

Simone Ombuen\*

## Digital geographic information and resources for spatial government

**Keywords:** spatial government, real estate value, taxation, geographic information system, INSPIRE European Directive

**Abstract** the paper enlightens some characters of GIS needed for an integrated management of the functions of territory planning, as well as of cadastral assessment and of maintenance of the property tax base, and particularly the characters of interoperability between different databases held by the PA areas variously responsible for territorial government. In the light of the European Directive INSPIRE these areas will achieve high standards of accessibility and information sharing.

A series of elements, both in Italy and Europe and at global level, are deeply changing the general picture where the main decisions concerning the future development in Italy will form. The coincidence in time of economic, financial, social and environmental crisis will soon force European countries to abandon their deficit-spending policies held so far – thanks to which a wide-coverage welfare state has been possible –, and to take on zero-deficit economic policies that our country has hardly ever met, and that will lead to major innovations in the definition of fiscal policies and the related monitoring tools. This is a change similar to the one that took place after World War Two and the Yalta agreements, or the one following the oil crisis of the first Seventies and the end of the Euro/Dollar parity.

In this scenario, the federalist reform, and in particular the “municipal federalism”, which will be funded through the new IMU (Single Municipal Tax), has highlighted the issue of the execution of the cadastral duties directly by municipalities. From this source, municipalities will have to collect the economic resources which are necessary for their ordinary duties (first of all, the care of the existing common land assets and the creation of new ones). This direct duty, after a first period of promotion connected to the transfer of the cadastral functions to municipalities, and to the revaluation of the tax bases by means of “cadastral micro-zoning”<sup>1</sup> – following the abolition of ICI for all the “first homes” – has unfortunately remained in the shadows.

However, it is important to underline that all these activities will not be possible if public authorities will have not provided themselves with information systems able to make available a relevant quantity of data, which are today distributed among many data providers and implemented according to methods that don't allow their full interoperability. The knowledge of the territory and of the ways how it is governed at all levels is an essential condition for the elaboration of public policies, and in particular for implementing a real tax reform, based on federative and subsidiarity principles, very important today given the above mentioned structural changes.

\* Dipartimento di Studi Urbani, Università Roma Tre • ombuen@uniroma3.it

<sup>1</sup> DPR 23 marzo 1998, n. 138. Presidential Decree N° 138, March 23 1998, Regulations for the general revision of the census areas, the rates of assessment of urban properties and related criteria as well as census commissions pursuant to Law N° 662, December 23, 1996, Article 3, Paragraphs 154 and 155 and subsequent guidelines; Law N° 311, December 30, 2004, Article 1, Paragraphs 338 and 339, regarding classifications of privately owned real estate; Agenzia del Territorio, Determination dated February 16, 2005 regarding the classification of privately owned property units. Guidelines published in Gazzetta Ufficiale N° 40, February 18, 2005.

Today, it is necessary to elaborate new property valuation tools, taking into account the recent innovations in spatial government due to regional laws and the actions of municipalities. A permanent coordination between spatial planning and tax base management is needed, with the objective of finding the resources which are necessary for maintaining the existing public assets and for creating new ones. With the aim of revising the tax base and rapidly verifying the new property values, it is necessary that public authorities equip themselves with instruments of automatic consultation and elaboration, in particular with geographic information systems able to compare cadastral information with spatial planning information, which, through its provisions, sets some of the major factors determining property values.

A first reference is surely the OMI, an observatory of the real estate market established by Agenzia del Territorio, which makes six-monthly surveys on the developments in the real estate market in almost all Italian municipalities, in particular those where it is more active. There is also GEOPOI, that allows consulting the values through a geographic navigation system ([http://www.agenziaterritorio.it/servizi/osservatorioimmobiliare/geopoi/avvia\\_geopoi\\_at.htm](http://www.agenziaterritorio.it/servizi/osservatorioimmobiliare/geopoi/avvia_geopoi_at.htm)).

However, such instruments are able to register the changes in value only when the market detects them, whereas they don't perceive those changes generated by land use planning. This is not only about establishing new development zones, but concerns also those decisions on the land which is already urbanised, such as deciding new subway lines, new hospitals or general services, etc. Considering that the urban space often extends beyond its limits towards the metropolitan scale, the valorisation of land is no longer linked only to proximity but also to accessibility; also, more and more important are becoming the constraints such as soil, water, landscape and cultural heritage protection. Therefore, in order to evaluate the possibility of transforming the land or to estimate its economic value, the consultation of the spatial planning provisions concerning the right to build is no longer sufficient, but it is also necessary to make a broader consultation, able to integrate both concrete elements, and other elements deriving from different planning instruments, which together determine or influence the formation of the value.

The norms for the digital geographic information are established, at European level, by the INSPIRE Directive<sup>2</sup>. Objective of the Directive is to implement a shared European "infrastructure", able to make spatial information of the different Member States interoperable, and based on the national infrastructures – existing or yet to be implemented – which will have to share information on the basis of common rules. The reference data refer to policies and activities that can have impacts on the environment. The process of implementation of the Directive is quite complex, and based on actions aiming to define technical specifications, agreements, coordination mechanisms, common procedures, etc.

The Directive aims also to establish the criteria of interoperability among different GISs, the metadata codes, the georeferencing criteria, the ways how to define data specifications for the themes listed in its Annexes. Among them, the "Land Use" theme is the one about land use planning provisions, which establish the conditions for managing and transforming all existing buildings.

The Directive is therefore facing the challenge of being able to fully compare, within the geographic information systems, elements coming from "reality" on the one hand, and normative elements provided by spatial planning instruments on the other; moreover, it also aims at the full interoperability among databases and GIS systems belonging to different institutions, which have to remain owners and responsible for these databases, but at the same time have to share the information flows with the aim of building a comparable institutional knowledge, which can be consulted in univocal ways. For these reasons, the implementation of the Directive and its full acknowledgement are an important element in the path towards the setting up of interoperable "knowledge frameworks" – functional to an integrated territorial government – and in particular towards the definition of the tax bases and property values. This objective is of course quite complex, due both to the variety of existing GISs and to the differences among legal systems not only among European Member States,

<sup>2</sup> Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) <http://inspire.jrc.ec.europa.eu/>

but also within the States themselves, in particular among their different Regions having different spatial planning legislations. The process of acknowledgement of INSPIRE envisages, besides other things, the establishment of different working groups on specific themes related to interoperability, and the collaboration with stakeholders at all levels, also through the funding of transnational research projects. Among these activities, and in implementation of the eContentplus Programme, the Plan4all project has started in 2009: a European consortium comprising 25 partners in 14 countries, which is developing for the Commission a number of prototypes of data models and a metadata profile, with the aim of ensuring interoperability among the information systems of the consortium's partners. The products of the project will become reference material for the INSPIRE initiative, in particular for the data specifications that it envisages.

Within the project activities, the Department of Urban Studies of Roma Tre University (DipSU) has undertaken the task of developing a conceptual data model for the INSPIRE theme "Land Use", able to acknowledge the different legal and planning systems existing in Europe and in the Italian Regions. The fact that, in the last 15 years, the Italian Regions have gone through different paths of innovation of their spatial planning regulations, has proven useful, because it has been possible to find, among these experiences, many of the elements characterising other European planning systems, making it easier to define a common data model.

This data model contains both criteria based on prescriptions (what you can / cannot do, how much, what) and on conditions (if... then, how) characterising spatial plans; both criteria are relevant when determining the conditions of use and the value of the properties. It is important to take into account different criteria and different pieces of information, coming from different competences, when undertaking an evaluation and, more in general, when trying to set up integrated policies for spatial government. In this case, there is an interesting convergence between the search for integrated policies and the technical effort towards the interoperability among geographic information systems. A typical example of an administrative function that would benefit from a consultation system, able to search from different databases, is the issuing of land use certificates, which municipalities usually produce under request in order to certify the land use provisions in force on a certain land parcel. There are some experimentations going on in Italy concerning the automatic production of such certificates, and in particular some attempts to harmonise the databases in order to make fully comparable the provisions of spatial plans of different levels (municipality, province, region) and, more recently, the provisions of spatial plans and landscape plans (the latter are getting more and more frequent, giving rise to strict prescriptions with which the building activity and spatial planning itself have to comply).

As regards the publication of spatial plans on the web, some Italian Regions are moving in the right direction. The regional spatial planning law of Friuli-Venezia Giulia, for example, states that the mandatory upload of the spatial plans on the regional territorial information system – which has to comply with specific technical norms – equals a certification of conformity to the original. There is still the problem, however, of how putting into practice such legal provisions interacts with technical but also cultural problems.

There are various elements limiting and/or delaying the diffusion of GIS within public authorities: questions related to financial resources, staff training, technology, acknowledgment of standards, legislation, relation to norms regulating the administrative process, attribution of responsibilities.

A tool such as the data model being defined by the Plan4all consortium can meet many of these requirements. Besides the chances offered to data interoperability, a shared data model can be a useful base for facilitating the "planning conferences", by allowing a dialogue among the "knowledge bases" of each institutional actor. A river, for example, can be seen very differently by a biologist on the one hand and a hydraulic engineer on the other; a previous agreement on the attributes that this object has in the data model can help to take into account, in an objective way, of the different points of view of all institutional actors involved.

Some planners may see this approach as something limiting their "creativity", but it has to be remembered that geographic information systems cannot be seen, especially considering the latest developments in the matter, as tools that simply "digitise" what has been already planned, but they

have to be considered as part of the planning process itself, and as instruments interacting with it in a substantial way. The data model is an example of a tool useful not only to describe planning datasets, but also as an actual planning tool. In the digital era it is no longer possible to elaborate spatial plans without a concrete system of specifications, which should be part of the know-how of each administration, result of a coordination with other administrations, participation of data producers and data users, definition of adequate rules.

Another consideration regards the legal validity of digital data. In the Netherlands, the work made on the national planning data model is enhanced by the latest spatial planning law, which gives legal validity to digital plans. Elsewhere, the path towards interoperability risks to be partly weakened because the digital planning data are not legally valid. This validity should be the final aim: not only the paper plans will always continue to hide the inconsistencies deriving from the “transcalar” nature of the planning activities, but the same fact that these data don’t have legal value doesn’t urge data providers to provide quality information.

The difficulty of this goal is not only caused by technical issues, but has also a cultural component: a piece of data unequivocally published and validated on the web could cause a feeling of loss of discretionary power for public administrations, and of capacity of interpretation and operational flexibility to privates and professionals.

From a normative point of view, many Regions have assigned to geographic information systems a key role in the planning processes, and many have acknowledged European directives and national laws regarding production, sharing and updating of geographic information. At regional level, there are spatial and environmental databases used for elaborating landscape plans, and many Regions are implementing services for having access to geographic information (cartographic portals and WebGISs). A research led by our Department has found that the information flow is today mainly mono-directional, i.e. from Regions to local authorities: even when there are studies and analyses of local level, producing highly detailed geographic information, the implementation of regional information systems (from local bodies to Regions) is made difficult by the failed adoption of interoperability standards and procedures for validating and certifying geographic data. In fact, only in rare cases, geographic databases of municipal plans have legal value, and rarely are they permanently shared and available to all.

In this context, Provinces can play a central role in the management of spatial and environmental data, and in the production and updating of shared knowledge frameworks, connecting the regional and the local level. Some experiences, examined also by Plan4all (such as the one of the Province of Bologna), show that the provincial level is fundamental for enhancing the sharing of spatial data and fostering cooperation between administrations.

The research has also highlighted that administrations and professionals dealing with spatial planning don’t make the most of the potentials of GISs, which still today are used almost only for territorial analyses and spatial representations, while they could effectively support territorial government in all its phases, from planning, to environmental assessment, to monitoring.

Today, it is almost impossible to imagine a planning conference where the involved authorities can assess the compatibility of a plan, by comparing information layers of different origins through a GIS. Often, public authorities are not available to make geographic information accessible, there are no web services for disseminating spatial data, and sometimes local bodies have to spend relevant resources in order to digitise existing data, or they have to make use of databases that are not certified or lacking in metadata.

There is no doubt that the paths towards the valorisation of the public real estate assets being transferred to the local autonomies through federalist provisions could significantly benefit from INSPIRE-compliant GISs, because they would allow not only a high level of sharing of information, but also a quicker valuation and a more rapid operational implementation at the end of the process of valuation and determination of its adequacy. Moreover, thanks to the INSPIRE-compliance of the used GIS, a comparison with the databases of Agenzia del Territorio would allow a valuation process having higher value and effectiveness.

## References

Camerata, F., De Marco, G., Magaudda, S., Ombuen, S., Pellegrino, G., “*La pianificazione territoriale in Europa: una proposta di modello dati per il tema land use di INSPIRE*”, in ASITA, 14° Conferenza nazionale ASITA, Brescia, 9-12 Novembre 2010.

Camerata, F., Mildorf, T., Ombuen, S., Vico, F., “*Data interoperability for spatial planning: a tentative common description of European datasets concerning land use*”, in UDMS, Proceedings of the 28th Urban Data Management Symposium, Delft, 28 – 30 settembre 2011. S. Zlatanova, H. Ledoux, E. Fendel & M. Rumor EDITORS, CRC Press, Taylor & Francis Group, London 2012

Eremitaggio, A. M., Procaccini, P., Ombuen, S., Vico, F., Zanetti, N. (2010), “*Plan4all: l’armonizzazione dei dati per la pianificazione territoriale in accordo con INSPIRE*”, in ASITA, 14° Conferenza Nazionale ASITA, Brescia, 9-12 Novembre 2010.

Mildorf, T., Ombuen, S., Vico, F. (2010), “*Plan4all: data interoperability for spatial planning*”, in AESOP, 24th Annual Conference, Finland, 7 - 10 July 2010