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## COMPARATIVE CHARACTERISTICS OF LEGAL REGULATION OF THE GEOSPATIAL DATA FORMATION IN UKRAINE AND THE EUROPEAN UNION

### ПОРІВНЯЛЬНА ХАРАКТЕРИСТИКА ПРАВОВОГО РЕГУЛЮВАННЯ ФОРМУВАННЯ ГЕОПРОСТОРОВИХ ДАНИХ В УКРАЇНІ ТА ЄВРОПЕЙСЬКОМУ СОЮЗІ

*The paper is devoted to the study of the concept, structure and methodology of creating a geospatial data infrastructure in the European Union and a comprehensive analysis of the results of the implementation of positive European experience in Ukraine. A comparative characterization of the legal support for the development of geospatial data infrastructure at the national, regional and local levels in the EU and in Ukraine has been carried out. It has been established that modern infrastructures of geospatial data are turning into platforms for the integration of all links of production, supply and use of geo-informational resources for management decision-making. It is proven that the adaptation of the domestic legislation on geospatial data to the European legislation is due to the need to provide our state with official high-quality geoinformation. The fact that the creation of a legal framework for the formation of geospatial data in the European Union began much earlier determines Ukraine's lag in the implementation of legal prescriptions for the purpose of forming the infrastructure of geospatial data. The legislation of the European Union, which regulates the creation and promotes the standardized exchange of geographic information and geospatial data, is analyzed. Ten fundamental EU Directives and Regulatory Acts in the field of geospatial data infrastructure formation are characterized. The special role and significance of Directive 2007/2/EC of the European Parliament and of the Council of March 14, 2007 on the creation of a spatial information infrastructure in Europe to support the environmental policy of the Community and policies or activities that may have an impact on the environment (the INSPIRE Directive) has been established. The provisions of the current legislation of Ukraine on the national infrastructure of geospatial data and the order of its functioning were studied, and a comparative characteristic of domestic and European legislation was carried out.*

**Key words:** geospatial data, geographic information, spatial data infrastructure, geoinformation databases.

*Стаття присвячена вивченню концепції, структури та методології створення інфраструктури геопросторових даних в Європейському Союзі та комплексному аналізу результатів впровадження позитивного європейського досвіду в Україні. Проведено порівняльну характеристику правового забезпечення розбудови інфраструктури геопросторових даних на національному, регіональному та місцевому рівнях в ЄС та в Україні. Встановлено, що сучасні інфраструктури геопросторових даних перетворюються в платформи інтегрування усіх ланок виробництва, постачання і використання геоінформаційних ресурсів для прийняття управлінських рішень. Доводиться, що адаптація вітчизняного законодавства про геопросторові дані до європейського обумовлено необхідністю забезпечення нашої держави офіційною високоякісною геоінформацією. Той факт, що створення правової бази для формування геопросторових даних в Європейському Союзі розпочався набагато раніше обумовлює відставання України в реалізації правових приписів з метою формування інфраструктури геопросторових даних. Проаналізовано законодавство Європейського Союзу, що регламентує створення та сприяє стандартизованому обміну географічною інформацією та геопросторовими даними. Охарактеризовано десять основоположних Директив і Регуляторних актів ЄС в галузі формування інфраструктури геопросторових даних. Встановлено особливу роль і значення Директиви 2007/2/ЄС Європейського Парламенту та Ради від 14 березня 2007 року про створення інфраструктури просторової інформації в Європі для підтримки екологічної політики Співтовариства та політики чи діяльності, які можуть мати вплив на довкілля (Директива INSPIRE). Досліджено положення чинного законодавства України про національну інфраструктуру геопросторових даних та порядку її функціонування, проведено порівняльну характеристику з вітчизняного і європейського законодавства.*

**Ключові слова:** геопросторові дані, географічна інформація, інфраструктура просторових даних, геоінформаційні бази даних.

**Introduction.** The need to collect, process and analyze information about various objects and places on the Earth's surface is due to various factors, starting from

climate change and weather monitoring and ending with tracking the distribution of human and animal populations. Aware of the need to provide the European Union

with official high-quality geo-information necessary for the development of policies and legislation in various countries in the field of the environment, competitive business, communal services, legal systems, security, the formation of a legal framework for the formation of geospatial data began in the EU. In Ukraine, the relevant legislation began to be formed much later, so we think it is appropriate to start with a review of the EU legislation.

**The state of scientific research of the problem.** National legislation on geospatial data began to be formed recently, therefore there is a need for an in-depth scientific study of this problem.

**The purpose of the article** is to conduct a comprehensive study of the legal framework of the European Union regarding the formation of spatial data infrastructure and a comparative analysis of European and Ukrainian legislation in this field.

**Main body.** Directive 2007/2/EC of the European Parliament and the Council of March 14, 2007 on the establishment of a spatial information infrastructure in Europe to support the Community's environmental policy and policies or activities that may have an impact on the environment (the INSPIRE Directive) became the basis. The INSPIRE directive, which entered into force on May 15, 2007, obliged all EU members to create a spatial data infrastructure on the Internet that would facilitate the standardized exchange of geographic information. INSPIRE is based on spatial information infrastructures created and operated by the member states of the European Union. The Directive addresses 34 topics of spatial data required for environmental applications, with key components defined in technical implementing rules. This makes INSPIRE a unique example of a legislative "regional" approach.

In order to ensure that Member States' spatial data infrastructures are compatible and usable in a Community and cross-border context, the Directive requires the adoption of Common Implementing Rules (CIRs) in a number of specific areas (metadata, data specifications, network services, data and service sharing, monitoring and reporting). EuroGeographics is an international non-profit organization, representative body and member association of national cartographic, cadastral and registration organizations in Europe that provides assistance. This organization unites all European countries without exception. EuroGeographics, together with member countries, is developing an infrastructure to integrate their national data, including topographic and land information, with the aim of implementing an integrated European Location System (ELF) for a wide range of users. By sharing best practices and creating standard data specifications, EuroGeographics aims to ensure the interoperability and interconnection of individual geospatial databases of member countries [1].

Commission Regulation (INSPIRE Metadata Regulation) No. 1205/2008 of December 3, 2008 implementing Directive 2007/2/EC of the European Parliament and

the Council on metadata was adopted to define a set of metadata elements. The definition of a set of metadata elements was necessary in order to allow the identification of the information resource for which the metadata is created, its classification and identification of geographical location and time reference, quality and reliability, compliance with implementation rules on the compatibility of spatial data sets and services, limitations, related related to access and use, and the organization responsible for the resource. Metadata elements associated with the metadata record itself are also needed to control that the generated metadata is updated, and to identify the entity responsible for creating and maintaining the metadata. This is the minimum set of metadata elements required to comply with Directive 2007/2/EC and does not preclude organizations from documenting information resources in more detail with additional elements arising from international standards or practices in their community of interest. Nor does it preclude the adoption of guidelines established and updated by the Commission, in particular where necessary to ensure metadata interoperability [2].

A further step on the way to the formation of the legal framework for the creation of geospatial data infrastructure was the Decision of the Commission of June 5, 2009 on the implementation of Directive 2007/2/EU of the European Parliament and of the Council on monitoring and reporting (Commission Decision regarding INSPIRE monitoring and reporting). Directive 2007/2/EC requires Member States to monitor the implementation and use of their infrastructure for spatial information and to report on the implementation of this Directive. Monitoring should be based on a set of indicators calculated on the basis of data collected from relevant stakeholders. The results of monitoring and reporting must be submitted to the Commission and made public [3].

The general rules for the creation of the Spatial Information Infrastructure in the European Community are established in Commission Regulation (EC) No. 976/2009 of October 19, 2009 on the implementation of Directive 2007/2/EC of the European Parliament and of the Council on network services (Commission Regulation No 976/2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards the Network Services 19.10.2009). Directive 2007/2/EU establishes general rules for the creation of Spatial Information Infrastructure in the European Community. Member States are required to establish and operate a network of services for spatial data sets and services for which metadata have been created in accordance with this Directive [4].

To ensure interoperability and harmonization between spatial data themes, Member States should meet requirements for common data types, spatial object identification, metadata for interoperability, a common network model and other concepts and rules that apply to all spatial data themes 29 March 2010 Commission Regulation

(EC) No. 268/2010 was adopted on the implementation of Directive 2007/2/EC of the European Parliament and of the Council on access to spatial data sets and services of member states by public institutions and bodies on harmonized terms (Regulation on INSPIRE Data and Service Sharing 29.03.2010). To ensure interoperability and harmonization within a single spatial data theme, Member States should use classifications and definitions of spatial objects, their key attributes and relationship roles, data types, value domains and specific rules that apply to individual spatial data themes [5].

The general rules for the creation of the Spatial Information Infrastructure in the European Community are established by Commission Regulation (EU) No. 1089/2010 of November 23, 2010 on the implementation of Directive 2007/2/EC of the European Parliament and of the Council on the compatibility of spatial data sets and services (Commission Regulation (EU) N 1089/2010 as regards interoperability of spatial data sets and services). Within this infrastructure, Member States shall provide access to datasets relating to one or more Annexes to Directive 2007/2/EC and relevant spatial data services in accordance with technical arrangements for interoperability and, where possible, to the harmonization of spatial datasets and services. The technical arrangements shall take into account the relevant user requirements obtained from the interested parties through the user requirements survey and the analysis of the submitted reference material and the relevant environmental policies and Union policies or activities that may have an impact on the environment.

In order to ensure interoperability and harmonization between spatial data topics, Member States should meet requirements for common data types, spatial object identification, interoperability metadata, a common network model and other concepts and rules that apply to all spatial data topics [6].

Additionally, on February 4, 2011, a regulatory act of the Commission was adopted (Commission Regulation (EU) N 102/2011 of 4 February 2011 amending Regulation (EU) N 1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services).

Commission Regulation (EC) No. 1253/2013 of October 21, 2013 amending Regulation (EC) No. 1089/2010 on the implementation of Directive 2007 helped to ensure the general consistency of technical agreements on the interoperability of spatial data sets and existing technical agreements on the interoperability of spatial data sets /2/ EU regarding the compatibility of spatial data sets and services (Commission Regulation (EU) N 1253/2013 of October 2013 amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC as regards interoperability of spatial data sets and services) [7].

Interoperability of spatial data services is characterized by the ability to communicate, execute or transfer data between them. Therefore, spatial data services

require additional documentation with additional metadata. Therefore, there was a need to make changes to Regulation No. 1089/2010 regarding the compatibility of spatial data services, which was done on December 10, 2014 [8].

In order to ensure mutual access to information by spatial data services, Commission Regulation (EU) No. 1311/2014 was adopted on the definition of the INSPIRE metadata element (Commission Regulation (EU) No 1311/2014) of 10 December 2014 amending Regulation (EC) No 976/2009 as regards the definition of an INSPIRE metadata element). As stated in the Regulation, a necessary condition for calling spatial data services is the ability to access the relevant information. Member States provide access to the metadata elements provided for in Commission Regulation (EC) No 1205/2008 through the discovery services provided for in Directive 2007/2/EC with implementing rules in Commission Regulation (EC) No. 976/2009. The rules for the implementation of spatial data services in Commission Regulation (EC) No 1089/2010 introduce new metadata elements for spatial data services, therefore the definition of a metadata element in Commission Regulation (EC) No 976/2009 needs to be updated to allow the discovery and availability of new metadata elements with discovery services member states) [9].

In Ukraine, the legal regulation of the national infrastructure of geospatial data is carried out in accordance with the Constitution of Ukraine, the Land Code of Ukraine, the Water Code of Ukraine, the Forest Code of Ukraine, the laws of Ukraine "On the National Infrastructure of Geospatial Data", "On Topographic, Geodetic and Cartographic Activities", "On the State Land cadastre", "On land management", "On state registration of property rights to immovable property and their encumbrances", "On nature reserve fund of Ukraine", as well as normative legal acts regulating relations with information and information systems.

Of course, the basic legislative act is the Law of Ukraine "On the National Infrastructure of Geospatial Data" dated April 13, 2020 [10]. In Art. 1 of this law, geospatial data is defined as a set of data about a geospatial object. A geospatial object is an object characterized by a certain location on Earth and space-time coordinates defined in the established system. Geospatial objects can be of national and local importance.

Geospatial objects of national significance are geospatial objects as part of the national infrastructure of geospatial data, the national (national) significance of which is determined by laws and regulations in the relevant field. Geospatial objects of local significance are geospatial objects as part of the national infrastructure of geospatial data, the local significance of which is determined by laws and regulations in the relevant field [11].

By law in Art. 5 provides that geospatial data is divided into basic geospatial data and thematic geospatial data. Basic geospatial data is publicly available geospatial

data that constitutes a unified digital coordinate-spatial basis for the production, integration and implementation of other activities with various geospatial data. Basic geospatial data are information about: 1) reference systems of coordinates and heights; 2) the state border of Ukraine; 3) administrative-territorial units, including their boundaries; 4) territorial communities, including the boundaries of their territories; 5) hydrographic objects and hydrotechnical structures; 6) settlements, including their street and road network; 7) buildings and structures; 8) highways; 9) railways; 10) engineering communications; 11) airports, sea and river ports; 12) land cover and soils; 13) land plots; 14) registers of streets and addresses of objects; 15) geographical names; 16) digital terrain model; 17) orthophoto plans. Basic geospatial data must not contain information that constitutes a state secret and other information to which access is restricted by law (restricted information).

Thematic geospatial data is geospatial data that is not classified as basic geospatial data. Thematic geospatial data includes all types of geospatial data created on the basis of basic geospatial data or as independent data sets.

Metadata is information about geospatial data and/or services that make it searchable and usable. Metadata contain reference information about the composition, structure, quality, territorial coverage, functions, conditions of use of geospatial data and services and may contain other reference information. The data holder is

responsible for the reliability, completeness, accuracy and relevance of geospatial data and metadata.

Sets (types) of geospatial data are provided for in the Addition to the Law of Ukraine "On the National Infrastructure of Geospatial Data" dated April 13, 2020 No. 554-IX [12].

**Conclusions.** In most cases today, geoinformation resources in the public sector are created on a departmental basis without an agreed technological policy, without unified methodological principles and technical regulations. Collection processes, requirements for the structure, composition and quality of geospatial data are not coordinated, data are registered using different cartographic sources, in different coordinate systems, in different classification systems and using different software and technological tools. Such uncoordinated activity inevitably leads to the dispersion of information flows and the duplication of expensive and time-consuming investigative work on the collection and formation of geospatial data, and ultimately to their incompatibility in the functioning of computer systems to support management decision-making. In addition, the limited access to geospatial data accumulated in departmental funds, the imperfection of the procedure for providing geoinformation resources that are state property to executive authorities, local self-government bodies and their executive bodies, as well as the procedure for their mutual exchange at the appropriate level.

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