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Sharing Platforms in Digital Geographic Information and Spatial Justice: Everything it Promises?

Pierre Gautreau
Matthieu Noucher

Abstract

Spatial data production and diffusion have been going through major developments since the digital transition of the 1990s, which translated in the emergence of new institutions organising their circulation: Spatial Data Infrastructures (SDI). In this new informational system, the notion of "sharing" is at the centre of the debates. But it is a contradictory ideology carrying divergent societal projects: some may think it encourages public transparency and informational democracy, and others that it compensates the State's inadequacy by favouring the participation of citizens in managing territories. This article on information geography offers a critical reading of the new modes of circulation of institutional spatial knowledge, by understanding spatial data sharing practices within SDIs, by comparing European and South American cases and analysing their effects in terms of spatial justice: citizens' access to information, improvement at territorial level of information coverage, mapping capacities of local specificities. SDIs seem to contribute especially to the reconstitution of the State's role, where in certain contexts they can favour the democratisation of territorialised public policies, and reinforce national sovereignty. They turn out to be far more paradoxical in their local effects: implementing a sharing process sometimes supposes a reinforcement of the exclusion forms of certain groups, and a normalisation preventing the expression of genuine territorial representations.

Key words: information geography; spatial data; open data; justice; informational democracy; access to information

Introduction

In this article, we contribute to the debates on the links between the world's algorithmisation and spatial justice, by offering a critical analysis of the political effects of the circulation of digital geographic information. This type of information contributes to the increasing number of algorithms guiding our daily life and the public policies affecting our territories (improvement of mobility, territorial forecasting, etc.). Therefore it is particularly important to understand its production methods, its flows as well as its consequences in terms of justice, and spatial justice in particular.

For a long time, the creation of territorialised databases involved only one actor. From the birth of the first land registries to the institutionalisation of public statistics in 16th- to 19th-century Europe, the State alone had reason and means to collect data on populations and resources over vast areas. The State alone had the capacity to standardise, organise and archive the collected data, thereby making the full extent of the national territory "legible" (Scott, 1998). In this context, the debates linking geographic information to spatial justice were organised around two antagonistic readings of the State's monopoly. The critical approaches of the State's informational build-up and its effects in terms of population monitoring (Foucault 1975), were in direct opposition to a positive vision linking the democratisation of public action to the creation of spatially exhaustive databases, making it possible to deal with every citizens fairly according to income, geographical position and property size[1]. Under this *Ancien Regime* informational system, characterised by an asymmetrical capitalisation of information in favour of the State but to the detriment of other social actors (Lascoumes and Le Galès, 2004), the central issue was that of the political and social effects of collecting and systematising data on territories, and the effects linked to a change in the scale of public action allowed by the transformation of local data into "national" databases.

[1] This is the main argument of civil servants who elaborate land registries, when they are confronted with frequently reticent land owners (Kain and Baigent, 1992; Touzerie, 2007).

With the digital transition, i.e. the increasing digitisation of data and the rapid expansion of the Internet, which has been affecting the production of geographic information since the 1990s, there has been a shift in the debate. Structured representations of space, as an alternative to those of the State, can emerge and become long-lasting on the Internet, thereby satisfying any claim for greater justice in taking into account the local particularities of populations (activist observatories), but also expressing private strategies disconnected from governmental agendas (as do GAFAM[2]). Simultaneously, the digital transition opens new possibilities for the State to pursue its multi-secular attempts at systematising its territorial databases, by treating the Internet as a new pool to find what is necessary to complete missing information on certain portions or dimensions of its territories. As such, an increasing number of public databases are pursuing their expansion by feeding partially on data stemming from participative sciences, from data produced voluntarily by citizens, or still from supranational databases produced by agencies not accounting directly accountable to governments. In this way, the digital transition is antagonistic in terms of spatial justice, promising both an increase in the equality of the spatial processing of citizens, and the growing possibilities for citizens to point out their local particularities and differences on the Internet.

The current complexity of what is called "digital geographic information", calls for observing new dimensions concerning the effects information has on society, and especially for understanding how the digital transition is re-structuring the transversal fields of constraint and emancipation. In this publication, we propose to tackle this re-structuring from the point of view of the "sharing" ideology which, it seems to us, governs the major evolutions of digital transition. The 2000s are the years of the multiplication of actors able to produce, interpret and manage geographic information, thanks to the Web, volunteered geographic information (Goodchild,

[2] This acronym designates the five large American firms dominating the digital market, i.e. Google, Apple, Facebook, Amazon and Microsoft. Of note is the fact that all of them have invested massively in the development of geolocation technologies.

2007)[3], the democratisation of geolocation technologies. With these come the redistribution of skills and technical capacities (Lin, 2015), and the multiplication of data sources. In this context where the nature and flow of geographic information is increasingly becoming more complex, today's priorities lie in knowing with whom the information produced is going to be shared and, as importantly if not more, what type of information is going to be produced. Hence the profusion of expressions such as data infrastructure, data platform, data governance, open data portal, smart data centre etc., all conveying the multiplication of systems organising new (geographic) information circulation. Today, as a result of multiple and often contradictory – although pragmatic – strategies (from the State, local authorities, large multinational firms, small consultancies, local militants, etc.), only those who share information are legitimate. These strategies exploit the discourse on sharing to negotiate their presence in the field of information, and to assert their role in the territories. Moreover, the "sharing" ideology is in many respects contradictory, in that it involves divergent societal projects likened to public transparency for some, or seen essentially from an instrumental angle for the others, making it possible to compensate for the State's shortcomings by favouring citizens' participation to the management of territories (Gautreau and Noucher, 2013).

As highlighted by Mol (2008) concerning the environment, information ceases to be a mere resource sustaining public policies to become a real field that "restructures processes, institutions and practices".

Where "sharing" involves positive and a priori democratic values, its forms (coalitions of actors, technical systems etc.) need to be understood, and especially its effects in terms of the modification of power relations between actors connected through the new flow of geographic information. This article tries to implement this by comparing cases from four countries (Argentina, Bolivia, Brazil and France), where systems symbolising this new informational paradigm – Spatial Data Infrastructures or SDIs –

[3] Volunteered geographic information characterises geo-located contents that are produced, enriched and updated by the wider public. It offers a unifying framework to a set of varying practices occurring outside the professional sphere of cartography or geomatics.

are being developed. Born in the 1990s, SDIs are institutions where information to be shared between territorial actors, sharing methods and even data production methods are negotiated: they associate a strong technical component (online data exchange platform) with a real network of territorialised actors organising flows of geographic information. Our analysis will focus on what the deployment of these systems will imply in terms of spatial justice. After defining our subject and framework in the first section, we will analyse successively the implications of SDIs in terms of citizens' access to information, in terms of the homogeneity of the territorial coverage of information, and in terms of equity in the expression of local particularisms.

1. Sharing Geographic Information and Justice: A Conceptual Framework

Often reduced to mere websites where the mapping data of a territory can be consulted through a geoportal and downloaded via a catalogue service, spatial data infrastructures are the seat of major evolutions affecting the current production and circulation system of geographic information. While they are very much managed by governments, they are intended for society as a whole, making it possible to observe the reconstitution of power relations around the State in this field. The will on the same territory to facilitate access to geographic data and services emanating from different suppliers has, since the 1990s, led to an increase in the development of national SDIs (Crompvoets et al., 2004), and to their being made available at all territorial levels (Masser, 2010). Today, SDIs bring together the data, computer networks, norms and standards, organisational agreements as well as human resources required to facilitate and co-ordinate spatial data sharing, access and management (Rajabifard et al., 2003). SDIs are from now on at the centre of the open data ecosystem, insofar as they have been structuring, for several years already, the institutional spatial data which constitutes an essential part of open data (Noucher and Gautreau, 2013).

Despite the diversity of SDI experiences, they are characterised and brought together by several traits. They are above all more or less stabilised institutions, within which rules for spatial data sharing are established between various actors in the form of

protocols or charters. The creation of workgroups within each SDI, open to many actors interested in geographic information (on data standards, computer protocols, legal issues, business applications etc.), is almost systematic and testifies to the institutional nature of theses SDIs. In order to live on, SDIs must convince their partners to supply the platform with data on a regular basis, thereby putting an end to the reluctance expressed by some to share information, and the desire expressed by others to capitalise on information to personal ends. SDIs must therefore enrol these partners in the long term, and spend a lot of energy to that end. Finally, any SDI involves co-ordinating different territorial levels, organising the coherence of data gathered for different objectives, on disparate scales, and managed by administrations or actors ranging from local to national levels for example. As we shall see, these three characteristics are absolutely essential in grasping the implications of SDIs in terms of spatial justice.

The sharing process implemented within SDIs covers a continuum of practices ranging from mutualisation, i.e. sharing data production capacities between institutions that are members of a closed group, to exchange, i.e. bidirectional flow between institutions, and finally to open data, i.e. dissemination beyond the public institutional framework. Irrespective of the practice considered, any SDI invests heavily in interoperability: in order to exchange data easily or to meet growing needs in distance communication and the need to be "spotted" on the Web and indexed by search engines, SDIs adopt international standards so as to make their systems interoperable, allowing them to communicate with other information systems.

Where "sharing" is often intuitively classified among the democratisation factors of our contemporary societies because it favours universal access, it must therefore be the subject of semantic clarification as well as a cautious and rigorous approach, since many exchange or mutualisation processes operate *de facto* by being explicitly off-limits for certain categories of the population.

Our case studies concern the SDIs of three South American countries and France[4], thereby making it possible to compare experiences conducted in very different political and informational contexts, and enriching the lessons drawn from these in terms of spatial justice. Although their general technical characteristics are similar, SDIs differ in the way they were created. The Argentinian SDI (IDERA) was born in 2007 (Figure 1) on the initiative of civil servants scattered in different federal and federated administrations of the country, and who wanted to formalise their unofficial exchanges by creating a national database. Today, the IDERA network, which ended up being co-ordinated by the National Geographic Institute, is very active. However, the low financial support given at federal level means that all activities rely on the quasi-voluntary activity of a few dozen people. It also explains why no data is online as yet[5], which does not mean that the institution does not exist: every year, the IDERA organises workshops in the provinces, which are attended by hundreds of participants who are trained in SDI notions and protocols, and are made aware of the legal and technical issues of sharing. In Bolivia, in 2012, it was on the initiative of a small team close to the vice-president and financed by international cooperation, that the SDI GeoBolivia was born, based more on a "top-down" approach. The objective was then to endow Evo Morales' government with reference data for the entire national territory, with a view to implementing his development and social redistribution policies (Lerch, 2013). After difficult beginnings where partners had to be enrolled by summons from the State, GeoBolivia began to structure a reduced network of public organisations in the form of subsystems connected to the SDI. However, the SDI acquired notoriety among the main public administrations, and regularly organises training sessions in spatial data management. In Brazil, in 2008, a national SDI was

[4] The Infraestructura de Datos Espaciales del Estado Plurinacional de Bolivia (http://geo.gob.bo), the Brazilian Infraestrutura Nacional de Dados Espaciais (www.inde.gov.br), the Infrestructura de Datos Espaciales de la República Argentina (www.idera.gob.ar). The French Infrastructure nationale de données géographiques is made up of the geoportal (http://www.geoportail.gouv.fr/) and the catalogue service (http://www.geocatalogue.fr/).

[5] The most active members of the network who contribute directly to the technical implementation of the IDERA, do not receive any remuneration in this regard, and often work on it in their spare time.

also created to meet a "top-down" logic, but it was run mainly by the Brazilian Institute of Geography and Statistics, which coordinates the initial workgroups[6] that led to formulating a long-term action plan. The project stemmed from the desire to create a national mapping data repository during the 1990s, and evolved into an SDI project after it was found that data was becoming increasingly digitised. Today, the INDE gathers mainly federal partners, and a high quantity of data is available (Figure 1). In Europe, the INSPIRE Directive (2007/2/CE)[7] has been aiming at deploying a Spatial Data Infrastructure in the European Community by relying on the SDIs of member States. In France, the National Council for Geographic Information (CNIG) ensures coordination between the national infrastructure - deployed since 2005 by the National Geographic Institute (IGN) and the French Geological Survey (BRGM) -, and the myriad of thematic (soil, water, coast etc.) or infra-national (departmental, regional, cross-border etc.) infrastructures that have seen the light since then. The regional scale is central in this system. As relays between local data and national standards, regional SDIs play an important organising role (federation, training and coordination). In January 2016, France counted 16 thematic SDIs at national level and 29 at regional level.

In this article, we will also bring up national biodiversity information systems (BIS), very close to SDIs as far as configuration and geographic data management are concerned, although BISs are generally simpler in that they correspond to sites where vegetal or animal taxa[8] are observed. Argentina's National Biological Data System was activated in 2009, through a project from the Ministry of Science and Technology aimed at creating large databases and instruments for scientific and technological policies. In actual fact, it consisted in the formalisation and institutionalisation of a

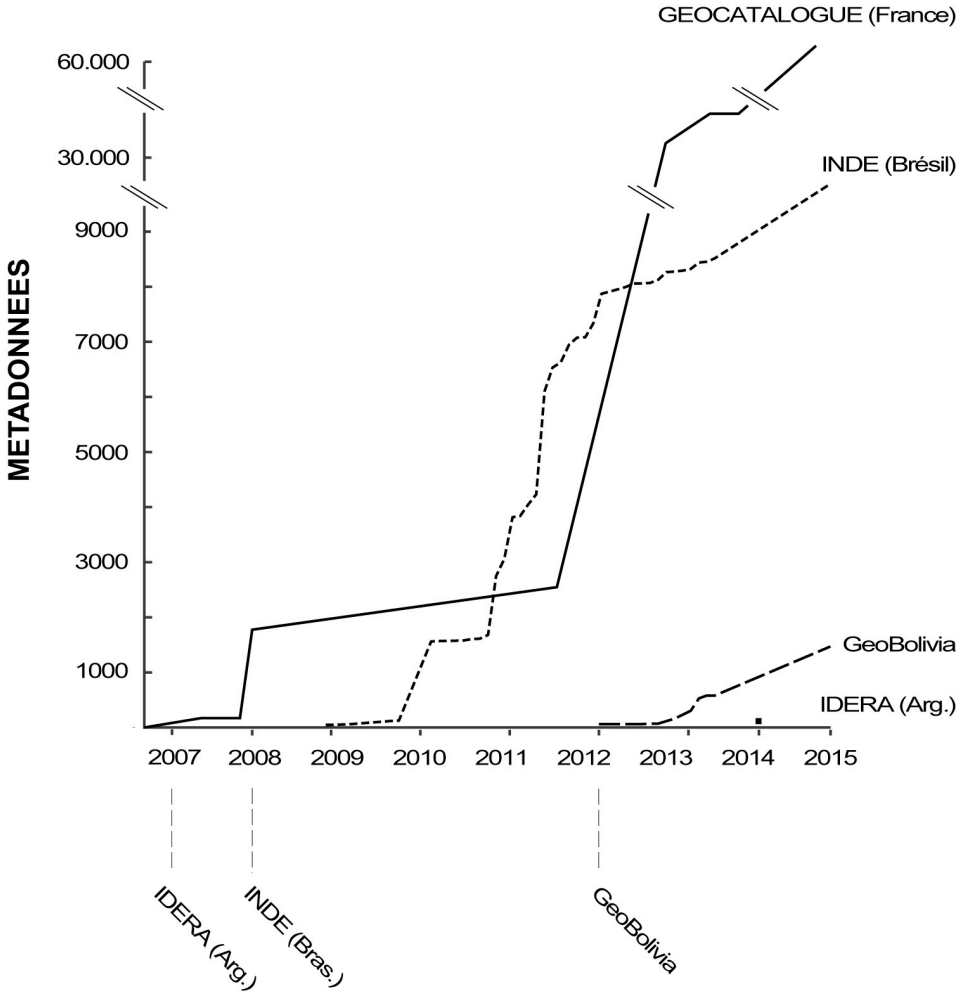
[6] 115 people from 23 institutions, including private aerial photography companies, took part in these initial discussions.

[7] http://inspire.ec.europa.eu/

[8] Sistema Nacional de Datos Biológicos de la República Argentina (www.sndb.mincyt.gob.ar), Sistema de Informação sobre a Biodiversidade Brasileira (www.sibbr.gov.br). The Bolivian information system on biodiversity is not active and does not have a Web interface (February 2014). The Information System on Nature and Landscape (http://www.naturefrance.fr/).

data exchange network between scientists and museums, technically supported by the Global Biodiversity Information Facility (GBIF) – an international consortium in charge of an SDI on global biodiversity, and of which the National Biological Data System has become a node with close to 500 000 records online in 2014. In Brazil, the Brazilian Biodiversity Information System (SibBr) came into being in 2011, following an initiative by the Ministry of Science, Technology and Innovation, the United Nations Environment Programme (technical section) and the Global Environment Fund (financing). In 2015, it had more than 3 million online records on offer for the Brazilian territory. As to Bolivia, it does not have any active BIS. In France, the Information System on Nature and Landscape (SINP) saw the light in 2005. It has since been managed by the Ministry in charge of Ecology, which is tasked with co-ordinating all biodiversity data-producing actors in France, from national authorities to amateur naturalists. The central platform of the SINP is organised by the National Museum of Natural History (MNHN) within the framework of the National Inventory of Natural Heritage (INPN). Although the global system is not yet fully implemented from a computing point of view, 35 million records are currently available online.

Figure 1. Evolution of the Scalability of Four National SDIs and Date of Creation[9]



The argument developed below relies on the longitudinal as well as multidimensional follow-up of the SDIs introduced, combining the exploration and search for data available in these platforms, observation of workgroups or leadership seminars, analyses of official reports and documents produced within SDIs, and many interviews with SDI officials and managers in the four countries since 2011[10]. These

[9] Evolution assessed from the number of metadata files contained in the catalogue service of each SDI. The authors would like to thank Julie Pierson for her web scraping work.

[10] Concerning South America, 45 interviews were conducted between 2011 and 2015 in the cities of La Paz, Santa Cruz, Cochabamba (Bolivie), Buenos Aires, Salta, Santa Fé, Rosario, La Plata (Argentine), Rio de Janeiro, Porto Alegre and Brasília (Brazil). In France, complete or participative observations have been conducted since 2005 through regular participation in yearly SDI meetings (AFIGEO), in INSPIRE seminars (CNIG) or in the works of different workgroups. The research project entitled GEOBS

cross-analyses sought to show how SDIs were created (institutional and organisational choices, co-ordination between actors), to understand what motivated project initiators and their partners to share information, as well as to quantitatively and qualitatively formalise open data.

Our conceptual framework, addressing the issue of the link between geographic information available in SDIs and justice, is structured around three informational dimensions of spatial justice. First, access to geographic information can be considered as a means of exercising citizenship as well as different rights, in the perspective of "the right to information" which has been expanding rapidly since the end of the 1990s, in Europe as well as in South America. Although access is the least geographic of the three informational dimensions of spatial justice, it questions the unequal social distribution of the right to information. Geographic information coverage is the second dimension, which questions mainly the equality of the spatial treatment of citizens by the State, particularly in the face of environmental risks. It questions the consequences of incomplete geographic information on a given territory, in terms of the authorities prioritising prevention and post-crisis intervention actions. It also offers the possibility of analysing the consequences of information homogeneity/heterogeneity as supplied by the authorities, on the ability of citizens to compare their local situation with that of other places, and to protest against situations where access to services or exposition to pollution is unequal. Finally, what we will designate as the institutional polyvalence of information, constitutes the third dimension which questions the capacity of SDIs to be used by a very wide range of social groups in the expression of their spatial singularity, and therefore to constitute an instrument of equity to be used in expressing different ways of seeing the world. This dimension questions especially the effects of information standardisation on the reduction or, on the contrary, the multiplication of spatial representation methods that can be transmitted.

(2015-2017) is currently pursuing these investigations by analysing the governance, contents and uses of French SDIs. An online survey was conducted in the summer of 2015 with officials from the 44 French national and regional SDIs. Data searches and interviews are also ongoing.

We will analyse SDIs successively through the prism of these three dimensions of access, coverage and institutional polyvalence. For each one of these dimensions, we will take an interest in the potentialities linked to SDI technical dimensions, to the discourse of actors on their objectives, as well as to the practices (information management and sharing negotiation methods) within the collectives they organise.

2. Access to Geographic Information and Citizenship

On first analysis, SDIs seem to materialise a citizen's right of access to information, which became structured and established at the turn of the 21st century in an increasing number of national and international legal systems. It is tempting to think of them as one of the technical building elements of a constantly evolving informational democracy. Theoretically, this materialisation simplifies and universalises access to certain public data, thanks to open data, in a process which, however, is not devoid of ambiguity as far as its links to the issue of transparency and to the actual impact of access universalisation are concerned.

2.1. Sharing Platforms or Anti-Algorithmic Black Boxes

First of all, it is because of their technical configurations that public geographic information sharing platforms are part of a transparency principle underlain by "openness". They can be described simply as referencing systems establishing metadata catalogue that, in turn, index geographic information existing in the different institutions taking part in the network, and enable users during their search by key-words to find data of interest. The success and appeal of these initiatives depend on the multiplicity of approaches for clarifying the database content, particularly by filling in "metadata" describing and tracing the origin of data (authors, date and method of creation etc.). In this case, this approach differs from those that create "black boxes" concealing the algorithms behind the results that can be consulted by users. On the contrary, the geographic information sharing platforms under study are supposed to work towards reinforcing the transparency of the State's actions, by making its intangible heritage accessible.

In so doing, these platforms become part of a principle which is the opposite of the "big data" principle that consists in exploiting any accessible data. Even if spatial data infrastructures are meant to integrate any data relating to a specified thematic or territory, they proceed above all to make a selection according to explicit objectives (aid to decision etc.). In fact, the volume, variety and velocity of metadata gathered in the SDIs under study, show that they constitute corpuses that, in many respects, differ from "big data"[11]. These systems are still mainly pre-algorithmic and feeding information into them remains very artisanal and parsimonious, as shown by the care with which reduced teams input and document small sets of data which are verified and corrected during their integration into the platform[12]. They are less part of a logic underlying the "transparency" of public action aiming at making all information possessed by the State accessible, than of a public service approach aiming at supplying a limited set of resources, documented in such a way that users know precisely what they can or cannot do with them. Although this general clarifying approach does not prevent certain restrictions of access, this ideal remains meaningful in the discourses of SDI members and largely motivates their adherence to such initiatives.

[11] Volume (size of data corpuses), variety (diversity of contents), velocity (how often they are updated) are the three dimensions (3V) identified by the Gartner Report (Douglas, 2001) to describe "big data" or "megadata" at least. Concerning our SDI corpus, its volume is reduced (cf. Figure 1), as is its velocity (metadata are rarely updated and when they are, it is on an annual basis), while its variety is limited, at least in the case of the French and Brazilian national SDIs where data is restricted to the jurisdiction of governments (cf. Figure 3 in this article).

[12] The relatively low quantity of metadata in the Bolivian catalogue service is due to the fact that all data shared must be described very precisely, which sometimes takes many weeks of research to find the author, origin and production forms of each datum. In Argentina, the national SDI has not yet made data available online, due to the fact that the team in charge of making an inventory of the data to be shared, and carefully drafting the metadata, is made up of a few people only. In France, the multiplication of guides and training sessions on cataloguing geographic data is a testimony of the skills required to create standardised metadata.

2.2. Sharing and the Right of Access to Information: Fortuitous Concomitance or Genetic Link?

However, we can legitimately question the relationship between the technical configurations and the motivations to share of the groups behind the creation of spatial data infrastructures, and particularly the importance given to the right of access to information for citizens willing to share. In the various fields studied, the simultaneity between the promulgation of legislations in favour of a right to information lato sensu or to the environment in particular, and the establishment of systems for sharing geographic information, could make one think that there is a genetic link between the two processes (Tableau 1). French SDI Géoportail was created with the specific purpose of supporting EU environmental policies, by setting up the national "node" of informational community infrastructure defined by the INSPIRE Directive. The South American platforms were launched between 2007 and 2012, a few years later or concomitantly to the adoption of specific laws on the right to information. In the environmental field, SDIs constitute the main expressions of "active transparency" as regards the right to information, which implies the dissemination of information by the State independently from specific requests by citizens, where meeting these requests on a case-by-case basis constitutes "passive transparency".

Yet the fact that these platforms constitute a specific response to legal evolutions is not obvious. The official methods justifying their creation lead to the conclusion that citizens' access to information constitutes a secondary motivation. The first version of the bill aiming at establishing the Argentinian national SDI introduces it, for example, as a tool meant above all to facilitate "decision making" by the State[13]. Similarly,

[13] Preliminary document, "National/Federal Bill on Spatial Data Infrastructure", consulted on the IDERA website in April 2015. Access issues are only brought up in the founding act of the IDERA (a document of lesser rank), and always around the central objective of improving public decision making: [the IDERA is] "a tool needed to improve the access of government agencies, academic and research entities and the public in general to georeferenced information"; the IDERA is expected to "assist the different levels of government efficiently and help citizens in their daily lives, improving their quality of life, contributing to progress as well as to social, economic and environmental development". Argentina's

legislations on the Bolivian SDI introduce it as playing a "strategic role in the management of the different institutions of the Plurinational State of Bolivia", geographic information being "of vital importance for the organisation, planning as well as adequate and opportune decision making" of the State, with no mention whatsoever of citizens' access[14]. Likewise, the decree for the foundation of the Brazilian national SDI in 2008, does not make any mention of this right, and formulates three reasons for the creation of the platform: the "country's development, the diffusion of the State's mapping standards, [and] the reduction of public expenses linked to the duplication of datasets by administrations". The objectives of Argentina's National Biological Data System correspond to the consolidation of a tool meant for scientists, and only marginally mention the right of access for all citizens[15]. In Europe, the preamble of the INSPIRE Directive contextualises and justifies its implementation with an argument organised around 35 items. Only one (item n°26) makes reference to the need to "facilitate access to geographic data beyond administrative and national borders". In this instance, opening up to the "public" is not proposed with a

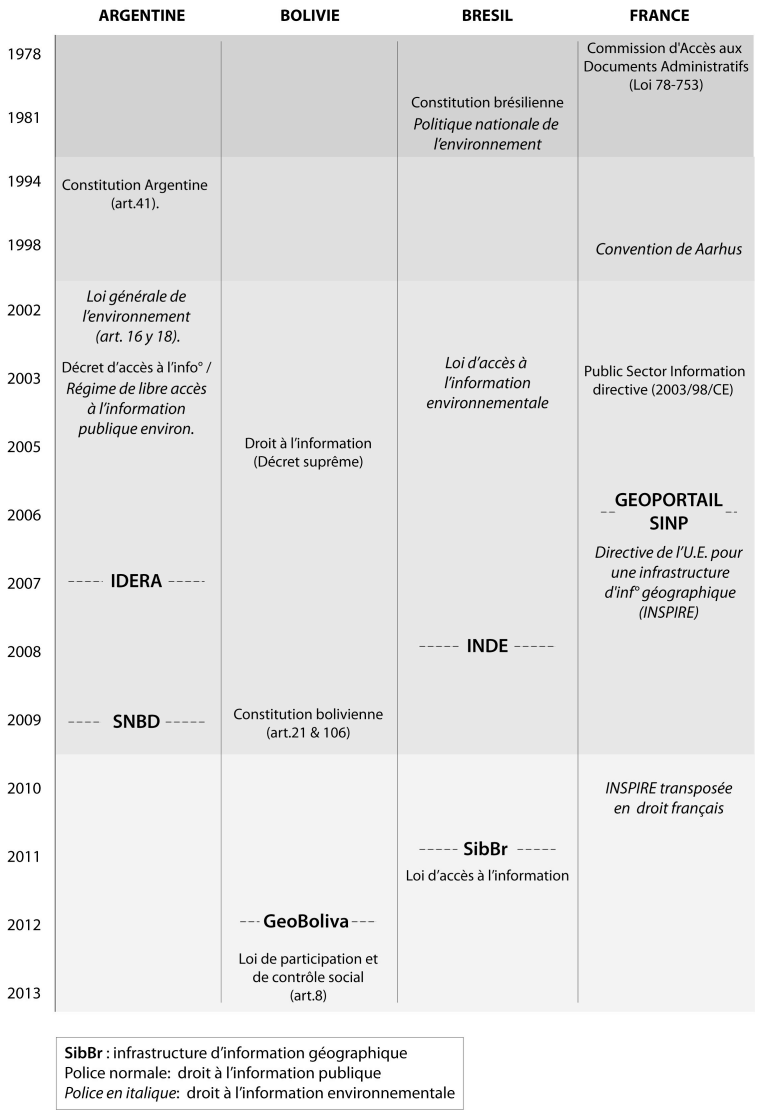
SDI will need to "democratise access to information in accordance with the data policies of each institution, and to constitute a major tool for identifying policies (sic) and decision making at all government levels" ("Acta acuerdo para la conformación de la plataforma de trabajo de la infraestructura de datos espaciales de la República Argentina, firmada en Santa Fé el 6 de agosto del 2010).

[14] Respective reference texts: "De los datos fundamentales de la infraestructura de datos del Estado Plurinacional de Bolivia » (resolución 01/2015), « Del documento base para la producción del información geográfica en el Estado Plurinacional de Bolivia" (resolución 04/2015).

[15] On the website of the National Biological Data System (consulted in April 2015), the following objectives are mentioned: "promoting the exchange of biotic information thanks to a national data network, analysing and implementing shared data quality and distribution policies; increasing and improving information accessibility by updating information; ensuring the international impact of the biological data produced in the country by spreading such data on virtual networks; reinforcing the conditions for the good conservation and management of collections; offering minimum knowledge on biodiversity to the public in general and according to defined standards and procedures; contributing to human resource training via shared programmes".

view to facilitating access to citizens, but "with a view to favouring third party value-added development"[16].

Table 1 – Comparison of platforms creation and the adoption of legislation on the Right to environmental information



The only exception in Table 1 is the protocol (2013) of the French Information System on Nature and Landscape, in that its preamble explicitly mentions access "to the

[16] http://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=CELEX:32007L0002

greatest number" as a central objective, referring specifically to Aarhus, INSPIRE and other legislations encompassing elements on the right to information[17]. It seems that the high number of amateur naturalist associations, in the French biodiversity information networks, is what explains the prioritisation of citizens' access, compared to the other systems which have networks composed of experts instead.

In this light, there is a strong paradox as far as geographic information sharing is concerned: although concretely they do favour better access for citizens, these systems do not seem to result from a legal evolution whereby rights are extended to information. We will explore the reasons for this apparent paradox further.

2.3. Sometimes Sharing Means Excluding

The fact that sharing geographic data online developed rapidly, has also resulted in the concealment of often paradoxical and contradictory processes: while, globally, access to information is amplified for society, it becomes differentiated according to the territorial levels and the different actors sharing.

Building SDIs links different territorial levels that, despite their institutional structuring through the creation of exchange protocols, can maintain different approaches in terms of data diffusion. As a general rule, the lower the level in the administrative hierarchy, the higher the restrictions in accessing a platform. This is partly due to the variation in the exchange forms between partners and the territorial scale. National platforms draw their legitimacy from their capacity to give access to a maximum of data to everyone, without users having to identify themselves (open network). A contrario, regional SDIs base their legitimacy on the fact that the actors of a network

[17] "This knowledge must make it possible to elaborate, monitor and assess biodiversity conservation, restoration or protection policies. It must also make it possible to throw light on public or private choices as regards town and country planning. Environmental knowledge must be made accessible to the greatest number as provided for by the Aarhus Convention dated 25 June 1998 and ratified by France, the European Landscape Convention and the 2007/2/CE INSPIRE Directory dated 14 March 2007. The Code of Environment (Article L124-1 et seqq. and Article L127-1 et seqq.) makes it compulsory for public environmental information to be made available" SINP Protocol, preamble (Appendix to circular devl1311244c dated 15 May 2013).

are clearly identified, and operate more easily using a closed network approach, limited to data exchange. In this regard, we conducted a survey on 44 French SDIs[18] in the summer of 2015, and found that 60% of them required users to identify themselves and sign a charter before being able to access "advanced" functions. However, practices between national and regional levels are highly differentiated and even reversed: only one quarter of national platforms require signing a charter against three quarters of regional platforms.

Confronted with the cost of organising and maintaining local digital infrastructures, platforms which opened up during the 2000s are currently tempted, in France at least, to restore differentiated access favouring those who contribute to platforms, or even those who are prepared to pay to access data. The open data movement is not, quite evidently, a process with no return, and the multiplication of tolls which, for some, marks the "end" of Internet as an open network (Beaude, 2014), is also affecting the public field. These new informational enclosures do not yet seem to affect South American SDIs, which are admittedly far more recent than their French counterparts.

These new enclosures also appear thanks to the tensions inherent to major sharing platforms, to which many actors whose agendas and interests diverge participate. The structuring of the Information System on Nature and Landscape (SINP), in France, came up against the contributors' fear of losing control over the data they connect to the national platform. A consensus was finally reached, allowing contributors to decide the scale at which their data could be restored: by default, any data integrated into the SINP was to be restored to the public using a 10 km² grid only. This "spatial fuzziness" prevents the exact location of species, perceived as sensitive by data producers, from being revealed. These producers can, at any time, modify the fuzziness level and circulate the data with maximum precision[19]. In the last case, we can see how the national co-ordinating body wanting to maintain an interest in the platform on behalf of voluntary contributors (who are therefore likely to leave the

[18] Survey conducted with 15 French national SDIs and 29 regional SDIs (Maulpoix *et al.*, 2016).

[19] Minutes of the National meeting on data distribution methods by the national platform (22 October 2015). Consulted in January 2016 on www.naturefrance.fr.

project), has led to its publics being segmented, with obvious effects in terms of spatial justice. While the wider public will only have access to information on sections of the territory incorporated in a 10 km² grid, only specific platform actors, including the State, will have access to all available data with maximum precision. This case is symbolic as far as constraints in sharing projects are concerned: in order to ensure that system contributors will be involved, they are granted differentiated rights to restrict access to their own data.

While it clearly appears that, today, there is a definite increase in geographic information access potential – and therefore in the exercise of citizenship associated with it, it turns out to be the collateral effect of a process which is seemingly aiming at something other than citizens' rights. This increase relates especially to an "instrument effect" (Lascoumes and Le Galès, 2004), not to a coherent policy in favour of State transparency. As to the inequalities of information access underlying deeper social and spatial inequalities, they subside rather than disappear, while restructuring themselves: the lesser is the social proximity to the core of the data sharing system, the lower is its accessibility.

3. Geographic Information Coverage, Equality and Risk

The relationship between digital geographic information and spatial justice can be analysed in terms of "coverage", beyond access issues. Where SDIs contribute to gathering together scattered cartographic heritage and generating new mapping reference systems[20], they theoretically contribute to perfecting the informational coverage of the territories under their jurisdiction, by increasing the quantity of data and homogenising it. As such, SDIs are instruments in favour of citizen equality, as far as the level of information on their spaces is concerned. But what about our different case studies?

[20] A "mapping referential" can be defined as *reference geographic data* exhaustively covering the territory, which is the responsibility of a clearly identified public structure, and in which users place a lot of trust, thereby reflecting the legitimacy of the agency in charge.

3.1. From Archipelago to Continent: Standardisation and Interoperability

In the field of geographic information, SDIs are a groundswell of technicality progressively making it possible to combine datasets growing in size, each time offering better coverage on the territories and reducing the heterogeneity of data formats. They actively take part in the tendency to standardise geographic information and the tools to manage such information. The circulation of the teams taking part in the organisation of SDIs, among many territorial authorities[21], contributes to the homogenisation of data formats and the adoption of shared software. Where one of the main issues for the success and continuity of a platform is to be visible on Internet, the tendency is to adopt interoperability standards, so that the data of a specific SDI can be consulted on other SDIs potentially set up in other countries, thanks to "web services". Setting up and interconnecting many SDIs at the same time worldwide, leads to the rapid constitution of a growing mass of information that, although scattered onto different servers, can easily be gathered by users and dealt with simultaneously. Standardisation and interoperability then make it possible to spatially connect ("continent") datasets that could not "interact" before, and that were evolving independently from one another ("archipelago").

In the environmental domain in particular, where the nature of the processes at play often require cross-border analyses that are independent of administrative perimeters, the potential for putting together *ad hoc* datasets originating from disparate institutions and territories, represents an important change linked to these technical evolutions. This vast movement also makes it possible to democratise the possibility for stakeholders to think on a different scale[22], by creating databases on vast territories from the concatenation of several datasets produced by different

[21] In France, the regional SDI network formed a workgroup within the French Association for Geographic Information (AFIGEO) which represents the country within the European Umbrella Organisation for Geographic Information (EUROGI), itself a founding member of the Global Spatial Data Infrastructure (GSDI).

[22] A possibility that, in the past, was reserved for the State that was the only entity with the capacity to generate databases allowing it to change scales when carrying out analyses (in this regard, cf. Scott's analyses, 1998, Chapter 1).

actors and on larger scales. Finally, in the specific domain of biodiversity, the digitisation and on-lining of collections gathered during colonial times and left in European and North American museums, leads to their virtual repatriation in the territories where the specimens were gathered, and to their integration into national databases[23].

Theoretically, standardisation and interoperability work in favour of a double movement: that of the democratisation of the State monopoly making it possible to "read" the territories on scales higher than the local one, and also to conceptualize these territories on supranational or cross-border scales. In both cases, the implications in terms of spatial justice are clear: the State as much as citizens are able to better compare places, and therefore to detect differences in the development or still in the exposure to risks, thereby offering leads with a view to correcting these gaps.

3.2. How Do SDIs Impact on the Equality of Citizens' Informational Treatment?

An analysis of the territorial coverage of the data up for sharing in the national infrastructures under study (Figure 2), brings one to question one of the recurrent arguments justifying the implementation of these platforms: that of the equitable treatment of territories by governments in the form of homogenous coverage. This argument is often put forward to counterbalance the initiatives of multinationals, such as Google Maps, which only focus on areas with high commercial stakes[24]. The

[23] An example, among others, is the collaboration between Brazil's Centre for Reference in Environmental Information (CRIA) and French institutions that were depositories for plants gathered by Auguste Prouvençal de Saint-Hilaire in Brazil, between 1816 and 1822, and that led to the digitisation of these specimens and to the creation of the Virtual Herbarium Auguste de Saint-Hilaire (http://hvsh.cria.org.br/).

[24] The introduction page of the IGN's Géoportail on Wikipedia stipulates the following: "The Géoportail covers the entire French territory in accordance with the principle of equality and satisfaction in the general interest while Google Maps covers the entire world with resolutions varying according to the importance of the site." https://fr.wikipedia.org/wiki/Géoportail_(France)

extraction of indexed spatial data in the Bolivian, Brazilian and French infrastructures makes it possible to question what a more "equitable" coverage of the territory would be like. As such, the density of raw data (collection n°1) or for 1000 km² (collection n°2) reveals high contrasts: Altiplano/Oriente or West/East in Bolivia (a) and Brazil (b), and in/outside the major area of low population densities in France (c). Brought down to 1000 inhabitants (collection n°3), contrasts are less striking but make it possible to show the disconnection between population density (collection n°4) and data density: the Amazonian Basin of Bolivia – Districts of Pando (d) and Beni (e) – and the South-East fringe of the Brazilian Amazon (g) have better coverage than major urban areas such as Cochabamba (f) in Bolivia, or the metropolitan areas of Rio (h) and São Paulo (i) in Brazil. Likewise, in France, the départements of Deux-Sèvres up to Lozère (j) seem to have better coverage proportionally to their number of inhabitants than those of Ile-de-France (k). This comparison shows that the distribution of information and its spatial discontinuities remain unequal within national SDIs. It even tends to show a reinforcement with the rise of SDIs. Indeed, when they are launched, these platforms focus on large mapping reference systems benefitting from exhaustive coverage. Parallel to the increase in the amount of data they store, SDIs enroll more and more partners and progressively integrate local cartographic productions, giving rise to a "patchwork effect". This is another side-effect of sharing platforms: the more SDIs gain in maturity, the more they seek to strive towards organisational exhaustiveness by forming partnerships with all actors of the public sphere, and the more the spatial coverage of their data appears heterogeneous.

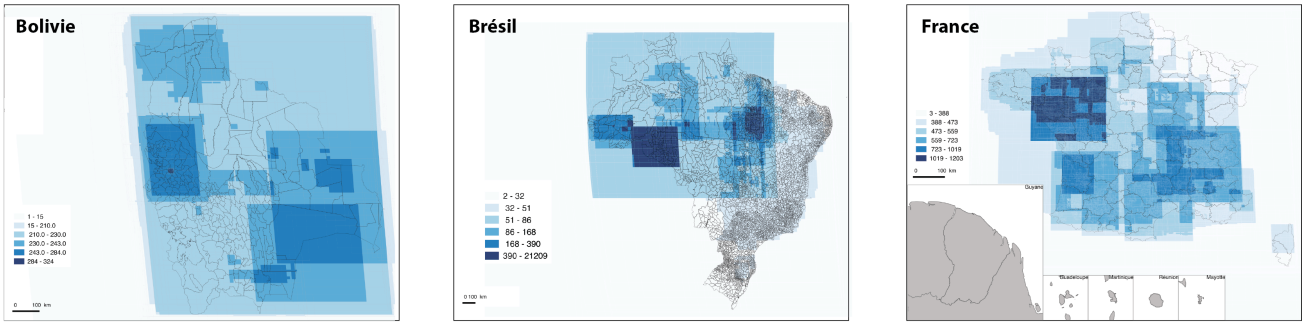
Figure 2. Territorial Coverage of Metadatas in Three Spatial Data Infrastructures.

Information géographique numérique et justice spatiale : les promesses du « partage »

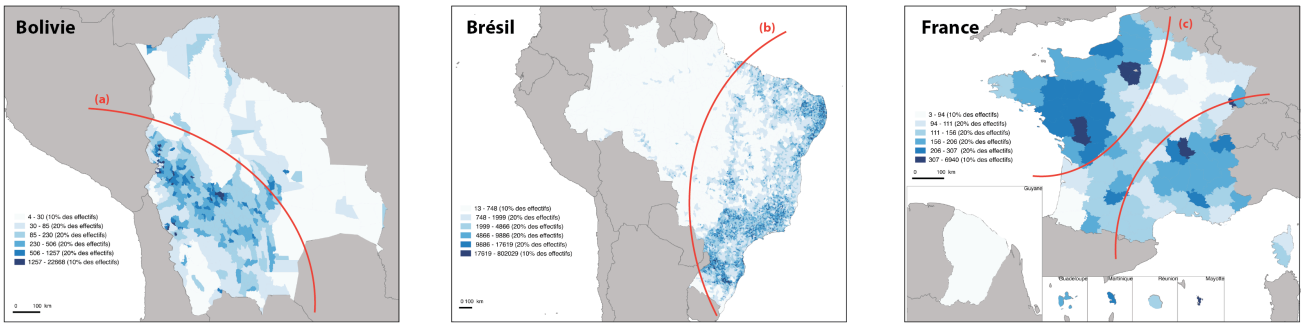
Couverture territoriale des données géographiques cataloguées dans trois Infrastructures nationales de Données Géographiques : Bolivie, Brésil, France

Ces cartes sont réalisées à partir de l'extraction (mars 2015) des emprises spatiales des métadonnées issues des trois IDG : GeoBolivia (Bolivie), INDE (Brésil), geocatalogue (France).
La 1ère collection de cartes présente la répartition des emprises sans pondération. Les collections 2 et 3 sont pondérées : le nombre d'emprises est calculé par unité administrative et pondéré par leur surface au sein de l'unité. La collection de cartes n°2 présente la densité d'emprises pour 1000 km2 et la collection n°3 pour 1000 habitants. La quatrième collection rappelle, à titre informatif, la densité de population des trois pays étudiés. Les discrétisations des quatre collections sont les mêmes : la première classe contient les 10% d'unités administratives les moins couvertes, les quatre classes suivantes comprennent chacune 20% des effectifs et la dernière classe contient les 10% d'unités les plus couvertes.

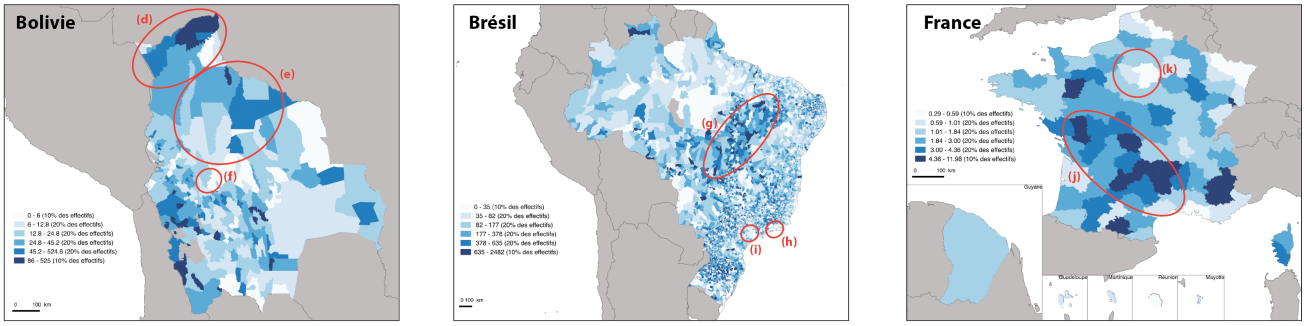
Collection de cartes n°1 : répartition des emprises des métadonnées



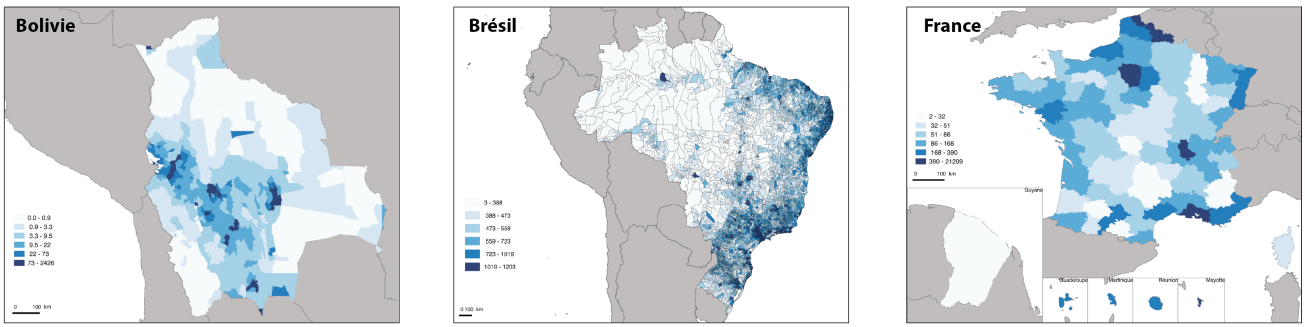
Collection de cartes n°2 : nombre de métadonnées / 1000 km2 (pondéré par la surface des emprises recouvrant les unités administratives)



Collection de cartes n°3 : nombre de métadonnées / 1000 habitants (pondéré par la surface des emprises recouvrant les unités administratives)



Collection de cartes n°4 : densité de population (hab. / km2)



Sources : Natural Earth (fond cartographique)
- Bolivie : Instituto Nacional de Estadistica, Censo Municipal 2012 (statistique population). http://geo.gob.bo/ (emprise des données). Unité statistique : municipios.
- Brésil : Instituto Brasileiro de Geographia e Estatistica, estimation 2015 (statistique population). http://www.inde.gov.br/ (emprise des données). Unité statistique : municipios.
- France : INSEE 2012 (statistique population). http://www.geocatalogue.fr (emprise des données). Unité statistique : département.

Projection : Robinson (EPSG 53030).
Réalisation : J. Pierson, M. Noucher, P. Gautreau - Oct. 2015.

3.3. Coverage, Sovereignty and the development State

In terms of spatial justice, the main SDI issues today stand probably less in their capacity to reinforce the equality of informational treatment of citizens, than in the reinforcement of the legitimacy of the State as sovereign actor of territorial development. In South America at least, the development of online spatial data platforms is part of a will to reduce areas beyond the reach of public policies due to the fact they are badly mapped, by rebuilding the informational capacities of the State. Following the dismantling of national agencies in charge of producing maps of national territories and resources during the neoliberal "roll back" of the 1980s-1990s, the production of spatial data was outsourced and scattered amongst a myriad of actors: NGOs, international institutions, private consultants… The principle inherent to the "new spirit of capitalism" (Boltanski and Chiapello, 1999) divides national public policies into "projects" confined to time and space, with no articulation between them, each starting to produce *ad hoc* and often redundant spatial data and remaining in the hands of their authors once the project is completed (Lerch, 2014). National SDIs were created explicitly during the 2000s to "gather together" a heritage that was mainly financed by public funds, but circulating clandestinely in private interpersonal networks, or immobilised in government servers. It is in Bolivia that this objective of building "post-neoliberal governmentality" by means of a new geographic information policy based on online sharing (Lerch, 2013) is the most clearly formulated. In practice, the Bolivian SDI team gave a lot of support to government teams with a view to building a more homogenous geographic vision of the national territory, making it possible in particular to plan the infrastructures needed by the redistributive policies of the Morales government (payment of pensions over the entire territory). In continuity with the analyses connecting the development of mapping institutions to the construction or defence of the State's sovereignty (Anderson, 1983; Craib, 2000), we can assert that the Bolivian State sought, through its SDI, to reunify the representations of its territory and environment (Gautreau, 2016).

At the geopolitical level, the development of SDIs contributes to reasserting "informational" sovereignty, in the environmental field in particular. In Brazil, investing in the national SDI and in the Information System on Brazilian Biodiversity (SIBBR), is part of the country's policy of emancipation from international (and particularly North American) suppliers of spatial data, which led it as early as the 1990s to endow itself with satellites specifically for observing Earth (C-bers programme in partnership with China).

In France, the informational sovereignty argument has also been used again recently by historical institutions. Confronted with the emergence of new data producers (i.e. from multinationals like Google to communities stemming from the OpenStreetMap project), and with a 30% sales decrease since 2009, the National Geographic Institute (IGN) has been reviewing its economic model progressively. In this regard, Director General Pascal Berteaud, in an interview for a professional journal in 2014[25], asserted that "government data remains an instrument of sovereignty". By saying this, he established that the Institute guarantees the homogenous treatment of the national territory, thereby dismissing Web giants and supporters of collaborative economy[26]. In France, it seems that competitive pressure and budget tensions are as much, if not more, the cause of these initiatives as the need for re-appropriating the country's informational resources.

In short, we can clearly see here how "sharing" has become a new instrument of public policy, before being a tool at the service of informational democracy. The effects in terms of spatial justice of these institutions, vary according to the outlook one has on the reinforcement of the State thanks to SDIs: in South America which claims to be "post-neoliberal", the State can be perceived as the vector of the extensive

[25] http://www.lagazettedescommunes.fr/215692/les-donnees-dautorite-restent-un-instrument-de-souverainete-pascal-berteaud-dg-de-lign/

[26] This has in fact been denounced by the IGN Unions, in a communiqué dated 24/09/2014, as an exacerbated form of neo-liberalism: "OpenStreetMap is an English non-profit organisation founded by a Steve Coast to take advantage of GPS and existing databases, and freeing oneself from national mapping services – the boundary between collaborative freedom and ultraliberalism is subtle".

democratisation of society (the case of Bolivia is symbolic in this regard), which is reinforced by the improvement of the territory's informational coverage. In France, certain sectors, on the contrary, see in it the expression of excessive power, resulting in the eclipse of different modes of practising and conceiving the territory: this is particularly the case of certain amateur naturalist associations and researchers, who see in the preparation of the SINP a tool for imposing excessively normed representations of the French environment, to the detriment of more local and diversified expressions (Alphandéry et al., 2012; Alphandéry and Fortier, 2012). Beyond issues relating to geographic information coverage, the issue of the diversity of territorial representations within SDIs is also being raised.

4. Institutional Polyvalence, Geographic Information and Equity

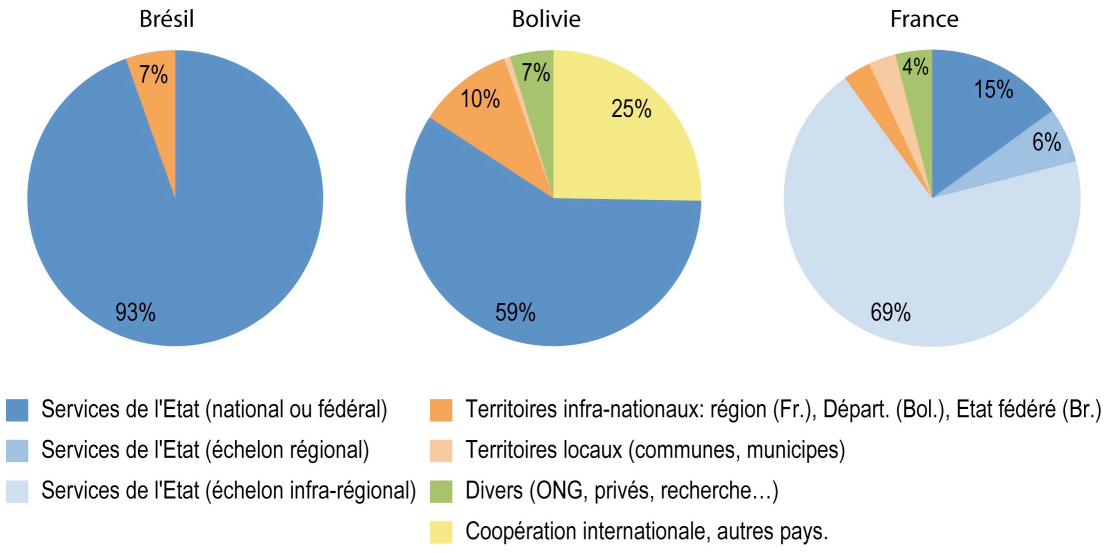
After analysing the relation between digital geographic information and spatial justice in terms of access and informational coverage, we still need to examine issues related to the polyvalence of the systems being studied (SDIs). 'Polyvalence' refers to their capacity to be used by a very wide range of social groups in order to express their spatial singularity, and therefore to represent an instrument of equity at the service of expressing different ways of seeing the world.

4.1. What is the Diversity of Representations of Space in SDIs?

One way of answering this question is to analyse the content of SDIs. The study of organisations associated with data disseminated by national SDIs, makes it possible to highlight the relatively low diversity of platform contributors (Figure 3). The French case illustrates the very large majority of data represented by the State (90%), of which close to 70% come from decentralised services (the various Government tax authorities in particular, which manage the cadastral map). Of note is the fact that, today in France and Brazil, the Academics and NGOs are almost non-existent. In Brazil, this finding is reinforced since data comes exclusively from the services of the Federal State (93%) or from one or even several federated States (as is the case for the SIPAM – Sistema de Proteção da Amazonia – which covers the entire Legal Amazon).

Moreover, most contacts (80%) come under the Brazilian Institute of Geography and Statistics, a symbol of a highly centralised national SDI and, to this day, based only on data coming from the central government. Bolivia can be distinguished by a smaller part of national level data (59%), a notable part of foreign co-operation (25%) and up to 7% of participation from NGOs, universities and private institutions. However, we can estimate that this situation corresponds less to the institutionalisation of the participation of diversified actors in SDIs, than to a legacy: most of the spatial data in the 1990s-2000s was produced thanks to international co-operation and NGOs (Lerch, 2013), the State having abandoned all prerogatives in this regard. Where GeoBolivia integrated this legacy, it did not mean the establishment of partnerships with extra-governmental actors, which in fact are no longer the same today.

Figure 3. Frequency of mention by Type of Organisation in the Metadata of Bolivian, Brazilian and French SDIs in 2014



In addition to this low inclusion of non-governmental representations, social practices linked to platform usage show that their potential for improving spatial justice on the national or international scale is still underutilised. The right to environmental

information involves a local vision of the effects of information in terms of justice: most Latin-American texts are inspired by the Rio Declaration on Environment and Development, of which Article 10 stipulates the need to favour citizens' access to information, so as to improve their participation in public decisions, as well as their potential for instituting proceedings in case of an attack on their health and living environment. What is important, in this legal corpus, is to access information on one's place of residence, where one is exposed to potential risks. Article 10 of the Rio Declaration does not anticipate that this access will enable comparisons between places nor the detection of injustice of treatment between territories. Theoretically, geographic information sharing platforms make it possible to compare territorial situations, expose inequalities as well as bring a relational and comparative vision of spatial justice. But, in reality, they are little or even not used at all in this perspective. In Latin America, databases are structured outside public platforms, going beyond the local level to denounce spatial injustice based on comparisons between places. Militant websites dedicated to environmental conflicts – mining conflicts in particular – work on locating and systematising information, making it possible to carry out the territorial measure (number of cases, distribution on a regional map) of processes materialising locally, in order to bring a global and comparative vision between territories[27]. In French Guyana, participative mapping work conducted by the Guyana Amazonian Park (PAG), needs considerable formatting to appear in GéoGuyane, the regional data platform that feeds the national infrastructure (Noucher, in press).

In practice, contributing to an SDI supposes the normalisation of one's data in order for it to be taken into account by the system: this is especially true of amateur naturalists in France, whose knowledge is only partly taken into account by SINPs (Alphandéry and Fortier, 2011). The official opening up of SDIs to contributors from civil society, academia or the private sector is still confidential and overcautious, like Argentina's IDERA that still has not decided whether or not to include universities as potential network partners. In many respects, the polyvalence of these systems seems

[27] regantestacagua.blogspot.com, celendinlibre.blogspot.com, mapaconflictominero.org.ar, conflictosmineros.net, mineriacontaminante.zocial.com.ar, minesandcommunities.org, olca.cl.

weak, and although theoretically they can host a great diversity of territorial representations, they seem, on the contrary, to be filtering and normalising these representations, and even operating a form of acculturation as understood by Serge Gruzinski (1987) [28]. Despite strong potentialities, SDIs remain tools for the dissemination of univocal representations of the territory, where representations other than those of the State have difficulty in working their way in.

4.2. If Not for Citizens, Then for Whom and for What Reasons Are SDIs Created?

This weak polyvalence, in addition to the fact that issues concerning citizens' right of access to information in SDI legislations (cf. second section) are rarely mentioned, prompts us to question why the actors behind SDIs actually want to share data. Through interviews, it appears that "sharing" is above all an innovative way of mobilising public administrations, and compelling them to exchange their data. Ethically speaking, it is difficult today for an administration to justify its opposition to open data outside of the State. By mobilising the notion of "sharing", the higher ranks of the administration defuse the reluctance shown by the lower ranks in communicating their data: by placing on the Internet the new values of the public administration – where that which frees its data is efficient and legitimate – one forces the hand of the recalcitrant… and the exposure principle on the Web reveals bad losers. The principle behind "sharing", as practiced by the State, is about updating its administration and improving its capacities to produce spatial knowledge, not about increasing its capacities to treat citizens more fairly.

Introduced as a carrier of many virtues, data "sharing" is in fact a constraint to public actors who are often compelled to "share" in order to continue existing in a system of actors. In certain fields, refusing to put data online equates to condemning oneself to

[28] In his article entitled "Colonial Indian Maps in Sixteenth-Century Mexico", the author shows how the Spanish Empire imposing European mapping methods in New-Mexico, marginalised the maps of the Nahuatl nobility, and helped the vanquished adapt to using representations of the territory that were different from theirs.

disappear from spaces that matter politically. As an example, the bodies where sharing is negotiated, i.e. SDI workgroups, are perceived – often rightly so – as places where ultimately dominant standards are elaborated. Many actors who are little motivated to share still take part in the process, for if they are going to end up being affected by standards, they might as well try to influence their production from inside. On another scale, and for similar reasons, we notice that States that are absents from major international online databases end up connecting to these, realising that they "must" be present. This is the case of Brazil that, after years of reluctance, ended up becoming a member of the GBIF in 2013, the major spatial data platform on biodiversity: Brazil's diplomacy had for a long time feared that the country's naturalist collections would be used for criminal purposes once they had become open to all. The information "gap" on Brazilian territory, clearly visible from the online GBIF interface, harmed more than protected the image and political ambitions of this megadiverse country in influencing global discussions on the management of environmental change.

Conclusion

Despite the high disparities found in the maturity of the sharing systems introduced here, it seems that a convergence towards similar systems is emerging, strongly managed by central governments and, in the end, not very open to new contributors. Most systems observed constitute "top-down" constructions, run by central levels and in fine offering little room for manoeuvre to the lower ranks. As such, we can hypothesise that, out of the two antagonistic "promises" pointed out in the introduction, the increasing equality of the spatial treatment of citizens is very likely to supplant the growing possibilities for citizens to point out their local particularities and differences on Internet.

In the light of this situation, we can wonder whether these systems do not constitute mainly a renewal by other means of the age-old undertaking to improve the "legibility" of society by the Modern State (Scott, 1998), the latter in the end reinforcing its power to the detriment of actors it would interact with, while enrolling

them to create databases. Our examples show that information technologies are "more suitable to continuity than to radical change" with regards social relations (Mol, 2008)[29].

In many respects, sharing spatial data online seems to indicate a major break in the paradigm linking the State and its citizens through information. By going along with sharing, the State ceases to accumulate asymmetrically the geographic information gathered by it, thereby reducing the power it could get out of the situation, a power that "was obtained for a long time by the collection and centralisation of information guiding political decisions but remaining an asset retained by governments" (Lascoumes and Le Galès, 2004, p. 25). The age-old work of the modern State to constitute geographic databases becomes collective and partially externalised. The rise in generality thanks to the systematisation of information on increasingly larger areas, the establishment of global analyses by combining fragmentary data or, still, the reduction of dependence upon local information suppliers (Gautreau and Garavaglia, 2012), are facilitated by organising data flows or, still, the leadership of collectives of actors related to the State, associations and the private sector working together to enrich public databases. These systems are symbolic of the "second age of democracy", where "the definition of common good no longer relates to the sole monopoly of legitimate rulers" (Lascoumes and Le Galès, 2004, p. 24).

However, our case studies make it possible to assert that sharing spatial data does not contribute to a loss of power by the State, but makes changes to the legitimation modes of the State as warrent of a form of spatial justice, due to its new role in information flows. In many respects, we have also seen that open data can represent a new form of control, by compelling actors to share without coercion. Today, it is probably more at the geopolitical level that we must look for changes operated by

[29] "When the importance of information, knowledge and information technology increases in society, the main consequences are not cultivating wisdom and free access […]. Information technology has been shaped, developed and used in conformity with the dominant social and political interests. And although these interests cannot determine all details of information technology structures, outcomes and effects, they push for continuity rather than for radical change" (p 37).

"sharing" in power relations between territory, endowing emerging and developing States with new tools to rebuild sovereign national policies, reducing "electronic colonialism" as well as cultural and informational dependency, as denounced by McPhail (2006).

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