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PROCESSING OF SPATIAL DATA ON THE EXAMPLE OF A WATER MANAGEMENT INFORMATION SYSTEM

Abstract: The Water Management Information System is an important instrument of water resource management that enables the collection, processing, publishing and sharing of water management data. The Water Management Information System is an integral part of proper and effective water management, the vision of which has been shaped over the last decades, transforming into an increasingly effective system adapted to the applicable legal and organizational conditions. The main feature of the information system is its multi-tier nature, providing access to other information resources, which will allow the utilization of data imported from other thematic databases. In this manner, on the basis of appropriate regulations, access to current data from various sources, a uniform reference system and proper use of water management data in planning and programming socio-economic development will be ensured. In the paper, WIMS will be characterized as a public register, taking into account the categories of data collected in the context of restricting access to data.

The subject of the considerations will be the identification of important elements in the field of ensuring access to information on water management, as well as its dissemination through the WMIS.

Keywords: spatial data, public register, restricting access to data

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Introduction

Water is an environmental component which plays major social and economical role. Furthermore, water is a limited resource and should be primarily destined for human consumption. Only then water can be used to pursue other goals: economic development, tourism or recreation (Hauser et al., 2018, p. 466). Water economy is primarily regulated by the Water Law Act of 20th of July 2017 (uniform text, Journal of Acts of the Republic of Poland 2022, item 2233 as amended) which covers the issues of managing waters consistently with the principles of sustainable development, in particular development and protection of water resources, utilizing water resources and managing water resources. The act also governs the issues of ownership of waters and land covered in water as well as the principles of managing these components as a part of the property of the State Treasury (articles 1 and 2 of the Water Law). The information-based civilization developing in the recent years influences effective development of land-use policies, also in regards to managing water resources, on nation-wide and regional levels. The justification of act's draft refers to the European Parliament and Council Directive 2000/60/EC of 23rd of October 2000 establishing a framework for the Community action in the field of water policy (OJ UE L 327/1) (hereinafter: framework water directive) The preamble of the directive states that the common water policy requires transparent, effective and cohesive legislative framework – a statement which should be interpreted as a postulate of implementation of legal provisions ensuring full and reasonable legal regulation of this area on the national level. The water economy reform requires forming such legal, organizational, financial and technical solutions regarding water management which will ensure permanent and sustainable social and economic development of the country and which will take into account using water for satisfying economic needs and which will ensure access to water resources of proper quality in an appropriate amount.

Water resources management is regulated in detail in chapter VII of the Water Law. Apart from the regulations concerning maintaining the Water Management Information System these regulations are comprised of provisions regulating the issues of planning and controlling water management and monitoring waters. Consistently with art. 10 of the Water Law the water resources management serves to satisfy the needs of the populace and economy as well as preserving waters and related natural environment. This ordinance is effected through various implements which were listed in art. 11 of the Water Law. These instruments cover water management planning, Water Law permits, fees for water services as well as other receivables, water management control as well as the water management system.

Material and methods

The Water Management Information System (WMIS) was developed in the aftermath of the water economy reform of 2017 and supplanted the existing water cadaster. The Water Management Information System is a major implement of managing water resources which enables collecting, processing, publishing and sharing the data

regarding water economy. The ordinance of the Minister of Maritime Economy and Inland Waterways of 10th of September 2020 regarding the Water Management Information System (Journal of Acts of the Republic of Poland 2020, item 1656) regarding the system came into effect in the October of 2020. The analysis of provisions of the act and the ordinance enables us to isolate the procedures for sharing the data operating on the basis of the statutory tasks imposed on the National Water Management Authority Polish Waters (hereinafter NWMA PW). In relation to the changes in the provisions regarding the extent of the data collected in the existing water cadaster and development of the Water Management Information System the subject of the analysis covers the statutory regulations and encompasses both the analysis of the provisions of the Water Law act as well as analysis of various other legal regulations which have to be taken into consideration in order to define the analyzed regulations; furthermore, the analysis covers the assessment of the existing procedures for sharing information along with the prospective conclusions as the components necessary for development of the WMIS. The main research method used to make relevant findings will be the analysis of literature and legal acts.

Spatial Data

Managing waters is a component of national spatial management. The spatial management (spatial economy) is defined as a rational use of the environment through proper placement of fixed assets. Land management defines the principles of rational selection of placement, spatial relations, spatial organization, and venues for development of location, interaction and organization systems. The land management should be considered as a system comprised of numerous active components (owners of plots of land, public administration) and passive components (differently utilized plots of land, technical infrastructure). The land management is a human activity resulting in specific spatial outcomes, both positive as well as detrimental (Zawadzki, 1969, p. 118; Domański, 2007, p. 28). Proper understanding of the concepts of spatial information and spatial data is crucial for defining the spatial management tasks. Spatial information is a collection of pieces of information regarding location, geometrical properties and spatial relations between the objects referred against the surface of the Earth. Spatial objects consist of both the natural objects such as lakes, forests, designated forest areas or any other classification units of land or artificial objects erected therein. These objects may be characterized as natural, social or economical phenomena (Miś et al., 2001, p. 15; For comprehensive analysis of the term „spatial information” check: Jankowska, 2017).

In turn, rapidly collecting and processing data is necessary in order to procure necessary and credible information. Contemporarily we gather increasing amount of data but, characteristically, this data primary comes from vastly differing sources. The classical sources of data such as documents and measurements were in recent years expanded with photographs, maps, sounds, websites or video recordings. This data is of a different character and gathering this data and processing it accordingly presents a major challenge.

It is also prudent to take note of the geoinformation concept defined as presenting the data regarding any objects located in the surroundings, land use and developing utility infrastructure through using tools specially developed for this purpose. The advantage of the geoinformation included in various information systems is the fact that the phenomena not directly connected to their location on the surface of the Earth can be assigned a new metric – a specific location defined through geographical coordinates. Bodies of spatial information can be divided into those which are being developed under the legal obligation and the bodies which are being developed under own initiative by various organizations and natural persons for the purpose of realizing their goals (Szpor, 1998, p. 85). The potential possibilities regarding utilizing geoinformation are dependent on the material scope of the information which is inherently extensive. Geoinformation cover knowledge regarding objects such as facts, events, items and processes. Furthermore, the contemporary maps are capable of not only graphically displaying the geographical horizon but also enable "conducting complex thematic analyzes, useful in making decisions regarding components of a complex structure. It is possible thanks to the multi-tier structure of digital maps integrated with text databases" (Ganczar, 2020, p. 93). Quality and credibility of this data, along with the willingness of private entities to pay for access to a specific data set, are of primary and basic significance for the practical application of this data, also its application for the needs of the judiciary system (Flaga-Gieruszyńska, 2018).

A piece of information can be properly utilized only when it is complete, credible, sorted and presented in appropriate form. Complete information can be collected only when the gathered data fully describes all aspects of the reality we are interested in and when the data accurately reflects its area of analysis. Incomplete data may be misleading if its user is unaware of the incompleteness of the data. In turn, when the user is aware of the incompleteness of the data, the user has to seek additional information in other sources if he wishes to minimize his knowledge-related shortcomings (the degree of ignorance) related to the specific field of knowledge the user is interested in (Bartman & Sobczyński, 2015, p. 244). Unreliable information is worthless information. The unreliability of information results from unreliability of data.

It is prudent to emphasize that limiting multiplying the instances of collecting the same spatial data will be significant for managing water economy. The reference data against which users are able to locate the objects and phenomena they are interested in plays major role. This task is realized through: developing topographical reference data bases for the local, regional and national level; developing databases containing metadata which enable checking what data are or will be made available in the future; assigning unique identifiers which enable integrating data from various databases containing spatial data for geographical objects (Linsenbarth & Ney, 1999, p. 174). Databases containing reference data are developed with the goal of preserving cohesion of the spatial data contained within numerous specialized data sets; at the same time developing such databases enables effecting previously impossible to realize analyses based on the combined data. Reference data is the data which may constitute a foundation for gathering specialized, more detailed data and the basis for visualizing

thematic data. Utilizing reference data is significant due to the opportunity for reducing costs of gathering and updating spatial data for various databases. Furthermore, utilizing reference data facilitates cooperation of the Geographical Information Systems based on the same source data. Undeniably one merit of reference databases is limiting financial expenditures on developing separate databases containing similar data, facilitating updating the data contained within registers – a change in the reference register enables access to the up-to-date data for all of its users. Furthermore, it enables providing citizens, public administrations and entrepreneurs with uniform, cohesive information and makes any comparisons and aggregated analysis of the data contained in reference registers and thematic databases easier. Currently the central geodesic and cartographic resource node GEOPORTAL plays the role of a reference database.

The WMIS maintained under an IT system

Consistently with art. 329, section 1 of the Water Law the Water Management Information System is maintained under a computerized IT system. Differentiating between these two types of systems appears to be important. Within the doctrine (Ficoń, 1998; Kisielnicki & Sroka 2015; Walasek, 2015) an information system is defined as a multi-tier structure which enables its user to transform input information into output information through using a specific model and through applying specific procedures. An information system constitutes a central link coordinating processes within an organization and integrating it with the external environment. The greater the rate of information turnover the greater the topicality and substantive value of the system in the process of developing and making decisions. Apart from the internal information processing technology the manner in which information is distributed internally within the system and externally is also of great importance for effective operation of the system. The information links between individual elements of the information system must be lasting, sustainable and methodical and the communicated information must be highly credible, synthetic in nature and up-to-date.

An information system should enable: gathering information; transmitting information between at least two users; storing information; processing information; sharing information in a specified place and at a specified time (Kucyk, 2013). An information system should: provide complex and up-to-date information, ensure selective and effective application of information and proper two-way exchange of information between organizational cells, supervisors and subordinates; ensure simplicity of use and providing constant, automatic method for gathering data from specified sources; enable accessing data immediately, even from the lowest management level, searching and collating information from various sources, presenting data and results of their analysis in various reporting systems; ensure flow of information based on feedback (Janczak, 2011).

The concept of an IT system must be distinguished from the concept of an information system. An information system shall be understood as a separate part of a social, economic or technical system consisting of such components as personnel

(people), information processes and data resources, realizing their tasks and goals. The primary tasks of an information system include satisfying information needs of an organization in order to enable making accurate and proper decisions. A digitized separate part of an information system becomes an IT system (Fajfer, 2011). An information system requires support of IT systems which are defined as formal computer systems enabling gathering, processing, sharing and integrating data from various sources in order to deliver necessary information at an appropriate time and to support decision-making processes (Chmielarz, 1996). It covers such technological attributes as: the type and structure of data, the data selection type, type of the user interface and types of reactions. Consistently with art. 3, section 3 of the act on the IT development of the bodies performing public tasks (uniform text, Journal of Acts of the Republic of Poland 2021, item 2070 as amended, hereinafter the ITact) a computerized IT system is a body of cooperating IT hardware and software ensuring processing, storage, sending and receiving of data through telecommunication networks through use of an output device understood as stipulated in the provisions of the act of 16th July 2004 – Telecommunications Law (uniform text, Journal of Acts of the Republic of Poland 2022, item 1648 as amended) – appropriate for a given type of a telecommunication network (these concepts and their correct use are discussed by Kuraś (2009).

The above distinction is of great importance for the appropriate and law-consistent processing of data under the WMIS. During the reading of the justification for the draft of the ordinance regarding the Water Management Information System the following statement draws attention: *"the ordinance does not bear the quality of the technical guidelines for developing the system and refers solely to sharing the data. The project is to enable proper realization of tasks without a uniform computerized IT system, on the basis of the existing software-hardware infrastructure and simultaneously to provide the guidelines for development of the Water Management Information System"* (Ministerstwo Gospodarki Morskiej i Żeglugi Śródlądowej, 2018). The ordinance projects that under the Water Management Information System, developed as a computerized IT system, standardized databases divided into water resource regions will be maintained. This system is maintained in a manner which shall facilitate managing water resources. In regards to the technological aspects of operations of a computerized IT system the provisions of the act on the IT development of the bodies performing public tasks and regulations of the National Interoperability Framework shall apply (Journal of Acts of the Republic of Poland 2017, item 2247). The obligation of meeting the minimal requirements for computerized IT systems established under art. 14, section 1 of the ITact is being met in consideration of art. 3, point 9 of the ITact according to which it is a body of organizational and technical requirements meeting which by a computerized IT system utilized to realize public tasks enables exchanging data with other computerized IT systems utilized to realize public tasks and ensures access to the information resources shared through these systems and shared consistently with the issued regulations of the National Interoperability Framework. The Council of Ministers determines the minimum requirements for the computerized IT systems in order to ensure cohesive operation of the computerized IT systems utilized to realize public

tasks (through defining at least the data format specification and communication encryption protocols which are to be applied in the interface software and at the same time ensuring that these specifications will be possible to apply free of charge. The efficient and safe electronic exchange of information between public entities and between public entities and bodies of other countries or international organizations should also be ensured.

The premises for the operations of the Water Management Information System

The Water Management Information System comprises an inseparable component of correct and effective management of water economy the vision for which was developed over the last decades transforming into an increasingly effective system adapted to existing and binding legal and organizational regulations. The WMIS operates as one of the primary components of the Informatics System for the Protection of the Country from extraordinary dangers (ISPC). In supplanting the existing systems and software for realization of the tasks regarding water cadastre the WMIS is to implement additional functionality resulting from the provisions of law and other tasks related to modern demands regarding managing water economy. Thus through implementing the provisions of the new Water Law act the water cadastre was transformed into the Water Management Information System maintained by the National Water Management Authority Polish Waters for the complex of catchment basins and water regions and the scope of the gathered data was expanded through, among others, the land improvement record keeping, previously maintained by Marshals of regions through the Land Improvement Administration.

The primary premise of the information system is a multi-tier structure ensuring access to other information; this structure will enable importing data from other thematic databases. In this manner, on the basis of appropriate procedures, the access to up-to-date data from various sources will be ensured along with a uniform reference system and proper application of water economy data in planning and designing social and economical development. Providing access to and sharing information are crucial. In this manner uniform information cohesive in terms of time and location will benefit conducting research and development works, determining opinions and views in regards to crucial quantitative and qualitative issues of water economy (Ganczar, 2021, p. 172).

The primary task of the WMIS defined in the legal provisions is gathering the information regarding water management (art. 329, section 2 of the Water Law). However, this role should serve as a departure point for further, intermediate functionality of the system. A database containing all information concerning water management should become a "core" of the system and support other implements of water resources management such as, e.g. water management planning, Water Law permits, fees for water services and remaining receivables, water management control and ensuring that the documentation is up-to date. Analysis of the data available in the WMIS may enable marking hot spots for issues, locations requiring investigating or the

locations generating discrepancies which should be investigated first. The system may also constitute a tool for planning the order of carrying out audits and inspections. The WMIS was developed primarily with the goal of establishing a centralized and cohesive source of information where all information is gathered, stored and updated. However, being a core of the water management system due to aggregating all aspects of this field in one place the WMIS should be also utilized as a tool supporting other instruments of water resources management and serve as a departure point for taking further steps. Provisions of the Water Law (art. 330, section 3) also indicate that works should be carried out towards ensuring interoperability understood as stipulated in the act on the IT development of the bodies performing public tasks. In relation to the aforementioned facts the system should be maintained in an open manner, ensuring safety of the processed data, oriented for co-creation of the system by the authorities realizing the tasks stipulated in the act and on the exchange of information between the entities realizing public tasks stipulated in art. 2, section 1 of the ITact (art. 330, sections 4 and 5 of the Water Law).

Centralization of such institutions as the NWMA PW, creating one organization which took over the responsibilities previously scattered across various bodies, became a challenge in the field of integrating IT systems on all levels of operations: infrastructural, format-related and pertaining to the scope of the collected data, related to application of the system. The ISPC system implemented in the organization, of which the WMIS is an integral part, does not yet cover all the changes introduced by the Water Law act of 2017. The wide range of responsibilities resulting from legal provisions gives birth to new demands and needs in terms of functionality of the software, harmonizing and digitizing the data as well as integrating computer systems and reaching mutual compatibility. A need exists in regards to development of the WMIS concerning developing reference registries, expanding the system with further categories of data, digitization and migration of the data until now collected in the paper form, standardizing and replenishing structures with numerical data, securing the technical infrastructure through manufacturer's support, expanding the WMIS with the functionality enabling inputting and editing data, introduction of a platform supporting charging fees for water services, developing a solution supporting submitting reports to institutions of the EU and supporting issuing Water Law permits.

The scope of the data processed under the WMIS

As indicated by the wording of art. 330 of the Water Law: "1. the Water Management Information System for the area of the country which takes into consideration the division of the country into catchment basins and water regions is maintained by the Polish Waters". Therefore all the obligations related to collecting, processing and sharing information through the WMIS are borne by the NWMA PW.

Moving to the issue of the sources of the information collected in the WMIS we should indicate that collecting the information is a material and technical action. The scope of the data collected and shared in the WMIS is defined in art. 329, section 2 of the

Water Law. The catalogue of the information contained therein is open. The newly developed system which is to serve as a basic tool for water resources management shall be expanded with a number of data which until now were not collected by the units responsible for water economy. The provisions of the regulation specify in detail the scope of the information collected and stored in the WMIS as well as the organization, manner and technical standard for maintaining the system. The following types of data will be available in the WMIS: the data concerning the hydro-graphical network depicted on a Hydrographic Division Map in a 1:10000 scale, the location of borders and catchment areas, water units, protection zones for water intakes and protection zones for inland waters, land improvement hardware and improved lands, the plans for flood emergency management, the plans for counteracting results of drought, flood hazard maps, the data shall cover the spatial information database as well as the cartographic version, Water Law permits, Water Law assessments and integrated permits.

The analysis of the provisions of art. 331 of the Water Law enables us to assess that the sources of the data collected in the WMIS come from the following entities: a) administration bodies (including: the Minister for Water Economy, water administration bodies, the bodies of the Environmental Protection Inspectorate, the bodies of the Chief Sanitary Inspection, bodies issuing integrated permits (the Marshal, the regional environment protection director, the starost), voivodes, b) research institutions – the basic measurement and observation network, the state environment monitoring, the state hydro-geological service and the groundwater research and monitoring network, c) other public authorities – water companies and their unions, d) owners of water units. The scope of the entities providing the WMIS with information is expansive and diverse.

The scope of the provided information is determined by the statutory requirements defined in broad terms; the category of the data should be defined broadly, not the specificity of particular data. Only in reference to the data submitted by owners of water units the legislator decided to define the objective scope of this obligation; the data provided by owners of water units must cover: 1) name, location and address of the owner as well as description of the manner in which water is being utilized; 2) parameters of the water unit and its technical condition; 3) location of the water unit including name and number of the surveying district along with the number or numbers of the land lots as well as their coordinates; 4) the data regarding the Water Law act permit determining the conditions for utilizing waters (art. 331, section 4 of the Water Law) along with the obligation to update the data within 30 days from the changes occurring. Realization of this obligation is secured with a criminal-regulatory sanction indicated in art. 478, point 3 of the Water Law.

In analysis of the provisions of the ordinance regarding the Water Management Information System we may ascertain that the system is maintained in a manner which facilitates supporting water resources management and the manner which enables controlling access to the WMIS and authorizing WMIS users; developing, saving, updating, securing and maintaining data sets; controlling quality of data sets; controlling correctness of the topological relations between the spatial objects disclosed by the

WMIS; searching, viewing and in case of spatial data sets – visualizing map compositions of data sets; conducting spatial analyses; transforming and processing data sets; sharing data; generating reports and comparisons; feeding publication databases of the Hydroportal.

The aforementioned functionality and technical standards the WMIS meets were defined in §4 of the ordinance. The computerized IT system under which the WMIS is maintained assigns to the objects disclosed under the system a unique identifier but in the case of the objects (provided) by an administrative body stipulated in art. 9, section 1 of the act on the infrastructure of spatial information (hereinafter: INFSPact) such objects retain the unique identifier they already possess. In case of the spatial objects understood consistently with the art. 3 point 5 of the INFSPact the unique identifier consist of: a) a namespace, developed on the basis of the identifier of the spatial data set to which a given spatial object belongs according to the register and spatial data services provided under spatial information infrastructure, b) a local identifier explicitly differentiating a given object contained in the database from other objects contained therein. In case of the spacial objects other than the spatial objects understood consistently with art. 3, point 5 of the INFSPact the unique identifier consist of a local identifier stipulated in letter b. Furthermore, the unique identifier as understood by the discussed ordinance consist of the elements discussed in letters a and b which are unique and cannot be changed. Such solution remains consistent with §10 of the National Interoperability Framework ordinance according to which the following types of objects are distinguished in public registers: a natural person, an entity and a spatial object, to which a unique identifier is assigned within a given type of objects.

This provision defines the three main types of objects in reference to which all other data is collected. It is so because everything happens in a specific point in space which can be defined (thus a reference to an addressable spatial object exists), in relation to activity of a particular person (explicitly identifiable through PESEL number) or operations of a specific entity (explicitly identifiable through REGON number). Among the information which is to be gathered under the WMIS there are personal details, incl. names and surnames, addresses, contact details and phone numbers of natural persons. The scope of this data should be commensurate to the goal of data's processing and consistent with the specific provisions which order gathering such data.

The varied personal details may also end up as specific information in other groups of information indicated in the attachment to the designed ordinance, including ending in copies of documents (Water Law permits, Water Law assessments, Water Law reports and integrated permits). This information may include the information regarding entrepreneurs who are natural persons – in this case the basic data identifying the entrepreneurs is public. This information may also concern natural persons representing entrepreneurs. The information collected by the WMIS, defined in general terms in individual groups in the ordinance, also contains the information regarding persons who are a party to administrative decisions as well as persons who made the decisions or participated in the decision-making process as well as the information regarding natural persons. We must bear in mind the diverse character of the personal

data and that the specific provisions which may order disclosure of the specific data (e.g. the data of persons entitled to fish in a fishing district) are of decisive importance. Therefore it is necessary to analyze what personal details are collected in the WMIS and to what extent this data should be protected on the grounds of the binding legal provisions. In submitting personal details or copies of documents containing personal details in the WMIS an assessment must be carried out regarding acceptability of making this type of data available. In circumstances when personal details should not be commonly available and a document is subject to sharing the process of anonymization must be conducted in order to prevent ascertaining identity of a person to which the data pertains. The same rules for verifying the acceptability of sharing the data should also concern processing undisclosed information and the information which constitute statutory protected secrets.

The Hydroportal

Defining the role and place of the Hydroportal under the WMIS, or rather defining their relation in regards to processing data in the WMIS and the Hydroportal, is necessary. Consistently with art. 240, section 2, point 12 of the Water Law the National Water Economy Authority develops and maintains the Hydroportal as the central access point referred to in art. 332, section 3. In analysis of the provisions of art. 332, section 3 of the Water Law according to which Polish Waters maintain the Hydroportal as a node of the national spatial information infrastructure and the access point to the services discussed in art. 9 of the act of 4th March 2012 regarding spatial information infrastructure as well as other information pertaining to managing waters we must emphasize that a wide range of implementations of the indicated services was adopted. Currently the Hydroportal as a public service concerning broadly understood issue of water in the area of Poland enables its users to browse the data concerning flood risk, counteracting drought or presentation of water management plans.

Consistently with the premises of data integration the Hydroportal contains a range of data collected in one place. In its design the Hydroportal is to serve as a component of the WMIS utilized to search and browse the contained data. Currently it is only possible to print out a screenshot of the data. The WMIS feeds publication databases of the Hydroportal. In turn, in the context of developing and modifying the WMIS and in the context of open data, in regards to maintaining the Hydroportal it may be assumed that the portal is developing towards implementation of further services of copying, generating and downloading a part of or whole documents, i.e. all the services indicated in art. 9 of the INFSPact. It is a direction for development valid also from the perspective of utilizing the potential of the data contained in the WMIS in the context of digital transformation as discussed in the draft of the new Integrated State Informatization Programme of May 2019 which draws attention to the potential of the data in the process of digital transformation.

Regulations for operations of the Hydroportal were published (Regulamin korzystania z Hydroportalu). As stipulated by §2, section 1 of the regulations the data

presented in the Hydroportal is solely illustrative in character and cannot be treated as an official document under any circumstances. This data also cannot serve as a basis for any administrative or official actions or legal claims. Furthermore, §4, section 3 stipulates that the Administrator does not bear any responsibility for the damages caused due to improper use of the information posted in the Hydroportal. No responsibility can be claimed for lost profits. It is even more so surprising due to the fact that the Hydroportal is supposed to serve as a reflection of the data contained in the WMIS which is openly available. The regulations worded in this manner rise reservations concerning credibility of the data collected under the WMIS. The regulations for processing data under the Hydroportal should be defined in an act-rank document if it is a system maintained by an appropriate body and if the system reflects the data processed and available in the WMIS system. If the WMIS operating as a public register processes the information which form a foundation for the water economy and feeds the data to the Hydroportal with the goal of rendering the service of browsing the data the assumption that the data contained therein is incorrect is unacceptable.

The WMIS as a public register

The WMIS is also a public register. Consistently with art. 3, point 5 of the ITact a public register is understood as a register, a filing system, a list or any other form of registry which is used for realization of public tasks, is maintained by a public entity on the basis of separate statutory provisions. The WMIS is maintained by a public entity on the basis of separate statutory provisions and it contains information defined by legal provisions collected under an organized structure. A public entity maintaining a public register is obliged to: maintain said register in a manner ensuring meeting the minimal criteria for a computerized IT system if the said system operates on a basis of computerized IT systems; to maintain said register consistently with the minimal requirements for public registers and exchange of information in an electronic form; and to enable inputting information into this register and sharing information from this register through electronic means if said register operates through utilizing computerized IT systems.

The discussed minimum requirements are indicated in the National Interoperability Framework ordinance. Consistently with §11 of the National Interoperability Framework ordinance a public entity maintaining a public register sharing information contained in this register through exchange is obliged to ensure accountability of such operation. An appropriate level of accountability (ensured through analysis of actions of users and system objects, monitoring automatic system logs and discovering other irregularities) is a crucial element of supervising security and safety. The computerized IT systems utilized by the entities realizing public tasks must be obligatory furnished with the tools ensuring full accountability for actions of users or system objects within the range defined by the risk analysis. The idea is to maintain a reasonable balance between security of the system and possible dangers. It is known that the greatest threat to a computerized IT system and the data contained and processed therein is humans –

irrespective of them being an employee of the entity managing the system or an outside person. The motives behind actions of a person presenting a threat, whether such individual is aware of the effects of his actions or not, are irrelevant. Ongoing, periodic analysis of system logs (records contained in the logs) enables controlling and preventing the attempts at breaching integrity of the data, infecting the system, effecting actions beyond control of other users or carried out through non-authorized persons attempting to effect any actions within the system (Martysz et al., 2015).

The intentionality of collecting this or other data in a register is justified through the necessary functionality. This functionality boils down to e.g. enabling realization of public tasks by other public entities under the assumption of the possibility of utilizing a public register or through referencing the reference data directly (§13, section 2 of the National Interoperability Framework ordinance) or through exchange of the data under a different mode (§13, section 3 of the National Interoperability Framework ordinance). Public registers serve various purposes (Oleński, 2006, p. 539; Stawecki, 2005). One of the primary assumed functions of public registers is the cadastral function, at times referred to as the cadastral-registry function. We may indicate that its primary goal is to maintain a complete and perfectly ordered collection of information of a specific type. The goal of a body maintaining a register is collecting specific information and preserving it, primarily through making appropriate entries in registry books: files, databases etc. as well as storing documents. The cadastral function is frequently based on a register assigning identification numbers or symbols later utilized in other aspects and disciplines of life, including utilizing the assigned identifiers in other registers. Analyzing the provisions of art. 329, section 2, point 20 of the Water Law we discover that the Water Management Information System aggregates the information regarding water management, in particular the information concerning land improvement hardware and improved lands indicated in art. 196, section 1. Article 329, section 2 point 20 of the Water Law serves as a foundation for legislator's intention regarding integrating the water management data in a single information system. Integrating databases instead of developing separate computerized IT systems is recommended in order to service the assets from a single category. It is also consistent with the direction indicated in the draft of the new National Integrated Informatisation Programme – the development programme for the 2018–2022 period (May 2019) according to which the interoperability will enable efficient cooperation of institutions in the field of realizing complex administrative processes and will benefit information exchange. The National Integrated Informatisation Programme demonstrates the problems regarding multiplying data on the central, regional and local levels, lack of further use of the data to a satisfying degree resulting in increasing expenditures on collecting data and inconsistencies of information. Scattered and uncoordinated IT resources management results in significant costs related to developing and maintaining public systems and registers.

Ultimately the continuously updated databases, registers and repositories of data for the entirety of the public administration are to be established which will eliminate the need for constantly repeating a number of operations related to realization of daily

tasks. The data collected in the public systems and registers will enable methodical analysis of said data which will support implementation of public policies and the national decision making process. Implementation of the WMIS appears to meet these premises and facilitate the drive for nullifying the reported problems; furthermore, the WMIS presents an opportunity of avoiding or eliminating said problems altogether.

Conclusions

The Water Management Information System is supposed to provide processes in the field of: collecting data – consisting of inputting new data, frequently from varied sources, into the system; updating data – ensuring that the data contained in the WMIS remains topical and up-to-date in regards to the reference data. The reference data comprise the core of the database forming the WMIS in this meaning that the reference data serves as a departure point for numerous other data. Therefore the quality of reference data is a prerequisite for the quality of the entire system. Sharing the data is the last process – it is the most diverse and varied process during which various optional forms of the system operations emerge – an administrative decision (denying access), a material and technical action (making the information available, passing the application consistently with its properties), other acts or actions from the field of public administration operations (the information regarding due fee) etc.

Processing data in the field of water management is highly desirable and possible; however, it hinges on meeting the specified technical and technological conditions primarily regarding the data format, guaranteeing topicality and credibility of data and ensuring remote access to the data without the need for authentication as well as guaranteeing anonymization of the personal details and protecting the remaining statutory secrets. The WMIS is maintained under a computerized IT system and is to ensure the opportunity for searching for, browsing and visualizing map compositions for data sets as well as conducting spatial analyzes. The WMIS is to serve as a tool for controlling the water economy which on one hand is supposed to determine the range of competences of administrative bodies and on the other is supposed to indicate the need for taking into consideration and reconciling the interests of individual entities with the public interest. Establishing and developing the WMIS faces certain obstacles in the form of lack of cohesion between the databases which constitute a source of the data for the WMIS. Furthermore, the blurred responsibility of the entities for credibility and quality of the inputted data is also noticeable. The premises of operations of the WMIS should be assessed positively; however, it is necessary to ensure interoperability which will enable greater and broader access to the data contained in the WMIS and will result in the data being credible and capable of serving as a foundation for developing further information necessary in the decision-making process. Only meeting these requirements will result in increasing confidence of citizens in the digital services rendered by the public administration.

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