

Spatial-Data Processing in the Infrastructure for Spatial Information: The Example of Poland*

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ABSTRACT The infrastructure for spatial information enables the optimal use of data for space management by public-administration authorities and private entities. Spatial data relate directly or indirectly to a specific location or geographical area.

The paper focuses on analysing two levels of spatial-data processing: the organisational and technological levels. The organisational level relates to the structure of entities like public-administration authorities and private entities who process spatial data. The technological level relates to the technical standards required by electronic public registers.

The article introduces a distinction between two spheres of data processing: the sphere of open access and the sphere of limited access. The sphere of open access is basic in nature with universal and free-of-charge processing of spatial data. The limited-access sphere preserves the natural monopoly of the state in providing spatial data from public resources.

1. Introduction

Public-administration authorities carry out public tasks with the use of spatial data, which have direct or indirect reference to a specific location or geographical area. Spatial-data sets are contained in public registers kept by various public-administration authorities. The infrastructure for spatial information enables the optimal use of this kind of data for spatial management at the level of the European Union, member states, regions or communities.¹ The provisions of law regulating the infrastructure for spatial information have been adopted at the European-Union and national levels. Legal provisions at the European-Union level include 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).² The aim of the Directive is to ensure that the infrastructure for spatial information created by the Member States is compatible and usable in the European Community and transboundary context.³ National regulations are contained, *inter alia*, in the Act on the Infrastructure for Spatial

Information of 4 March 2010⁴ and in the Land Surveying and Cartographic Law Act of 17 May 1989.⁵ These levels are interrelated because of implementation of the INSPIRE Directive into national law.

The infrastructure for spatial information includes spatial-data sets and related services, technical measures, processes and procedures. This infrastructure is created mainly by public-administration authorities but it can also be created by third parties.⁶ The spatial data, which are part of this infrastructure, could be processed by the public-administration authorities and third parties who created the infrastructure, as well as the users of the infrastructure.

Researching the issues of spatial-data processing requires analysing two levels: the organisational level and the technological level. The organisational level relates to the structure of the entities which form the infrastructure, and the technological level relates to the applicable technical standards. Both levels determine the method used for spatial-data processing.

⁴ The Act on Infrastructure for Spatial Information of 4 March 2010 (consolidated text Journal of Laws 2021, item 214), hereinafter ISI.

⁵ Land Surveying and Cartographic Law Act of 17 May 1989 (consolidated text Journal of Laws 2021, item 1990 with amendments), hereinafter LSCL.

⁶ Art. 3 point 2 ISI. According to art. 3 point 1 INSPIRE Directive, infrastructure for spatial information includes 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.

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¹ J. Gaździcki, *Kataster nieruchomości na tle infrastruktury informacji przestrzennej*, in *Polskie Towarzystwo Informatyki Przestrzennej. Roczniki Geomatyki*, Vol. 14, Issue 3, 2016, 296.

² Official Journal of the European Union L 108, 25 April 2007, 1-14 with amendments.

³ Recital 5 sentence 2 INSPIRE Directive.

2. The organisational level

The organisational level of spatial-information processing is based on the existing structure of the public administration. This level is governed solely by the provisions of national law, because of the institutional autonomy of Member States. The Act on Infrastructure for Spatial Information introduced a model based on existing public-administration authorities due to the need to account for various information resources.

This model includes four types of entities: the coordinator, the leading authority, the authority keeping a public register and the user. The aim of this model is to ensure effective cooperation among the public-administration authorities who create the infrastructure for spatial information.

The coordinator of infrastructure for spatial information is the Minister of Construction, Spatial Planning and Housing.⁷ The Minister exercises the function with the assistance of the Surveyor General.⁸ The subject of coordination includes: the creation, maintenance and development of the infrastructure for spatial information.⁹

The supreme public-administration bodies or central public-administration bodies could enjoy the status of leading authorities.¹⁰ These authorities organise, coordinate and monitor activities to ensure the operation of the infrastructure for spatial information. The Act on the infrastructure for spatial information introduced more than one leading authority. Each of them acts according to their substantive jurisdiction.¹¹

The authorities keeping public registers are stakeholders of the infrastructure for spatial information. If their public registers are related to topics of spatial data, these authorities are required to establish and maintain the network of spatial-data related

services.¹² They keep public registers as required by relevant specific provisions.

The users are public-administration authorities as well as private entities that use spatial-information resources. A public administration authority who is a member of this group may, at the same time, be either the creator and user of these resources, or only a user.¹³

3. The technological level

The infrastructure for spatial information was created on the basis of existing public registers in which public-administration authorities and other public entities had been collecting spatial data for decades. The structure of this infrastructure allows for a more optimal use of spatial-information resources by public-administration authorities. For this reason, regulations governing the infrastructure for spatial information introduced the requirement to modernise existing public registers in compliance with technical standards enabling cooperation with other public registers.¹⁴

The modernisation relates to the tele-information systems, which ensure the operation of public registers. Regulations governing the infrastructure for spatial information establish some technical standards applicable to these systems. The technical standards must be harmonised according to the interoperability standard.¹⁵ The requirement of harmonisation is fulfilled by interoperable public registers.¹⁶

¹² Art. 9 item 1 ISI.

¹³ M. Baranowski, *Infrastruktura informacji przestrzennej w ujęciu systemowym*, 36.

¹⁴ J. Gaździcki emphasizes that, in Poland, the infrastructure of spatial information was based on the existing technical infrastructure including public registers and other information resources. The amendments in the law mainly concerned the modernization of the existing technical infrastructure. J. Gaździcki, *Infrastruktura informacji przestrzennej w świetle doświadczeń wdrożeniowych w Polsce*, in *Polskie Towarzystwo Informacji Przestrzennej. Roczniki Geomatyki*, Vol 11, Issue 3, 2013, 10. See also J. Gaździcki, *Kataster nieruchomości na tle infrastruktury informacji przestrzennej*, 2016, 297.

¹⁵ According to M. Baranowski, tele-information systems may achieve interoperability thanks to harmonization initiatives. M. Baranowski, *Infrastruktura informacji przestrzennej w ujęciu systemowym*, 38-39.

¹⁶ According to art. 13 item 1 the Act of 17 February 2005 on the computerisation of entities performing public tasks (consolidated text Journal of Laws 2021, item 2070 with amendments), hereinafter CEPPT, public tele-information systems should be compatible with the minimum requirements of system interoperability speci-

⁷ Art. 18 item 1 ISI.

⁸ Art. 19 item 1 in connection with art. 18 ISI M. Baranowski, *Infrastruktura informacji przestrzennej w ujęciu systemowym*, Warszawa, Instytut Geodezji i Kartografii, 2012, 31-32.

⁹ According to art. 17 item 1 ISI leading authorities, other authorities of public administration and third parties, alone as well as in cooperation with each other, create, maintain and develop the infrastructure for spatial information. According to art. 18 item 1 ISI, Minister of Construction, Spatial Planning and Housing coordinates the creation, maintenance and development of the infrastructure of spatial information.

¹⁰ Art. 3 point 7 ISI.

¹¹ Art. 20 item 1 ISI.

Interoperability is a characteristic feature of tele-information systems and is defined as the ability to communicate with other tele-information systems without direct human interference.¹⁷

There are four basic layers of interoperability: 1) the organisational layer (including procedures for cooperation and procedures for informing on the method for using the tele-information systems); 2) the semantic layer (including data exchange and their correct interpretation); 3) the technological layer (relating to the structural and operational aspects of the tele-information system, as well as the syntactic aspect related to data transferring and downloading); 4) the legal layer (including legal provisions, which govern deployment of the three previous layers).¹⁸

The provisions of the Act on the infrastructure for spatial information require interoperability of the tele-information systems, which are part of this infrastructure. The requirements of interoperability are related to interconnection of spatial-data sets as well as the automatic interaction of spatial-data services. To meet these requirements, the leading authority should provide public administration-authorities and third parties who participate in the infrastructure for spatial information, the information required to achieve interoperability.¹⁹ The requirement of interoperability applies to the Geoportal as well as to public registers.²⁰

4. The Geoportal

The Geoportal is the main tool providing access to spatial-data services. It is an Internet-service operated at Geoportal.gov.pl. The Geoportal is a central access point to

spatial-data services.²¹ Therefore, it is the central system of the national infrastructure for spatial information as well as part of the European network INSPIRE.²² The Surveyor General has created and maintains the Geoportal as the tele-information system allowing access to these services by means of electronic communication.²³ The Geoportal consists of two parts – the first one is a map service, and the second one is a catalogue and metadata search engine.²⁴ The Geoportal enables optimal sharing of spatial data with the users of this tele-information system. The Geoportal makes available spatial data previously collected in public registers, meaning spatial-data sets kept by public-administration authorities.²⁵

These public registers are, inter alia: 1) the National Register of Basic Geodetic, Gravimetric and Magnetic Networks; 2) the Land and Building Register (Cadastre of Real Estate); 3) the Geodetic Register of Utilities Network; 4) the National Register of Boundaries; 5) the National Register of Geographical Names; 6) the Register of Towns, Streets and Addresses; 7) the Register of Prices of Real Estates; 8) the Topographic-Objects Database; 9) the Database of General Geographic Objects; 10) the Detailed-Control Network Database; 11) the Database of Aerial and Satellite Imagery, and Orthophotomaps and Numerical Terrain Model.²⁶ Spatial-data sets are also created for spatial planning, such as: 1) regional spatial development plans; 2) study of conditions and directions of spatial development of municipalities; 3) local spatial development plans (zoning plans); 4) local reconstruction plans; 5) local revitalization plans.²⁷ The public-administration authorities

fied in the National Interoperability Framework.

¹⁷ M. Błażewski, *Zapewnienie interoperacyjności i systemów teleinformatycznych. Studium administracyjnoprawne*, Warszawa, Difin, 2020, 57.

¹⁸ M. Błażewski, *Zapewnienie interoperacyjności i systemów teleinformatycznych. Studium administracyjnoprawne*, 63- 67; M. Baranowski, *Infrastruktura informacji przestrzennej w ujęciu systemowym*, 29.

¹⁹ Art. 8 ISI.

²⁰ Paweł Sudra, *Serwis internetowy geoportal.gov.pl jako narzędzie wspomagające warsztat urbanisty*, in *Człowiek i Środowisko*, Vol. 36, 2012, 9. According to art. 13 item 1 CEPPT, public registers operating with the use of a public tele-information system should be compatible with the minimum requirements of systems interoperability specified in the National Interoperability Framework.

²¹ Art. 13 item 1 ISI P. Pokojska and W. Pokojski, *Geoportal krajowy ważnym źródłem informacji przestrzennej o środowisku geograficznym w procesie edukacji*, in *Edukacja biologiczna i środowiskowa*, Vol 1, 2013, 44.

²² P. Sudra, *Serwis internetowy geoportal.gov.pl jako narzędzie wspomagające warsztat urbanisty*, 9.

²³ Art. 13 item 1 ISI P. Sudra, *Serwis internetowy geoportal.gov.pl jako narzędzie wspomagające warsztat urbanisty*, 5; P. Pokojska and W. Pokojski, *Geoportal krajowy ważnym źródłem informacji przestrzennej o środowisku geograficznym w procesie edukacji*, 44.

²⁴ P. Sudra, *Serwis internetowy geoportal.gov.pl jako narzędzie wspomagające warsztat urbanisty*, 10.

²⁵ P. Sudra, *Serwis internetowy geoportal.gov.pl jako narzędzie wspomagające warsztat urbanisty*, 9.

²⁶ Art. 4 item 1a LSCL.

²⁷ Art. 67a item 1-2 the Act of 27 March 2003 on land planning and spatial development (consolidated text Journal of Laws 2022, item 503 with amendments).

keeping these public registers and data sets are required to keep them updated and ensure their compliance with the interoperability requirements.²⁸

5. The scope of spatial-data processing

The processing of spatial data involves the use of these data in the infrastructure for spatial information. Spatial data are also public information.²⁹ The processing of spatial data is carried out using spatial-data services, which include, inter alia: searching, browsing, downloading and transforming spatial-data sets as well as activating other services.³⁰ There are two spheres of processing of these data: the sphere of open access and the sphere of limited access to spatial data.

The sphere of open access applies to a significant portion of spatial data. Legal regulations set out the scope of the sphere in a complex manner.

Firstly, these regulations ensure open (universal and free) access. Users of the infrastructure of the spatial information may search for data also for commercial purposes.³¹ However, special regulations exclude open access for spatial-data searching. The exclusion applies to the National Geodetic and Cartographic Resource. Public-administration authorities, who maintain this resource, provide access to such materials for a fee.³²

Secondly, the sphere of open access may be governed by specific provisions, which apply to public registers. Public-administration authorities, who keep these registers, ensure open access to data sets according to their competences.³³

²⁸ Art. 4 item 1d LSCL.

²⁹ According to art. 1 item 1 the Act of 6 September 2001 on access to public information (consolidated text Journal of Laws 2022, item 902), any information about public matters has public-information status.

³⁰ Art. 9 item 1 ISI.

³¹ Art. 12 item 2 in connection with *a contrario* art. 9 item 2 ISI.

³² Art. 40a item 1 LSCL. Judgment of the Regional Administrative Court in Kraków of 8 February 2017, III SA/ Kr 1304/16, CBOSA. The judgment concerns the refusal to allow free access to principal maps with electronic means of communication.

³³ The open access to spatial data, which is without fee, concerns public registers, like: 1) The National Register of Basic Geodetic, Gravimetric and Magnetic Networks (art. 40a item 2 point 1 letter f LSCL); 2) the National Register of Boundaries (art. 40a item 2 point 1 letter a LSCL); 3) the National Register of Geographical Names (art. 40a item 2 point 1 letter b LSCL); 4) the Topographic Objects Database (art. 40a item 2 point 1 letter

The sphere of limited access is defined by the purpose of access to spatial data. There are two levels of restrictions: 1) sharing related to performing a public task or personal use, with the exception of use for commercial purposes;³⁴ 2) sharing for any purpose for a fee.³⁵

The second level of limitation of sharing of spatial data does not apply to the public-administration authorities and private entities that use spatial information in carrying out a public task.³⁶

The purpose of limiting access to spatial data is to ensure an effective state monopoly in providing these data from public resources.³⁷ This limitation prevents the creation a parallel portal based on public spatial-data resources by private entrepreneurs.

The Act on the infrastructure for spatial information introduces other exceptions to sharing spatial data, which apply to 1) the implementation of international agreements binding the Republic of Poland; 2) state security; 3) public safety; 4) the activities of

h LSCL); 5) the Database of General Geographic Objects (art. 40a item 2 point 1 letter c LSCL); 6) The Detailed Control Network Database (art. 40a item 2 point 1 letter g LSCL); 7) the Database of Orthophotomaps and Numerical Terrain Model (art. 40a item 2 point 1 letter d as well as art. 40a item 2 point 1 letter e LSCL).

³⁴ According to interpretation *a contrario* art. 12 item 2 in connection with art. 9 item 1 point 1 oraz 3-5 ISI, spatial data are available through spatial-data services such as: searching, browsing, downloading and transforming spatial data sets as well as other activating services. Access to these spatial data may have a form that prevents their re-use for commercial purposes.

³⁵ According to art. 12 item 4 in connection with art. 9 item 1 point 3-5 ISI, public-administration authorities who are maintaining public registers, may charge fees to provide data from these registers. Fees may consider spatial-data services like downloading, transforming and other activating services. Fees are charged according to specific provisions.

³⁶ According to art. 14 item 1 ISI, spatial-data sets and spatial-data services, which are maintained by public-administration authorities, are available without any fee, for the performance of public tasks by other authorities and entities. According to art. 15 item 1 CEPPT, public-administration authorities and private entities who are performing public tasks have access to data collected in electronic public registers for the execution of their public tasks.

³⁷ Judgment of the Supreme Administrative Court in Warszawa of 11 March 2021 r., I OSK 4090/18, CBOSA. The judgment of the court concerned an administrative penalty for unlawfully using geodesy and cartography resources. The issue of the purpose of limiting access to spatial data is one of the aspects of this judgment.

the judiciary.³⁸

6. Conclusions

In accordance with Polish law, the processing of spatial data involves the use of these data in the infrastructure for spatial information. The processing methods depend on the organisational structure of the public-administration authorities and third parties who created the infrastructure, as well as the required technical standards. This processing involves spatial data, which are directly or indirectly related to a specific location or geographical area. In principle, the processing of spatial data is universal and free of charge. The access is restricted by law because of the processing method, as well as the purpose of using spatial data. The purpose of such restrictions on spatial-data processing is to preserve the natural monopoly of the public administration, while taking into account the needs of private parties to use spatial data for their activities.

³⁸ Art. 16 ISI.

