Geoportals Evaluation. Italian Regions: A Case Study

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Abstract. This paper presents the state of the art of the geoportals of Italian regions at the end of the year 2007. The report tackles a topic that arose a lot of discussions and is still in the heart of GIS debate: the methods and criteria for evaluating a Spatial Data Infrastructure. The difficulties on evaluating an SDI comes obviously from the complex nature of the matter to examine (de Man, 2006) and reflects its multifaceted, dynamic essence and the involvement of many stakeholder in the process of building and running an SDI. The necessity of evaluating an SDI, which represents most of the time a capital investments that wants to receive a feedback not only in an economic sense but also in a social and technical sense, is worthing more than ever. The research, considering the importance and the impact of the INSPIRE Directive on National Spatial Data Infrastructure, intended to investigate the actual conditions of the 20 Italian regions, that are the bricks of the wall of the Italian SDI. Because of the plenty of geodata handled by regions, has been studied how these data are managed in each regional geoportal and presented to external users for further utilization and processing; the interface of the geoportals has been studied as an important factor to be considered in the approach of a common user. It has also been studied the degree of implementation of services and functionalities offered to the user. The research had to face the comparison with local, national and international laws and experiences, the technical problems due to difficulties on finding data on the web, the problem of presenting a complex situation in a perceptible way. By the use of few parameters, we could trace a quite honest picture of the actual state of play of Italian regional geoportals. Despite all the improvements the regions have done, the current situation of distributed Geoinformation sharing is not so positive, and among a lot of attempts, only few regions have embryonic SDI in place.

INTRODUCTION

The political and administrative decentralization, as foreseen by the Italian National Constitution, has progressively increased throughout the years and lead to attribute to Italian Regions, which represent administrative units NUTS2, competences on different issues: urban planning (land use, preservation and transformations, environmental protection of soil and of natural heritage), air-water-termic and noise pollution, infrastuctures, transport, roads and communications, navigation, hunting and fishing, health services, etc. The national government has a coordinating function over all these activities.

Moreover, five Italian regions have a "Statuto Speciale", a special status that gives those regions more autonomy.

Subsequently, a large amount of data is collected and maintained by each public administration at regional level and each region can legislate and decide how to manage data, which kind of restriction to impose on data, which relashionship to mantain with other public administrations. If we consider also the deep cultural diversities, the result is a high fragmentation on how geographic data are treated from one region to another.

Recently the *"Codice dell'Amministrazione Digitale"* has been approved, a decree that estabilish a National GI Repository and rules to create, update and exchange of geographic data between public administrations.

Failing the presence of a national framework that can cope with most of the aspects of SDI implementation and management, the references come from the European level: the Directive recently approved in 2007 (Directive 2007/2/EC of the European Parliament and of the Council) establishing an INfrastructure for SPatial InfoRmation in Europe (INSPIRE). The Directive states that the European Infrastructure is based on SDI implemented by the Member States, and defines few rules and minimum set of information and service to be provided.

The last report on Italians SDI elaborated in the framework of the INSPIRE initiative (State of play, 2006) has been updated at the beginning of 2007 and concerns most of all the national level.

The Italian SDIs at regional level have not been the subject of an exaustive research.

METHODOLOGY

Before starting the assessment process, evaluation has to face two main question: what is the object of assessment and how to evaluate it.

This report focuses on geoportals, the access door to geospatial data and services. The World Wide Web represents an effective way for Geographic Information distribution, since it allows to offer different kind of data and services from different kind of sources to different kind of users.

Other works have analysed geoportals from international level (Crompvoets, 2005) to local level (Craglia, 2007), showing that the social impact is not high as the economic one; this work concentrates on Italian geoportals and on the social impacts of the geoportals.

Another important aspect of the evaluation is the approach used in the assessment (Grus, 2007); this report is based on the analysis of regional web sites from the point of view of an external user - who may be a citizen and/or another public administration officer - who faces for the first time a regional geoportal. All the information about the geoportals have been collected through internet; no intranet or internal net that needs a password has been taken into account, because the limit of access that prevent a common user from consulting data.

Starting from the user point of view, the key characteristic that have been considerated are the visibility, the accessibility and the consistency of terminology to define the instruments used by common user.

Together with this approach, also an INSPIRE approach has been used, to analyse the impact of the Directive. For this reason the geoportals have been studied and compared depending on some features, that are the basic elements of a Spatial Data Infrastructure: "*metadata, spatial data sets and spatial data services; network services and technologies; agreements on sharing, access and use; and coordination and monitoring mechanisms, processes and procedures*". (EC, 2007). This approach is based on parameters studied by INSPIRE monitoring framework working groups. Only few elements have been chosen, in particular those, like services, whose characteristics overlap with user perpective and can be simply checked by web.

The methology used for assessing the geoportals was based on data collected through web survey. First of all an inventory of all the existing regional webgis has been compiled by browsing the web.

Twenty regions have been analysed; one of these regions, Trentino Alto Adige, a region with a "statuto speciale", is divided in two provinces, Trento and Alto Adige; in this region does not exists a regional geoportal, but two geoportals, one for each province. For this reason the webgis studied are twentyone.

The paper presents and discusses the results of the analysis, extracting some qualitative and quantitative indications for setting up parameters able to evaluate the effectiveness of Italian geoportals.

The analysis, conducted between July and December 2007 over twenty regions and twentyone geoportals, has been monitoring the issues and corresponding parameters listed in the table below (Tab. 1).

Issue	**Parameter**
VISIBILITY	Link to institutional homepage
CONSISTENCY	Name of map navigator
ACCESSIBILITY	Use of language
USER INTERFACE	List of tools
DOWNLOAD SERVICES	Possibility to download data
DISCOVERY SERVICES	Existence of Discovery Services
METADATA	Existence of md/format

Tab. 1: List of issues analysed

Visibility – Link to institutional home page

The first issue analysed is the visibility of the geoportals, defining how the user can discern the way to get to cartographic data, starting from the home page of regional portals. This feature is focused on how easy or difficult it is to access to where regional Geographic Information is located.

A ranking has been done, starting from some considerations, that classifies the visibility in two main categories:

- high visibility: when the geoportal has a direct access from the regional portal. In this case there's a direct link from the home page of the regional site to the cartographic area. The visibility given to the Geographic Information is a characteristic which has two implications: on one hand it is helpful for those (public or private sector) who are searching for geographic data; on the other hand, it is an element that enables us to evaluate the way GI is considered in these regions. It is easy to demostrate that the regions who promotes their geoportal are proud of it and usually have a substantially implemented geoportal.

- Low visibility: when the geoportal has no direct link from the regional homepage and is "hidden" somewhere in the web. The user has to pass through logical associations and different thematic channels to find the correct path. The regions who "hide" their geoportal make their Geographic Information difficult to find, and so difficult to obtain.

This simple parameter (geoportal has/doesn't have a link in the homepage) enables to highlight those regions that give visibility to their Geo-information.

Consistency - Name of the map navigator

The way regions name their data viewer has been another interesting item to investigate. This issue comes from the necessity to evaluate the consistency of nomenclature used all over Italy and to see if common definitions are shared between public administrations. The target is not to decide the

perfect name for this kind of tool, but rather to see if comprehensible terminology is used and understood by common user.

Accessibility - Language used

Another interesting issue to analize has been the language used in the user interface (e.g. for the tooltips). The language may be taken for granted, but is a fundamental means for the user accessibility.

User interface functionalities – View services

The interface of the view services have been analysed, considering the INSPIRE assertion: "making it possible, as a minimum, to display, navigate, zoom in/out, pan, or overlay spatial data sets and to display legend information and any relevant content of metadata", available on the geoportals: all the functions have been censed region by region, to see what kind of tools are available and compare the webgis services.

Other services

The research has also considered the availability of services as defined by the INSPIRE Directive and analysed the services described by INSPIRE as:

- discovery services: "*making it possible to search for spatial data sets and spatial data services on the basis of the content of the corresponding metadata and to display the content of the metadata*";
- download services, "*enabling copies of complete spatial data sets, or of parts of such sets, to be downloaded*";
- transformation services, "*enabling spatial data sets to be transformed*";
- "invoke spatial data services" services, "*enabling data services to be invoked*".

The results of the survey of each item have been inserted into tables: the use of tables enables to derive some parameters for ranking regions in relation to the specific item of interest.

RESULTS

Visibility– Link to home page

Currently, based on the categories mentioned in the introduction, only four regions out of twenty have an high visible geoportal, in terms of easy and immediate access to the carthographic area: Calabria, Lombardia, Sardegna e Sicilia. The geoportals of these regions are easily reached through a direct link from the regional website home page.

The "GI area" of the other regions is often associated with thematic channels, such as urban planning, land use, environment, IT, etc. Because this area is somehow "hidden", the result is a low visibility, according to what has been defined in the introduction.

This low percentage of easy to find geoportals (only 20%) shows that the awareness on the importance of Geographic Information in the Public Administration needs to be fostered and supported.

Consistency - Name of the map navigator

The main result of this survey shows that regions intend the "data viewer" and its features in different ways.

First of all, what the research brought to light is that there are fifteen different names for twentyone geoportals. The surveyed names are listed in the table below (Tab. 2).

	Number of regions
Geographic Information System	4
WebGis	3
Cartographic portal	2
WebSit	1
Environmental and territorial data catalogue	1
Cartographic service	1
Geographic data viewer	1
Cartographic web server	1
Interactive cartography	1
Cartographic navigator	1
CTR on WEB	1
Carta dell'uso del suolo	1
Cartography	1
Cartoweb	1
Browser	1

Tab 2 : Names of Italian webgis

Another result that highlights the lack of consistency is the use of different names and words in the same web site referring to the same tools (the “map viewer” is called in different ways, like Sit, Webgis, Portal, etc.), while on the other hand it has been surveyed that in the same website the same word is largerly used for individuating and activating different functions, applications and operations (eg. the term “Webgis” for activating applications like the repository of metadata, browser, catalogue, etc); for this reason the names have been classified according to the most evident message given to the external user, facilitating the first approach to the geoportal and to the “data viewer”.

This feature occurs quite often, increasing the ambiguity of understanding and influencing the accessibility and effectiveness. The visibility about the state of the art of the research has not been measured against this feature; this is one of the future planned developments of the research.

Moreover, a mix of Italians and English terms mixed in one Italian name or frase has been monitored.

This result shows that there is uncertainty and confusion on nomenclature about GIS.

Accessibility - Language used

The result highlights relevant problems in terms of language and semantic. Tools tooltips, for example are in Italian language just in four cases; in two cases only icons are displayed (none case: no language used). Mostly a mix of English-Italian language is used. In some cases tooltips are not used at all. Only two regions are bilingual: regions Trentino and Alto Adige. (Tab. 3)

	Number of regions
Italian Language used	9
English Language used	3
Italian and English Language used	5
Italian and German Language used	2
No language used	2

Tab. 3 : Language used in the user inteface

Even in this case there's a problem of lack of consistency between different geoportal: sometimes the same tool is named in six different ways (eg: zoom to full extent, full view, zoom max estension, map, full map, fit all, entire array).

The results of the survey is a wide range of words (Italian and English): in some cases differents labels are used to indicate the same objects, while in other cases the same label is used to indicate different objects.

View services/ User interface services

Most of the regions provide the possibility to preview data through a webgis systems: these webgis have been analysed in terms of interface and functionalities.

An average of 12 tools is used for the view services.

All the toolbars have been censed and shown in the following table (Tab. 4)

The most common tools are: zoom in, zoom out, zoom to full extent, zoom box, pan, back, overview map, query, print, help.

Very often the same tool performs different functionalities for different regions.

User interface - VIEW SERVICES		Number of regions
NAVIGATION	zoom in	21
	zoom out	21
	pan	19
	zoom to full extent	18
	zoom box	10
	dinamic zoom	3
	previous view	12
	next view	3
	Home/ starting page	2
	refresh map	6
	center point	1
DISPLAY	Display overlay	3
	Display overview / reference map	10
	Display legend	6
	Add themes /create new theme	2
	Erase themes from legend	1
	Display metadata	3
	display list of data set	1
	display grid	1
	dispaly background	1
PRINT	print	13
COORDINATE	display coordinates(by corner of box)	2
	display point coordinate	2
	Insert coordinate	2
	query coordinates	1
QUERY	query (choose a query)	1
	query feature	14
	query layer/theme	3
	zoom to query object	1
	query service/query map	2
IDENTIFY-SELECT	select object with line/poligon/rectangle	3
	Display selected object	1
	Remove selected objects	7
	Identify	1
	Select bookmark / Select a path	1
DRAW	Draw poliline/poligon	2
	Remove object	2
MEASURE	measure	6
	linear measure	5
	aeral measure	3
RICERCA	search place	7
	search element on active layer	3
	search by area	2
	search by query	2

OTHER FUNCTION	help	9
	find	3
	Google earth link	1

Tab. 4 : List of toolbar instruments of the user interface

Other services- discovery services

There are generally two possibilities for Italian users, when searching for data: to find a list of data or to find a discovery service.

The regions usually use the terms “catalogue” to indicate a simple list of data which is, anyway, useful to know all the data they own and publish. These “catalogues” generally do not have any metadata or information associated with maps (except for scale and, in few cases, content), and do not enables for data or metadata search/query.

Some regions provide a more complex system, established on a metadata database, that enables for search/query; in this case query are enabled based on position/content/keyword/temporal extent etc.

The analysis on this topic has pointed out that most geoportals have “catalogues” where all data are listed, but only few of them implement metadata search functionalities.

Rarely some of these catalogues provide a direct access to the “map viewer”. No real “catalogue service” (webservice) has been found.

Other services - Download

Only seven regions provide a download service. It is possibile to download in different formats (shape, dwg, dxf, etc.), both vector and raster data. Sometimes the download is preceded by data preview: in most of those cases the download button is on the toolbar of the map navigator; in other cases the download is outside this area, and rarely is it possible to preview data the user wants to access. No .pdf data downloading has been considered in the analysis conducted on downloadable data.

Other services- gazzeteer and place search, transformation services and web services

A gazzetter service is provided by six regions out of twenty.

Some regions also provide thematic specific search: eg. Beaches location (Sardinia)

Provincia Autonoma di Bolzano-Alto Adige provides a coordinate transformation service.

WMS/WFS services are provided only in five regions.

Metadata

Half of the geoportals (eleven on twenty) provides raw metadata or catalogue metadata available for free search. Sometimes metadata are available directly from the map navigator.

Only three regions (Lombardia, Piemonte and Veneto) implement ISO 19915 standard for metadata, and only one region (Calabria) is compliant to the latest Guidelines produced by the CNIPA (Italian authority for Informatic in Public Administration), that produced a guide for the application of ISO 199115 in Italy at the end of 2006.

Regione Sardinia announced that the regional metadata will be available soon for the wider public. As already said, no catalogue service is available.

CONCLUSIONS

The results of the short survey on Italian regional geoportals show a high level of fragmentation.

On one hand, there are some regions with highly implemented geoportals, deeply introduced in the European debate; on the other hand there are regions that have simple maps published on the web, where geographic information has not enough relevance.

The general confusion over some analysed items, above all the ones related to the language issue, leads to think that a lot of efforts have to be invested in order to achieve effective geoportals and reliable SDIs in Italy.

The Italian situation at the moment is demonstrating the need of the effort of INSPIRE for harmonizing single situations not already coordinated.

It is absolutely necessary to invest in this kind of monitoring and analysis in order to optimise the realization of regional geoportals and in order to foster the standardization process and to augment the accessibility and usage of Geographic Information.

FUTURE WORK

Future activities are foreseen for continuing the monitoring of geoportals on regular time basis in order to extract some more synthetic parameters for monitoring and reporting the functioning and achievements of regional geoportals. In this sense the research is aiming to contribute to monitoring and reporting activities which INSPIRE is putting in reality. The above presented tables will be processed to extract some synthetic parameters.

The next step of the work will consist in the analysis of all the data and metadata available on the geoportals of the Italian regions, compared to the annexes I to III of the INSPIRE Directive.

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