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Concept of Municipality Geoportal – Selected Legal and Administrative Issues***

Abstract: The entry into force of the INSPIRE Directive (Infrastructure for Spatial Information in Europe) has contributed to the progressive building of spatial data infrastructures in the countries of the European Union. Laws on spatial information infrastructure require local government to create and share spatial data. The result of the INSPIRE Directive in Polish legislation is the adoption of the law of March 4, 2010, about spatial information infrastructure by the Polish Government. This act contained the principles of creation and use of spatial data infrastructure.

The presented work consists of selected legal regulations and administrative provisions relating to the conduct of a municipality's geoportals. As an example, the geoportal prepared for the Tomice municipality has been presented. To prepare the thematic layers, QGIS software based on the Open Source License was used. Several thematic layers were prepared based on the data made available by the municipality, the data obtained from a national geoportal (www.geoportal.gov.pl), and the General Directorate for Environmental Protection as well as materials developed during the many years of cooperation with the municipality. The process of portal assumptions was made on the basis of Geoxa software.

Geoportals can be regarded as tools that are valuable sources of information for various consumers – from the government to individual users. They allow for quick and transparent access to diverse spatial data at the same time based on detailed and reliable sources.

Keywords: municipality geoportal, INSPIRE, geoinformation web services

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1. Introduction

According to Iwaniak [9], the history of geographic information systems dates back to several decades being applied in numerous areas of life. Reasons for this phenomenon can be revealed in the rapid development of an informative community influenced in turn by an increase in the role of the Internet in a series of various human activities [9, 10, 16]. It is worth stating that constant expansion of informative technology has revolutionized a significant part of the population's activity. In his surveys, Iwaniak [9] referred to the analyses carried out in Western Europe and Australia on the basis of which he stated that 80% of information the community deals with is of a spatial character. According to Borys [1], the most-wanted information is geographic information (GIS). He also pays attention to the fact that transferring data about the space and location of events appeared relatively long before; however, their dynamic development began with web applications that allowed for "moving across the map." The range of data published in the Internet has evolved as well – from country borders or satellite orthophotomaps to more and more precise maps that comply with the requirements of precise measurements and field location.

In accordance with Ślusarski's opinion [15], demand for spatial information is constantly increasing. This is because they support decision processes that refer to the functioning of countries, regions, and local centers as well as the quality of the inhabitants' lives. This aspect was also noticed by Trystuła [16], who provided information that operations performed for spatial data (searching, downloading, browsing, and transferring) use the Internet for this purpose, and they are the most-important mechanisms that influence the development and functioning of the modern economy and public administration.

Siejka and Ślusarski [13] as well as Borys [1] point out that the development of modern informative technology influenced to a large extent opportunity to present geoinformation resources on the Internet servers in the form of topic overlays. According to Sudra [14], web services are some of the most-quickly-developing internet applications. Data obtained by means of geoinformation web services have proven to be extremely useful. They can be used by public administration especially for performing spatial analyses, spatial planning, and geovisualization. Also, Glanowska and Hanus [7] confirm this in their research. Geoinformation services that are GIS technology realization provide users with access to spatial data regardless of their equipment and program platform as well as their location.

Data about space in Poland is collected by various public and municipal institutions. The Polish system of spatial information is considered on three main levels by Ślusarski [15]:

- central – which includes the whole area of Poland (global scale),
- regional – which includes projects concerning provinces (often integrated with the data of local levels),
- local – which includes databases with the highest level of detail (district scale).

In the division presented above, the lowest level is lacking – the communal level. The aim of the present paper became the analysis of legal and administrative conditionings that accompany creating a communal system of spatial information. The surveys concern the building of a geoportal in Tomice commune (Małopolska province); however, the presented processes as well as the technological and legal conditionings became the starting point for considerations of a general character. Attention was paid to presenting a scheme that would be possible to implement in any unit at the communal level.

In view of civilizational progress, community expectations, and legal regulations, organs of public administration try to implement specialized web pages that publish spatial data. As Glanowska and Hanus [7] say, citizens of communes express positive opinions that concern the availability of information and possibility of verification (without a necessary personal visit in the office), paying attention to benefits of both the authorities and inhabitants.

Collecting complex information about a given area needs time and labor efforts due to the necessary integration of information from numerous sources. A solution to this problem appears to be the INSPIRE directive [4], which constitutes the foundations of the European standardized system of exchanging information in space. The directive was implemented to the Polish legal system through its transposition as the act of spatial information infrastructure from March 4, 2010, [17] on the basis of which the governmental geoportal (www.geoportal.gov.pl) has been conducted since 2006.

2. Material and Methods

The building of a communal geoportal was started from collecting source layers that were composed of the following:

- a vector layer of NATURA 2000 areas – obtained by means of download web services WFS (Web Feature Service) from <http://sdi.gdos.gov.pl/wfs> [6] conducted by the General Directorate for Environmental Protection (in Polish: Generalna Dyrekcja Ochrony Środowiska – abbreviated GDOŚ):
- raster layers obtained by means of web services WMS (Web Map Services) from www.geoportal.gov.pl [25]:
 - a topographic map,
 - an environmental map,
 - a hydrographic map,
- vector layers of administrative borders of a commune and its municipal subdivisions (called *sołectwo* in Polish) obtained from the Center of Geodesic and Cartographic Documentation;
- a vector layer of plots obtained from the Land Parcel Identification System portal (LPIS);

- a vector layer of address points obtained from the Center of Geodesic and Cartographic Documentation;
- the layer of buildings obtained from the Database of Topographic Objects (Polish abbreviation: BDOT10k);
- vector layers elaborated by students, workers, and doctorate students of the Hugo Kołłątaj University of Agriculture in Krakow during cooperation between the university and the commune:
 - the local plan of spatial development – a vector layer together with the use of the proper classification of unique values depending on the accepted plan settlements;
 - the map of downslope gradients – a vector layer together with the use of the proper classification of gradual values depending on the area downslope;
- a vector layer of a mask, thanks to which visibility of the individual layers was limited only to the area of the commune.

The obtained materials were modified by adapting their graphic images (choice of classification, range of colors, visibility, etc.). For this purpose, QGIS software working on the basis of OpenSource license was used.

The material prepared in such a way served to construct a communal geoservice, and Geoxa MapServer software was used for its construction. The independent software, whose task it is to generate maps on the basis of a previously prepared project, as well as interaction with software of a user of web pages comprises the server's module. It does not have an interface – the control is performed by means of a configuration file called config.xml (Geoxa MapServer Plugin 2009). This module is used for the “visual” building of projects that, in the end, will be displayed on a www (World Wide Web) browser. It is a plug-in to another range of programs – Geoxa Viewer and Geoxa Editor.

3. Legal and Administrative Aspects

Using the Internet with the purpose of publicizing spatial information is, in the view of Trystuła [16], most-often associated with maps. Current usage is also connected with updating these resources. What is most important, the spatial data published on the Internet should be in accordance with standards that are in force throughout the world (e.g., WMS). This is a key aspect, considering the possibility of connecting the data with other services. Sudra [14] describes that the need of sharing geographic information resources that come from various sources requires some data standardization. The purpose of this is to obtain a consistency and interoperability of information, that is using of such standards and specifications that will facilitate joining data sets in an effective way. The regulating issue in this aspect appeared to be the INSPIRE Directive adopted in 2007 by the EU [4]

under which the regulations of European spatial information for community political purposes were established. This document includes a description of the set of activities concentrated on building the European net of spatial information infrastructure, specifying the possibility of data access for every member of the community as a priority. First of all, it includes activities in the range of environmental protection as well as politics and activities that can influence the environment [4].

The document was targeted towards three key elements:

- metadata – i.e., additional information that describes spatial data and allows us to determine their accordance with the legislation, quality, and validity of an available data set or conditions on the basis of which access and data usage are possible;
- interoperability of sets and spatial services – i.e., determining technical solutions that allow us to connect data sets and services without repetitive manual intervention;
- web services that allow us to search, browse, download, and transform spatial data sets in a way that is publicly available with a view towards user demands.

Using data at the European level is intended to be used for any kind of planning and research work connected among others with ecological politics or agriculture [25]. Izdebski [10] claims that, when the requirements of the directive are complied, additional activities that are aimed at ordering issues connected with spatial data in Poland can be taken.

The act from 2010 of spatial information infrastructure [17] that is, in a way, a transposition of the directive to Polish legal condition appeared to be a standardizing activity. Under this act, administrative units were charged with several obligations connected with spatial data subject matter. According to Art. 5.1. of the act, the main task of the organs of administration is to create, update, and access data sets (metadata). Art. 7 says that the organs responsible for keeping public registers that include data sets connected with the topics mentioned in the annex to the act are obligated to implement any technological solutions thanks to which the interoperability of sets of services and spatial data will be possible. The act also pays attention to the standardization of the performed sets and services.

The records of Art. 9.1. obligate the organs that keep such registers to create and service the net of services concerning spatial data, which should include the following:

- searching – which allows people to find spatial data sets on the basis of the content of proper metadata as well as browsing their content;
- browsing – which allows for at least displaying, navigating, magnifying/deleting it, displacing, or overlapping visualized sets and also displaying comments of cartographic symbols and metadata content;

- downloading – which allows people to download copies of sets or their parts or direct access;
- transforming – which allows people to change a set's specification, leading to its interoperability;
- starting spatial data services.

Art. 17.1. shows that creating, maintaining, developing, and operating the infrastructure is possible as a result of the cooperation of leading bodies, other bodies of administration, and any third parties that co-create it.

According to records of Art. 9.3. of the act about spatial information infrastructure, geoportals are treated as tools that are valuable sources of information for a diverse range of customers – from governmental institutions to individual users. They allow for the transparent and quick access to various data sets on the basis of detailed and reliable sources. As www.geoportal2.pl states, basic data placed in the geoportals at the lowest administrative level (city or commune) are closely connected with the tasks of these units. As the basic units of territorial government, communes were established in order to respond to the basic needs of the local community. The tasks of the self-government community are precisely determined by Art. 7 of the act about a communal council of March 8, 1990 [18].

Among other things, the basic tasks are as follows:

- servicing an address database,
- elaborating the study of conditions and directions of spatial development,
- elaborating local plans of spatial development,
- servicing databases of roads and road infrastructure,
- establishing and monitoring properties for sale.

Communal geoportals also allow us to attach services provided by units of higher levels (district, provincial, and national portals).

Sudra [14] also pays attention to other legal aspects connected with providing spatial data:

- intellectual property rights – the act of February 4, 1994, about copyright law and related laws [19] and also the act about spatial information infrastructure [17]; Art. 2 says that this act does not disturb the rights on the basis of rules connected with intellectual property right protection;
- protection of classified information – the act of August 5, 2010, about the protection of classified information [22];
- community access to information about the environment – the act of October 3, 2008, [21] about providing information about the environment and its protection, the community's contribution to environmental protection, and the evaluation of its influence on the environment, and the act about spatial information infrastructure [17]; Art. 2 says that this act does not disturb rights on the basis of rules connected with providing information about the environment and its protection;

- access to public information and re-using information that belongs to the public sector – the act of September 6, 2001, about access to public information [23] and the act about spatial information infrastructure [17] – Art. 9;
- the way, range, and procedure of providing data collected in the public records – the act about spatial information infrastructure [17] – Art. 12, Art. 14;
- protection of databases;
- potential fees for downloading data – the geodesic and cartographic law [20] – Art. 40, Par. 3, Point 3c, as well as records of the act about spatial information infrastructure that concerns providing data free of charge to administrative bodies in the range necessary to realizing public tasks;
- availability of browsing services – the act about spatial information infrastructure [17] – Art. 12, Pars. 1 and 2 say that access to browsing services is to be common and free of charge;
- requirements for creating and maintaining spatial information infrastructure that results indirectly from the INSPIRE Directive records [4].

In Poland, problem of database protection is regulated both by the act about copyrights and related rights [19] (when the database can be treated as a work) and the act of July 27, 2001, about database protection [24] implemented on the basis of Directive 96/9/WE of the European Parliament and Council of March 11, 1996, about database legal protection [5]. It is worth mentioning that a database does not have to be in electronic form to be protected. Protection also concerns such sets (“compilations”) that can be arranged, stored, or provided by variety of means regardless of the component elements (works within the meaning of copyright of materials, data, or information that are not subject to this law). The directive about the legal protection of databases [5] shows examples (processes) of such storage or arrangement [24].

4. Construction of Communal Geoportal

Deal et al. [3] indicated providing users with the simplified receipt of data sets and the possibility of presenting different types of information – from text to pictures (raster layers) or point, line, or polygon elements (raster layers) as a benefit of building geoportals. Such an approach allows us to manage a database in a uniform and compact way, efficiently simplifying the process of data analysis at the same time. According to the definition published in the act of database protection as well as Wagłowski [24], a database is “a set of independent data or any other materials and elements collected in accordance with specified taxonomy and method provided individually in any way.”

Before starting to build a project, the previously prepared source layers used in the project were recorded to the program. The portal of Tomice commune was prepared on the basis of five scales of detail. In the case of each scale, the proper joining of groups that include previously prepared maps were used (Tab. 1).

Table 1. System of used scales, joining groups, and individual maps

Scale	Connecting group	Map
1:40 000	Administrative borders	Commune's map Cadastral regions' map Mask
	Topographic map	Topographic map
1:20 000	Hydrographic map	Hydrographic map
1:10 000	Environmental map	Sozological map
	MPZP	Local plan of spatial development
	Protected areas – NATURA2000	NATURA2000 areas' map
	Map of downslopes	Map of downslopes
1:5000	Topographic map	Commune's map Cadastral regions' map Mask
	Topographic map	Topographic map
1:2000	Buildings	Buildings' map
	Address points	Address points' map
	Plots	Plots' map
	MPZP	Local plan of spatial development
	Map of downslopes	Map of downslopes
	NATURA2000 protected areas	NATURA2000 areas' map

Usage of joining layers enables us to begin logical and compact blocks that ultimately appear as a single layer in the software of the customer (WWW). This procedure is also used in the situation when several layers representing the same feature occur and the customer wants to limit their number in the final project of the server.

Defining of the project also consisted of using proper map profiles (Tab. 2, Fig. 1) in regard to each scale irrespectively. The profiles allow us to define the composition of layers for a given scale and also to attribute any name to them. After choosing a proper profile from the list, the user also activates the previously defined composition of layers. Thanks to the proper defining of visibility of a layer in a specific scale, the possibility of the quicker and more-transparent graphic visualization of some information on the map is obtained. In the case of each map profile, an active layer automatically activated after choosing a profile was attributed.

In each case, layers of administrative borders were automatically included. After choosing the scale and the proper map profile, the users are not limited by the content of the displayed information. They have the possibility of arranging the visibility of the individual layers independently.

An additional attribute of the established portal was the possibility to search for information by a user. This option was defined for individual layers, and in the case of the geoportal of Tomice commune – for the layer of plots and address points. Searching criteria such as a plot number, cadastral region, or street address were also established.

Table 2. Elaborated map profiles in regard to individual scales

Scale	Profile of the map
1:40 000	Topographic map
1:20 000	Environmental map
1:10 000	Hydrographic map MPZP (Local development plan) Downslopes
1:5000	MPZP (Local development plan)
1:2000	Plots Plots, buildings, address points

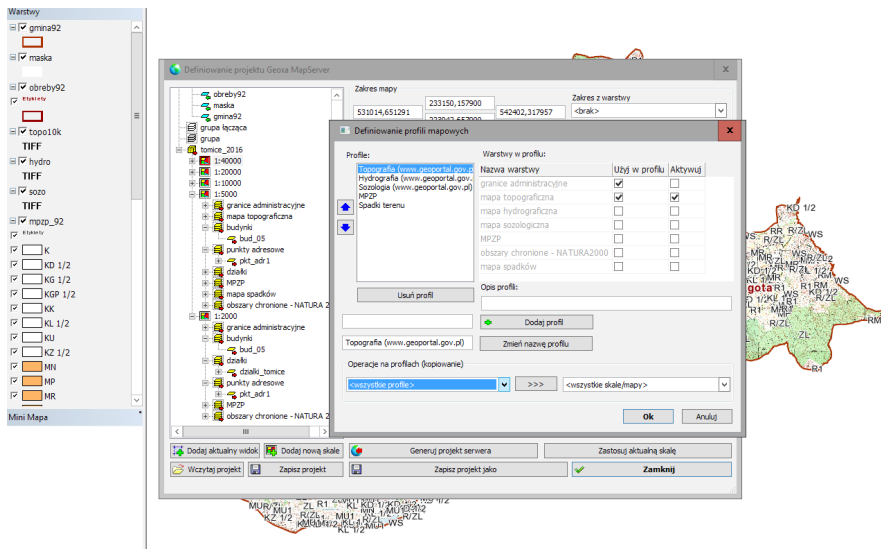


Fig. 1. Defining map profiles

After elaborating all of the parameters, the operation of generating project files was performed. Depending on the degree of its expansion and the computer’s computing power, this can be a time-consuming process. After indicating the place of generating a server’s project, five files located in a sub-catalog were automatically created. Files prepared in such a way were placed on the website (Fig. 2).

The geoportal of the Tomice commune allows for access to data together with the service of their searching and browsing. This fulfills the requirements determined by Art. 9, Par. 1, Point 1 and the second act about spatial information infrastructure of March 4, 2010, for spatial data sets [17]. Information included in the server and printouts generated by means of it cannot be documents in conducted administrative proceedings. They are only information sets with explanatory character, and their range of use is based only on the approximate identification and spatial location of database objects.

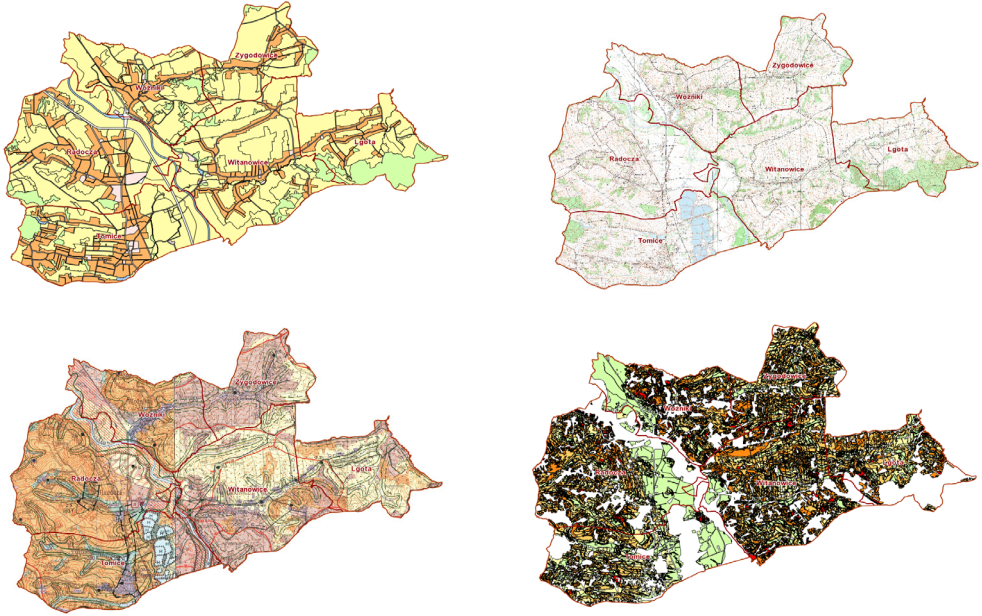


Fig. 2. Exemplary view of map

5. Summary and Conclusions

Currently, the methodology of searching spatial data and its visualization itself is well-developed, which has been confirmed by Iwaniak's surveys [9]. The effect of this dynamic development is a constant increase in the number of internet services that provide services in this range. According to Izdebski's opinion [10], further development of this technology can be expected at the level of EU countries. This is caused by the growth of data transmission parameters as well as a standardization that includes processing and providing data of a spatial character.

It is worth noticing that a significant number of communes do not have internet portals that present spatial data (although legal regulations indicate that they should). However, Sudra's theory [14] (which says that municipal services become more and more numerous, which results from the introduction of the INSPIRE Directive provisions and its Polish equivalent in the form of the act about spatial information infrastructure) is being confirmed. This process is extremely beneficial for users and these who mainly deal professionally with issues of spatial planning and town planning. The possibility of downloading selected spatial data in order to analyze and further process it should be considered as a positive aspect. This perspective is particularly promising in regards to spatial planning as a domain that deals with the organization of geographic space for human use.

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Koncepcja gminnego geoportalu – wybrane zagadnienia prawno-administracyjne

Streszczenie: Wejście w życie dyrektywy INSPIRE (Infrastructure for Spatial Information in Europe) przyczyniło się do stopniowego tworzenia infrastruktur danych przestrzennych w krajach Unii Europejskiej. Ustawa o infrastrukturze informacji przestrzennej narzuca wobec samorządu lokalnego wymagania tworzenia i udostępniania danych przestrzennych. Rezultatem dyrektywy INSPIRE w polskim prawodawstwie jest przyjęcie przez rząd polski ustawy z dnia 4 marca 2010 r. o infrastrukturze informacji przestrzennej. Ustawa ta zawiera zasady tworzenia i wykorzystania infrastruktury danych przestrzennych. Praca omawia wybrane regulacje prawne i przepisy administracyjne związane z prowadzeniem geoportali gminnych. Dla przykładu opracowano geoportal gminy Tomice. Do przygotowania warstw tematycznych wykorzystano oprogramowanie QGIS działające na licencji Open Source. Sporządzono warstwy tematyczne na podstawie danych udostępnionych przez gminę, danych uzyskanych z krajowych geoportali (www.geoportal.gov.pl), od Generalnej Dyrekcji Ochrony Środowiska oraz z materiałów opracowanych w trakcie wie-

loletniej współpracy z gminą. W procesie zakładania portalu zastosowano oprogramowanie Geoxa.

Geoportale można uznać za narzędzia, które są cennymi źródłami informacji dla różnych grup konsumentów – od rządu po poszczególnych użytkowników. Umożliwiają szybki i prosty dostęp do różnorodnych danych przestrzennych pochodzących ze szczegółowych i wiarygodnych źródeł.

Słowa

kluczowe: geoportal gminny, INSPIRE, geoinformacyjne serwisy internetowe