities in network configurations.

Introduction

The contemporary world has experienced such significant changes that they often produce a feeling of powerlessness when it comes to trying to master their problematic effects. There is no shame in admitting that it is difficult to understand this world or recognising the feeling that there are such powerful forces to be faced that hope of changing them tends to be lost. What can be done in order not to be condemned to surrendering and passively observing? Initiatives can be taken to develop new capabilities that are better adapted. In order to do this, there may be tools available that have not necessarily been considered for this purpose.

This is the case of network analysis, as we have been able to see it develop in the field of social sciences. This perspective, which is fuelled mostly by research in sociology, but

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also political science, geography, and economics, entails understanding the world through the networks that it is made of. In other words, it involves recognising the relational processes in which identifiable entities are involved, particularly to try and understand the nature of these relationships, their forming and transforming.[1] In such a perspective, it is a question of thinking in terms of how activities are connected, by linking individual or group participants, bringing into play different types of exchanges (material or symbolic, etc.) and playing a role in the distribution of various types of resources. Thanks to proven methods, it is possible to penetrate and understand the resulting relational structures at different organisational or geographic scales.[2] This perspective can even apply to 'non-humans' (Latour, 1993, 2005).

Underneath this scientific exterior, which could be considered as reserved for the academic elite, there could be a powerful tool politically speaking. In this case, it could be used to decipher and to act. When developed and extended, network analysis can be a tool of emancipation, both for knowledge and action, which could help counteract a feeling of powerlessness that is too widespread in people who have the impression of being subjected to domination without being able to find the root of the problem.

For example, rather than rambling on about globalisation, a theme that is largely debated, resorting to network analysis can be a way to more precisely understand the hidden forces that are supposedly behind this transformation. A phrase like 'Made in China' on a product already gives the buyer information, and for the imaginative mind, it can be an opening to a whole network, including manufacturers, carriers, importers, distributors, etc. The idea would be to assess to what extent it is possible to go beyond mere imagination and trace these networks in a tangible way, generalising this practice in order to go over and above the quasi-mythological tales that often describe our world and the new powers that are supposed to be running it.

Realising such a program, destined to be continuously restarted, would naturally coincide with a movement of 'explicitation' ('Explikation'), as Peter Sloterdijk calls it (Sloterdijk, 2005); this task has already been largely entered into and applied to the conditions of collective existence. This development of knowledge about the networks of our world would complement this movement and extend its reach. In this sense, this development would constitute a form of continuation and a development of a dimension of this explicitation that Sloterdijk associates with modernity.[3] Thanks to this intellectual undertaking, it is indeed another large domain in which a passage from darkness to light could be brought about.

However, such an undertaking can not simply have a descriptive purpose. Giving it a more systematic nature can indeed produce far-reaching effects: by what it can make visible, by what it can bring attention to, by restoring meaning, by grasping what was incomprehensible. Far from the promises of a revolutionary messianism,[4] the realisation of this type of program could be the way to replace the causalities endured by an outcome that is chosen. Tracing networks (in the old sense of following, but also plotting) would actually help to break apart these causalities. In the vast modern fabric of networks, it would be a question of finding the threads and being capable of pulling them to see where they lead.

The objective of this article is to show the potential of network analysis by marking out and explaining three possible steps to such a political project. The first step relates to the establishing of a knowledge of networks and emphasises the usefulness of a process which traces them. The second step shows the possibilities that this knowledge offers, particularly in allowing one to find one's bearings in a world which is frequently described as veering towards an increasing complexity, and by helping to rebuild the selection criteria for connections in this world, thanks to an additional degree of reflexivity. The third step draws on these points to invite the reader to imagine the intervention capacities in network configurations.

Step 1: Tracing networks in order to understand them better

The first step aims at establishing a knowledge base. The latter is based on a reflection on tracing, not only not to forget these traces, but also to be able to make them reappear.

The usefulness of this process

Defining certain phenomena allows them to be noticed. But in the case of seemingly profound transformations like those that globalisation represents, it can also make these phenomena even more impressive. This is typically what happens in numerous discussions about globalisation, especially those which make it a new dimension of capitalism. On the other hand, by revealing networks, feelings of being crushed by these transformations can be avoided. It is through this form of incarnation and representation in particular that bringing to light networks can begin to be a political project.

Michel Callon and Bruno Latour do not claim to push their sociological perspective as far as this political objective, but the recommendations they propose to stop reifying capitalism could be interpreted from a more political point of view:

> The thread that capitalism breaks and anti-capitalists have so much trouble recovering is far from being invisible. Indeed, it is the result of the introduction at all points of a series of networks made of scientific and technological elements—in the broad sense of the word—that allows for *the dislocation of temporal and spatial frameworks*. [...] We must study the history of sciences, techniques, and metrology thoroughly, for it gives us the practical means to explain the fracturing of localities, and it can also enable us to replace the illusion of a world market with a series of networks of power that is fully traceable and attributable. (Callon & Latour, 1997, p. 66, present author's translation)

It seems that the authors confine themselves to the sociology of sciences and techniques point of view.

However, such a process that generalises this prompting to trace networks would be even more useful at a time when the social and economic dynamics seems to align itself with a connectionist logic, like what authors such as Manuel Castells in *The Rise of the Network Society* (1996) or Luc Boltanski and Eve Chiapello in *The New Spirit of Capitalism* (2006) seem to suggest. For Castells, society should indeed be qualified as a 'network society', which is the specific social structure of what he calls 'the era of information'. Boltanski and Chiapello also detect a deployment of

the network form, which they link to the renewal of capitalism. In both cases, but also in a number of other written works since the 1990s, it is the image of a reticulation of the world that is often given. The analyses undertaken from this perspective are still recent and rich in controversy, but it seems justified to make sure that the tools are available to allow an understanding of such an evolution.

Understanding interdependence and factors of heteronomy.   Developments in the world can give the impression of a web of interdependent factors which has become so tightly knitted that distance and borders seem to have become secondary. Tracing the connections and networks can help to understand and interpret better the interdependence. For example, the damage that certain ecosystems in Southern countries have suffered can be better understood when related to consumption patterns that industrialised countries have adopted because these consumption patterns and the distribution channels they depend on tend to increase the extraction of resources in developing countries that export raw materials (for example, Shanahan & Carlsson-Kanyama, 2005). Along the same lines, the changes that millions of people are forced to undergo in their job can be linked to a series of exchanges in the economic and financial circles, similar to the links that subject the future of certain industrial bases to stock market fluctuations.

This knowledge is also useful for making the factors of heteronomy apparent, that is, the factors which are likely to have a rather strong effect on regulating individual and collective choices, or even reduce the ability to act. The position in a network or the simple fact of being part of it can indeed represent a source of structural constraints. For example, the atmosphere of constant economic competition can be linked in part to a growing intricacy of commercial exchange networks in an economy that has become globalised.

More broadly speaking, many of the elements that make up everyday life can be reinterpreted through an understanding of the network of choices. In this light, meeting individual needs appears to be integrated in an intertwining of determining factors that can lead to an interiorisation of behavioural constraints or to their naturalisation. We can typically consider that the individual as a consumer has a tendency to make choices that are no longer entirely his own, since they depend on a context that the consumer does not control (because there is a limited offer and/or hegemonic distribution channels; because he or she does not have all of the information to evaluate this offer, etc., these factors could interact thus reinforcing the situations of heteronomy).

Restoring collective choices by reducing opacity.   Citizens may often feel that they are subject to many decisions without being able to determine where they come from and how they were decided. Tracing networks can also be useful in this respect by helping to find the threads that lead to certain choices assigned to the community or specific groups. This means recognising, so far as it is possible to speak of 'decisions', that these decisions are most often made, not in a specific place, but rather result from a culmination of processes involving multiple opportunities for

discussion. Therefore, it is not a question of identifying one political responsibility, but keeping in the idea of responsibility a form of pertinence that is needed for a democratic regulation of life in society.

In a reticular understanding of power, one important part may consist of making certain nodes that accumulate resources visible and identifying their role in the ana-lysed networks. Tracing networks and highlighting the nodes that make up these networks can allow for a better understanding of the asymmetric distribution of power. In a broader sense, rather than assuming that multinational companies and state institutions have formidable power, network analysis would be the way to under-stand the different means by which these groups obtain resources and are successful in their domains. This can help, for example, to explain the phenomena of economic concentration.

A knowledge of networks can also allow for an analysis, or even a correction, of exclusionary tendencies of organisations which are supposed to be democratic. In this way, this type of knowledge can help to understand the 'capture phenomena' or the corporatist phenomena, situations in which certain administrative branches are influenced by the interests they are responsible for. Therefore, using this know-ledge to reduce the opacity would also be a way to prevent the relatively partial obstruction of democracy.

What could be done and by whom?

Spreading knowledge about networks might appear to be a repetitive task, given the increasing amount of information that seems to be available about our world. Yet, despite this accumulation the world may not be any less opaque. On the one hand, communities also seem to be subject to a growing complexity of their organisation, techniques they employ, procedures they use, and this can create an impression of a movement towards opacity. On the other hand, the wealth of information available can be overwhelming enough to drown in.

Opening the black boxes. Exploring networks is precisely related to opening the 'black boxes', to use the expression that Callon and Latour reworked in their perspective of sociology of science. What is peculiar about these 'black boxes' is that they can func-tion without the users necessarily having to know what is happening inside. Hetero-geneous entities, both human and non-human in the minds of Callon and Latour, overlap so much that the whole lot seems to be sealed. It is the network that has become invisible that needs to be made visible.

In order to do this, the basic work can also be related to a tracing back movement that would take place on many levels. For example, it would be like people plugging themselves into an electrical outlet or telephone jack to try to see and discover what is behind the outlet by progressively going back through the wires. They would be following the wires of multiple connections that could link even those elements that are heterogeneous. This is also what Latour means by the notion of network, in a per-spective that is in fact more of an 'actor-network theory' (ANT):

> For instance, you begin with a T-bone steak on your plate and you end up in the labora-
> tory of a protein specialist showing you the tertiary structure of the now infamous prion,
> one of the possible causes of the so-called 'mad cow' disease. But in the mean time you
> have visited European Commission bureaucracies, the cattle farmers' unions, quite a few
> hospitals, and participated in a lot of scientific meetings. [...] In brief, you have traced a
> network—a network, to prevent any objection from people not familiar with our use of
> the word, being not a thing in the world but the path traced by the researcher equipped
> with an ANT methodology during his explorations.(Latour, 2003, p. 36)

The American sociologist Gary Gereffi proposes a method of reticular investigation
in his study of what he calls *global commodity chains* (Gereffi & Korzeniewicz, 1994).
Given the expansion of the global commodity chains due to their fragmentation
in different parts of the world, for Gereffi it is a question of revealing these global
commodity chains that link the spheres of production and consumption of goods.
Such a perspective can help to understand and explain certain profound changes in
the production system, notably those linked to the advent and functioning of mass
retailing which strongly contributed to reshaping the economic circuit on an inter-
national level. Gereffi has been able to study the shift of economic power from the
manufacturing industry to the mass retailing industry over the last forty years
(Gereffi, 1994).

In a world that seems to be marked with complexity, tracing networks is nevertheless
not an easy task. The more complex the networks become, the more difficult the task
becomes. It is also probable that certain network branches are being concealed. Even if
networks are under increased surveillance by governmental, quasi-governmental and
supranational institutions, certain limitations of exploring networks will have to be
recognised when faced with illegal networks, like offshore financial centres, organised
crime and related trafficking, or terrorist networks (Raab & Milward, 2003).

Who can do the work and how?   If the production of knowledge about networks that
form the framework of modern society is so important, there is one inevitable ques-
tion: Who does the work? How can such knowledge be produced?

In fact, such work can be done in part by exploiting resources that already exist.
Motivated people can manage to group these resources and at times examine them
in a reticular perspective, even if this was not their original purpose. Different
sources of information would have to be brought together and the data collected
and combined.

However, one important condition is to be able to access pertinent information.
Knowledge, in fact, depends on the flow of information, but making networks
visible also means revealing how information flows, locating the different channels,
blocking points or retention points. Resources will also need to be developed and
various organisations from different horizons can participate. There is such a tremen-
dous amount of work to be done that tasks will have to be distributed.

In addition, academic writings can be used. To evaluate the increasing importance
of the reticular vision, one only has to consider the number of academic journals that
include the very word network in their title (*Social networks*, *Global networks*, etc.) or
the research that refers to this type of perspective.

Initiatives proposed by public institutions can also be used, like those which are founded on objectives of transparency. These initiatives can have a reticular aspect, meaning they work on the tracing or assure that the traces remain visible in order to follow certain activities. The Extractive Industries Transparency Initiative (EITI) corresponds to this perspective. The aim of this initiative, which was proposed by British Prime Minister Tony Blair at the World Summit on Sustainable Development in Johannesburg in September 2002 and supported by French President Jacques Chirac, is to encourage the publication of transactions made between the extractive industries sector and the governments of the countries where they operate. In 2005, there were 20 countries committed at different levels as well as the biggest oil companies and NGOs such as Global Witness and Transparency International. The EITI plans to publish government revenues from oil and account information on the Internet after they have been audited by an international accounting office and consolidated by an independent administrator. The objective is to facilitate, thanks to this form of communication, the monitoring of extractive industries' use of revenue to therefore avoid negative effects such as corruption or monopolisation of any part of the revenues at the expense of the population.[5]

Non-governmental organisations, non-profit organisations, and activist groups can also contribute to a reticular investigation, with backing from members of academic circles or related groups. The report published in September 2000 by five researchers from the Corporate Europe Observatory entitled *Europe Inc.: Regional and Global Restructuring and the Rise of Corporate Power* (Balanyá *et al.*, 2003) is one example, targeting the influence of economic lobbies on the European political sphere.

As the amount of information collected increases, the problem of data sorting, data organisation, and more broadly speaking, computing power will have to be addressed. For the latter, the Internet can play an important role in terms of collective archiving, and be used to communicate and make information available, according to the need. Public institutions and local and state authorities already offer access to a great number of documents, studies, reports, etc. by Internet, often for free, which were not widely available on paper before. Even if the Internet was not designed with our particular perspective in mind, it is a resource that can be used provided that there is a possibility to log on to the Internet and a minimal mastery of search engines on the Web.

Certain types of communities that form through the Internet develop procedures which could be similar to reticular investigations. Community initiatives already exist in a number of domains, such as sustainable development (Ahmed & Hardaker, 1999). In addition, there is a growing number of activist groups that put information on the Internet they have collected from monitoring certain activities. For example, on the sites http://www.corporatewatch.org or http://www.corpwatch.org, there are reports about the social and environmental effects of multinationals. These are, to some extent, network nodes which are already found on the Web. Of course, the question of unequal opportunities in exploiting new technology remains and some networks (institutional, economic, etc.) that are more able to accumulate capacities may continue to do so for quite a long time.

A set of visualisation instruments in the process of being developed.   Tools are needed to make things visible. Researchers in social sciences have designed methods for network penetration and analysis and continue to develop such tools (Wasserman & Faust, 1994). These developments have even led to attempts to create visual and graphic representations of networks, which have been made easier by progress in computer technology and can be very useful for our perspective.[6]

This type of instrumentation enables relevant information about the network to be located, meaning not only the elements that are part of the network, but how they are connected. The studies about this subject frequently mention the nodes and the links to analyse these elements, which suggests the idea of a structure that would emerge. For example, using such a framework of analysis can help to understand the emergence or the strengthening of points of attraction, which signals the relative importance of certain nodes over others.

Projects are currently underway using these types of tools. In sociology, The International Network Archive (INA), under the auspices of the Department of Sociology at Princeton University, aims to gather groups of data to construct visual representations of all the exchanges that occur around the world and contribute to globalisation: goods and services, financial investments, sales of arms, migration trends, movement of tourists, study abroad programs, telephone calls, etc. The site http://www.princeton.edu/~ina/ was developed to present the project and give access to data files, analyses, and maps that can be completed or reused.

Traceability devices as a potential source of inspiration.   Mechanisms in the socioeconomic sphere which use a form of network tracing are already in use. These applications could be investigated to see if they could be a source of inspiration. Such mechanisms were in fact developed and introduced based on the idea of traceability. Along the same lines, regulations are more and more often planned for certain products (food, medicine, etc.) and certain people (Hermitte, 2003).

Generally speaking, traceability consists of gathering the relevant information for each step in a process in order to follow its development and interfere if any information proves to be problematic. This is what is more and more frequently planned for certain products, from their fabrication and preparation to their distribution. Therefore, concerning food safety, the 28 January 2002 European ruling defines traceability as 'the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution'.[7]

This type of reasoning shows, at least in certain domains, that there is a need to establish conditions for monitoring. This was particularly the case in the food industry following a series of crises. But there are also signs that this logic is spreading to other areas, and tools and methods are indeed being developed in this perspective. Traceability is in a way the mirror image and corollary of a network society. In other words, the need expressed through this reasoning conveys a certain vision of the reticulation of modern society. Traceability has seemingly been made necessary due to the lengthening of intermediary chains. It is notably concerning these aspects

that the arsenal of procedures and methods developed seems to be interesting for the project being developed in this text, particularly for the possibility of information recovery they suggest, and in any case more than for the technique of government they appear to progressively represent.[8]

Step 2: Choosing how to act in a reticular world

From the political point of view that we have begun to formulate above, advocating the knowledge of networks only makes sense if this work leads to practical applications. Re-evaluating the role of networks from a political angle can also lead to revisions of how individuals act in the world, which can also be a lever of change.

The reflexive understanding of the position in networks as a way to choose individual connections

The specificity of knowledge is to allow for forms of reflexivity to be sustained. We could say the same for the knowledge of networks. Thanks to this knowledge, imagining a self-evaluation of the individual in relation to the reticular world becomes possible, and this therefore makes the examination and the revision of a whole array of social practices more widely available.[9] It is this type of application that can also give a political dimension to the tracing of networks. In this perspective, it is not only a question of the individual familiarising himself/herself with networks he or she is a part of, but also trying to gauge how to act in relation to the networks and thus organise his/her life.[10]

Familiarising oneself with how one is a part of networks could lead to reflection, resulting in the possibility of being able to choose the networks one participates in. Each person's life is made up of a sequence of connections that can be examined in a critical manner. The challenge would be to have a better understanding of the range of these connections so each person could clearly see his or her participation, voluntary or not, in certain networks.

Concerning ways of life, making purchases, for example, becomes less of a neutral act. Not choosing certain products when buying is a way to reject certain networks of production. On the contrary, continuing to buy certain products is one possible way to support and maintain a market for them. Being connected to short distribution chains is not the same as being connected to long distribution chains. Favouring local production is one way to avoid supporting certain flows of goods and consequently avoid generating certain types of pollution, like pollution from traffic.

Choice of connections and reticular options in the consumer society

Studies on consumer behavior show that there is an increasing interest in knowing the origins of products. Even if the price and the quality are still determining factors, consumers are paying more and more attention to other criteria, like the country of origin and the production conditions. This train of thought can lead to examining what

happens prior to the purchasing. Supporters of ethical consumerism assert that consumer's attention to the aforementioned criteria could cause certain changes to be made in production, particularly concerning social or environmental issues. The act of purchasing is no longer done just to satisfy certain wishes or needs, but has become a way to express ethical beliefs. Many researchers who are analysing this behaviour qualify this tendency as political consumerism.[11]

Such a change in consumer behavior is only possible when the conditions of production and commercialisation are brought to light in a rather precise way. For when consumers understand more about these conditions, they can change their buying habits. The view of certain economic networks provides a basis not only for criticising the consequences of what could be said to be a large-scale adaptation in production, (too) easily qualified as globalisation due to its international aspect, but also for starting to imagine alternatives to move away from the uniformisation of product lines or control the supply chain management by shortening them. Some activist groups are trying to resist the globalisation tendencies in practical terms by encouraging the relocalisation of certain economic activities, like those in the food supply industry, in order to return certain agricultural production channels to the local level (Hendrickson & Heffernan, 2002; Watts, Ilbery & Maye, 2005).

As far as consumption is concerned, tracing networks allows the links between producers and consumers to be reconsidered. The next step could even be to strengthen the links between consumers and certain small farmers who have chosen to defend a less productive way of farming. This is precisely what the Associations pour le maintien d'une agriculture paysanne (AMAP) in France or the experiences of Community-Supported Agriculture in countries such as the United States are trying to do.[12] Organisations like the AMAP are founded on the principle of a consumer–producer partnership. The consumer makes a commitment to buy products from the farmer in advance and the farmer is able to sell the products directly to the consumer. A set of initiatives have developed along the same lines of produce subscriptions, which can serve as a basis for developing a whole series of potentially motivating questions (food quality, maintaining a local economy, protecting the environment, etc.).[13]

Revealing the constituent networks also highlights the considerable differences between the production and localised distribution system and the mass retailing system, which is located on a much longer network. Concerning mass retailing, the consumer who goes to a supermarket or a hypermarket has a wide range of goods which are displayed in a relatively limited amount of space, and he has the choice, in a concentrated form, of a large number of possible connections, but with a reduced visibility of the origin of these connections. On the other hand, this visibility appears to be wider in the consumer–producer distribution system because the consumer who participates in this system can have information about the production process. This alternative offers consumers a way around the pitfalls set by mass retailers and consequently an occasion to establish other types of links against the mass relating model which has become dominant and often exclusive. In this alternative, the closeness of these relationships allows the consumer and producer to imagine an agreement, more or less explicitly stated, regarding standards of quality, but also

about pricing, by which the producer could assure for himself/herself a proper revenue while at the same time appearing to propose what consumers consider to be a reasonable price.

Rethinking the nature of relationships by reconsidering the type of connections

The choice of making certain connections or not is an important question, but the type of connection made is yet another. Another mechanism of action can be to change the nature of the relationships within the networks.

The conviviality supported by Ivan Illich represents this type of aspiration which aims to put social ties on new bases (Illich, 1973). In a society organised in a convivial way, as he sees it, each person can act while being able to master and control the techniques and structures he uses. Car-pooling can create, to some extent, a context for meeting and discussion. This practice tends to create a form of networking, especially when Internet forums are set up to facilitate their development.

Settings can also be changed by modifying the types of exchanges that are favoured. For example, it is different whether the exchanges be commercial or not, or dependent or not on an institutional framework. By proposing new transaction channels and favouring a type of bartering system, the experiences of Local Exchange and Trading Systems (LETS) produce a change in the way people are connected to each other, with the more or less expressed intention of getting out of the monetary system (Pacione, 1997; Servet, 1999). Thus, the system of mutual aid seems to be a form of common aspiration that has been tried out and is still being tried out in different types of experiments to create spaces where relationships free from domination can be expressed.

Other trends built around notions such as solidarity economy or fair trade represent other ways of rethinking the connections between producers and consumers and redefining the networks that connect them. The goal of fair trade, which has been promoted as a new economic mode, is to create alternative market relations by reorganising certain parts of the production chain. International organisations such as IFAT (International Federation for Alternative Trade), NEWS! (Network of European World Shops), and EFTA (European Fair Trade Association) have made a commitment to this type of goal. In France, the work of the group 'De l'éthique sur l'étiquette' (Ethics on the tag), member of the international network of 'Clean clothes campaign', has a similar goal. Their objective is to draw attention to child labour exploitation and the absence of trade union rights in some exporting nations to which certain businesses have relocated.

Beyond these examples, what is important to note is that these forms of action, both individual and collective, that are built on the criticism of certain modes of exchange and production, encourage a reticular way of thinking without necessarily formalising it explicitly. If it continues in this way, a profound re-evaluation of how people interact in the world could be brought about. Collaborative frameworks are being set up and organised, and working towards new types of networks focused on respecting certain ethical principles.

Step 3: Intervening in networks

What can be done when faced with nodes in a network which tend to be established at key points and create situations of dependence? The construction of competing networks can be a solution, insofar as it can represent a way to establish other nodes. The organisation of alternative connection models becomes a practical question. Such a process necessitates cooperative strategies which must allow for reflection about alternative network configurations and their possibilities of deployment.

Dissidence as a way out of a network and a refusal of connecting to it

Being able to identify the production of forms of domination by certain networks is likely to create the conditions for the destabilisation of these networks. Opposition becomes more easily imaginable once the restrictive relational structures have been made apparent. Challenging forced participation can contribute to the undoing of the established networks by loosening the ties that had been formed.

Opposition arises, for example, when confronted with alienating and ecologically detrimental aspects of the consumer society, as in the voluntary simplicity movement (Maniates, 2002) or sustainable degrowth movement (Fournier, 2008). Others are expected in view of the extension of domains, such as culture, for which access is transformed into a paying service. Consequently, more and more human relationships are regulated by a commercial or monetary system.[14]

Refusing to connect to certain networks can therefore become a form of resistance. From an analytical point of view, if we put resistance back in the social relations field, the temporary autonomous zone (TAZ) that Hakim Bey promotes is a network that is temporarily disconnected, a network that refuses a certain number of connections (Bey, 1988).

In view of the densification of technological presence in most human activities, one of the challenges is actually to keep the preferred options visible in devices and technical systems, similar to what is available on computer networks to make sure that codes are accessible and protocols are open.[15] Echoing the approach of hacking in a political and activist form, 'hacktivism' restores such a reflexive relation to technology (Taylor, 2005): it is a way to open the black boxes of computer networks. However, 'hacktivism' is limited to the universe of computers and the issue is whether this idea can be generalised to the whole technical world. In order to carry out this step, a major effort would be necessary to develop an expanded form of 'reverse engineering' (the study of an artefact in order to find its principles and mechanisms). However, allowing the generalisation of such an approach would precisely lend support to studying technical networks in a direction going backwards from the products to their design and deployment.

Indeed, the use of certain technical systems rather than others has implications that are not simply technical. In terms of electricity supply for example, different choices may lead to different logic and different networks. Between supporting decentralised technologies such as solar power and prioritising technologies based on heavy infrastructure such as nuclear power, the consequences are not actually the same.

Similarly, using bicycles or automobiles is not only a choice of means of transport, but also a way to participate in various technical systems, as part of their organisation as well as in their relationship with the rest of the world (Furness, 2005). The challenge is for citizens to be able to comprehend technical developments, in particular to remain aware of the consequences of these developments and of the trajectories on which they may be embarking (Sclove, 1995). This means that information sources and spaces of discussion should be available, but it should be reminded that these are supports to be built according the resources and opportunities available at that time. Compared to traditional channels of communication, the development of the Internet could, for example, be seized by militants groups to set up a space of vigilance, i.e. both a new and broad space of publication, circulation, exchange and debate, usable according to the needs and opportunities.[16]

Tracing alternative paths: the construction of networks as a reflected action

Tracing networks and identifying the main nodes can allow alternative paths to be drawn. Another universe of choices could then open up in which the circulation could be made easier, thanks to a widening of the field of vision, like on a motorway where signposts allow a driver to find his way. Paths could be made available to avoid being closed into a network that is considered to be questionable.

A whole array of social mobilisations, action groups, and committees have also developed by organising themselves in networks, often in order to find conditions of participation and action that avoid bureaucratic and centralist idiosyncrasies (Diani & McAdam, 2003). Associations such as those that defend individuals without resources (like Droit Au Logement (Right to Housing) in France, la Coordination Nationale des Sans-Papiers (The National Organization of Undocumented Immigrants) in Switzerland), unions like SUD (Solidaires Unitaires Démocratiques), distance themselves from more traditional structures to engage in their own processes of opposition. The reticular organisation that is developed in a mindful manner is more and more frequently used to defend common goals, even between activist groups that come from different countries (Routledge, 2000). Issues that are likely to concern different groups, like the environment or human rights, have been taken on by 'transnational advocacy networks', to use the expression of Margaret E. Keck and Kathryn Sikkink who showed the role that this type of activism has been able to take on the international scene (Keck & Sikkink, 1998). It is these activist groups, by developing their links and actions beyond the national border, that have qualified themselves as 'networks' (Keck & Sikkink, 1998, p. 4). Indeed, this type of activism has advantages and potential because these movements have managed to build flexible organisational bases and foster a dynamic by setting up counter-summits opposing certain major international meetings, and forums that are held more or less regularly, which are as much for meeting other as they were for exchanging ideas.

Authors like Boltanski and Chiapello (2006), who have compared the organisational developments in the capitalist world of businesses and the developments of

activist groups that have committed themselves to critical action, have noticed a tendency towards isomorphism. In each group, a reticular form and a connectionist logic tend to be favoured. The development of the critical movement would correspond to a functional need in view of changes in capitalism, precisely to maintain an opposition, as Boltanski implies:

> The 'network' form is obviously not only used to make a profit, even if what we see proves that it is indeed used more and more to these ends, including illegally (with the economic weight of criminal activity in mind). The success of the network in the economic field, which is linked to the availability of long distance communication tools that make the network possible without losing control of it, calls for the development of critical forces that also function in a network and have the flexibility and the scope of capitalism. How can we fight a capitalistic process that spreads in a decentralized and reticular way with hierarchical organizations which are centralized? Therefore, the natural order of things would be [...] to see a more and more serious confrontation develop between the two types of networks (capitalist and critical), like between the criminal networks and the others'.   (Boltanski & Chiapello, 2000, present author's translation)

A lever of influence

The deployment of rival networks to dominant networks can be a way to no longer be influenced by the latter. Above all, it allows the rival networks to exercise an influence. The development of reticular organisations does indeed have a tendency to encourage systems of influence. This is, in a certain way, what Castells predicted: 'In this information era, the battles for power are primarily cultural battles. We must develop new ways of acting that attempt to indirectly influence the process far more than make decisions' (Castells, 1999, present author's translation). Indeed, activist strategies seem to be going in this way. For example, Dara O'Rourke shows that behind the campaigns that targeted certain products, there are also networks that managed to be created and find their points of leverage to launch their action (O'Rourke, 2005).

Influence as a tactic of collective action has an interesting particularity, in that it can be part of a cumulative process. The interaction of different influences can allow a critical mass to be attained. The boycotting of certain products or certain businesses can be interpreted, from an individual point of view, as a refusal to connect to certain networks. But above all, when a boycott is publicised and collective, it increases its power to influence (Friedman, 1999). The boycott can dry up the profits of a market, and if a part of the network is deprived of its resources, there is a good chance that it will disappear or at least decline.

A way to rethink the idea of democracy

Democratic practices can also be seen as chains of links and considered in terms of the number of connections they allow or activate. The representative form of democracy tends to activate a limited number of connections by often limiting the expression of citizens to a ballot in the ballot box. However, a more participative form of democracy

can enrich both the quality and the quantity of these connections.[17] The hope of a participative government often brings into question the intermediary role that certain organisations claim to play, primarily the political parties, and the tendency of political professionals to constitute themselves as exclusive spokespersons (Blondiaux, 2005).

What is more and more often expressed is the problem that the choices concerning the community remain subject to the possibility of transparency. In terms of networks, this type of problem consists of avoiding the formation of closed decision-making networks, or equally maintaining the channels of discussion open in which the options that can involve the community will be developed. This is also to encourage keeping an attentive eye on the chains of delegation.

A reticular vision can be a way to rethink the idea of citizenship. It can show and highlight the links between citizens, the fabric of relationships they are a part of. It can also contribute to developing a feeling of responsibility in individuals and groups that these individuals are a part of. A reticular understanding of the world can even be a way to support a citizenship which is often multidimensional in nature because of the pluralism and the overlapping of institutional levels it can be associated with (from local to international).[18]

Adjusting the reticular configurations can also facilitate the circulation of information and therefore improve the conditions of citizen participation. The opening of these reticular configurations is an important factor in the formation of discussion and debate forums. Again, the Internet is often considered to be a technological innovation full of new possibilities.[19] From an instrumental point of view, it can help with information gathering and spreading. It can facilitate the circulation of analyses which would be more and more difficult to include in the traditional forms of media. The Internet also allows for the creation of new types of discussion forums which are free from the constraints of organising a physical meeting. It is now possible to find sites of counter-expertise, think tanks like Nexus, which is presented as Britain's first virtual think tank. In terms of communication, the formation of networks can facilitate the sharing of knowledge and experiences. It can allow situations of dependence to be reduced, notably concerning institutions, by pooling resources that are likely to encourage a liberating form of collective intelligence.

Internet has indeed generated a lot of hope as a new horizon of thought and of political experimentation. Efforts are increasing to develop its potentialities. The challenge, which goes far beyond technical aspects, is similar to that of movements which defend free and open source software (Chopra & Dexter, 2007). If digital tools and infrastructures are becoming hubs of electronic communication networks, their nature and their form also have a philosophical and political dimension. To go beyond optimistic invocations towards 'new information and communication technologies', social, cultural, political conditions remain to be constructed or maintained so that these digital networks can become an entry point to the opening of spaces of discussion about technical options and the development of new forms of citizenship (and certainly not of new control devices).

Conclusion

The proposals put forward in this text will naturally have to be developed. Their main aim is to lead to reflection on the construction and development of a specific type of knowledge, the knowledge of networks, and place this knowledge of sociological inspiration in a perspective of social purpose.

Tracing networks means reducing the feeling of elusive complexity that any individual today can have when faced with the world around him, the feeling of an inability to grasp this world. The feeling of overwhelming complexity leads to passivity. The visualisation of networks can be a way to make the world perceptible again and improve the comprehension of it.

We have seen that the basic knowledge about networks can already be utilised. The next phase could be to make it more widely applicable, to do it in a more systematic way. This certainly resembles the work of Sisyphus, given the changing nature of the networks that make up the world. Deciding to take on this type of task also means being aware that it is unending and can become even more difficult if the underlying extension of the socio-technical networks that Latour (1993) showed the importance of in the human adventure continues.

But what is at stake is powerful and important. It is a question of both reconstructing an ability to understand and finding an ability to act in view of a system moving towards a globalisation and an increasing number of interconnections. To use a well-known slogan, the process can allow one to think globally and act locally.

A view of networks can also help to rethink and (re)create forms of solidarity, even on a planetary level. In this case, drowning the hope of solidarity in an elusive global nature could be avoided and a practical way to (re)establish connections could be offered. A reticular understanding not only allows actors to see the interdependences they may not have been aware of, but also to re-evaluate these interdependences and make adjustments willingly in a well-thought out way. This could also cultivate a collective empathy and reduce indifference towards others in favour of living as a community. Being aware of reticular relationships offers the possibility of working on links between individuals or groups, beyond the physical borders or the symbolic boundaries that institutions have managed to create over time.

Is it a question of making everything visible and producing a system where everyone could see everyone? Supposing this is possible, the question, related to the limit between transparency and surveillance, can be debated collectively to plan a set of guidelines. At any rate, the aim of tracing networks must not be to watch over individuals. Therefore, it is not necessary to see in this project any return to a panoptical fantasy.

Notes

1.   It is even a key to understanding the world that is far from being reserved for social sciences (Barabási, 2002).
2.   Regarding the potentiality of this approach and for an example of its application, see Dicken (2003) and Dicken *et al.* (2001).

3. 'The fundamental concept of modernity is not revolution, but explicitation. [...] The time in which we live does not disrupt things, situations, themes: they just unfold. [...] Modernity wants to know everything about the background, what is tucked away, what was until now inaccessible and secluded—and otherwise everything, at least enough to make it available in preparation for new actions in the foreground, deployments, interventions, reformations' (Sloterdijk, 2005, p. 77, present author's translation).
4. Whose criticism has already largely been undertaken to emerge from the obsession of seizing power (for example, Benasayag & Scavino, 1997).
5. For more information, see http://www.eitransparency.org/. Some aspects of this type of initiative leave certain authors sceptical (Frynas, 2005).
6. See, for example, in political science, for the policy networks (Brandes *et al.*, 1999).
7. See European Commission (2002) which lays down the general principles and requirements of food laws establishing the European Food Safely Authority and laying down procedures in matter of food safety.
8. Which as such can raise critical questions (Torny, 1998).
9. This would again be following the trend of 'modernity', with a task that would fully support Giddens's (1989, 'The Reflexivity of Modernity') idea of a deepening of 'modernity' and be in line with what he regards as an essential characteristic of its dynamics.
10. Here also the perspective of Peter Sloterdijk can be applied to the explicitation of networks and the possibilities that such a work offers: 'what makes up the important characteristic of the conditions of knowledge in modern times is not that the "subjects" can reflect themselves or make the public aware of the reasons of their opinions, but the fact that they act themselves and they have before them the maps and the cards of their own former darkness finally unveiled that indicate to them the potential points of attack for the interventions they will do on themselves' (Sloterdijk, 2005, p. 64, present author's translation).
11. Michele Micheletti analyses this form of activism as an 'individualized collective action', that tends to convert the marketplace into a forum for political expression (Micheletti, 2003; also Micheletti *et al.*, 2004).
12. For more information about this type of experience, see, for example, Cone & Myhre (2000).
13. For a presentation and more in-depth analysis, notably from a political engagement point of view that can thus be made, see Dubuisson-Quellier & Lamine (2004).
14. For more information about the effects of this tendency, see Rifkin (2000).
15. On the not just technical but also potentially political and cultural role and challenges of these protocols, see Galloway (2004).
16. On the advantages of the Internet and the opportunities opened on a large scale, see Naughton (2001).
17. Such a perspective is similar to that of Benjamin Barber, in which the more the individual participates in community affairs, the more he becomes a citizen, making political participation a way of life and not a meaningless ritual (Barber, 2004).
18. David Held discusses 'multilayered citizenship' and 'multilevel citizenship' (Held, 2004).
19. For a more balanced view, see Bennett (2003).

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