GEOMATICS AND ENVIRONMENTAL ENGINEERING • Volume 19 • Number 4 • 2025

https://doi.org/10.7494/geom.2025.19.4.99

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Methodology for Evaluating Applicability of Real Estate Information Systems

Abstract: This article proposes a methodology for evaluating the applicability of real estate information systems. Despite the fact that such systems have been created by different agencies and for different reasons, all of them should effectively deliver their designed functionalities. These functionalities are determined by the types of users. Real estate information systems have been developed on the assumption that they would be accessible to all citizens; therefore, the applicability of these systems should be examined. In this context, applicability is defined as the degree to which a product, system, or service enables users to achieve their goals in an efficient, effective, and satisfactory manner. A universal methodology for evaluating the applicability of a given system has been proposed and validated in this study. Certain limitations of real estate information systems that could affect their use in land administration procedures were also identified.

Keywords: real estate information systems, land administration, applicability, methodology

Received: March 5, 2025; accepted: June 17, 2025

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1. Introduction

Land administration can be defined as the process of determining, recording, and disseminating information about the ownership, value, and use of land and their related resources. These processes include the determination – or in some cases, adjudication – of land rights and other property attributes. They also involve the measurement and description of these rights. Additionally, detailed documentation must be developed. Finally, the relevant information is provided to support land markets [1]. The effectiveness of land administration can be improved by establishing a system that streamlines real estate management processes; in the literature, such systems are referred to as land administration systems (LASs). European countries have developed and operate their own LASs based on European Union (EU) regulations. Land administration systems have been extensively studied. The design concept and the process of creating and developing LASs have been discussed by the International Federation of Surveyors (FIG) [2, 3], Kaufmann and Steudler [4], the United Nations Economic Commission for Europe (UNECE) [5, 6], and Williamson [7]. The main goal of an LAS is to support the management of real estate [8] and facilitate land policy. An effectively designed and implemented LAS can contribute to the sustainable development of the real estate market [7, 9, 10]. This system plays an essential role for both administrative bodies and citizens [11].

The real estate data that is collected by such a system are used in four sectors:

1) Land Tenure – those processes and institutions that are responsible for creating access to land and for inventorying, allocating, registering, and protecting land resources. These processes include cadastral mapping and legal analyses, which are conducted to determine property boundaries, create new real estate, modify existing properties, and transfer the legal title to property ownership or use through sale, lease, or mortgage contracts. These processes also include real estate management and the settlements of disputes over property rights and boundaries.
2) Land Value – those processes and institutions that are responsible for land and real estate valuation, the calculation and collection of real estate taxes and lease fees, and the settlements of disputes over the valuation and taxation of real estate.
3) Land Use – those processes and institutions that regulate land use by developing and implementing planning policies and land-use regulations at the national, regional, and local levels. These include the enforcement of regulations and settlements of land-use conflicts.
4) Land Development – those processes and institutions that are responsible for the development of infrastructure and public utilities. These include land planning, land acquisition for public use, expropriation, changes in zoning regulations through the issue of construction permits, and the establishment of rules for splitting costs in public investments [7].

A land administration system is something that should be created in the most appropriate way for a country [12]. A system cannot be created just for the sake of being – it must be useful in the context of land management [8]. Technical information about properties (as well as legal information) must be taken into account for sustainable land management [13]. This study indicated that land administration systems need further standardization so that the information among them can flow better [14, 15]. It was also pointed out that, in order to have a functioning LAS, changes were needed; these included technical changes that would allow data from multiple systems to be combined in one place [16]. Setting up a land administration system is a process; it is necessary to constantly adapt it to a country's needs and technical possibilities [17, 18]. In order to achieve a properly functioning LAS, some authors have pointed out that it would be a good idea to combine LAS-related activities in one body [19, 20].

A milestone in the development of land information systems in Europe was the release of 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) [21]. The entry into force of this directive was to make it possible to combine spatial data from different sources and to use it together. The EU member states have started the process of implementing a real estate information system in these countries. It should be remembered that, in its annexes, the directive introduced the minimum scope of these systems; therefore, each of the systems that operate in the member states of the European Union must contain the information that is listed in the appendix to the Directive INSPIRE at a minimum.

Different countries have approached the creation of property information systems in different ways. To a certain extent, EU countries have been forced to disclose the minimum information that arose from the Inspire Directive in their systems. However, they were free to expand their systems in any way that they wished; of course, they were free to add additional information.

In Spain, the declaration in the cadastre is mandatory, and property buyers are required to report changes of ownership; however, registration in the country's land register is voluntary. This results in a lack of consistency, as different owners may be listed in the cadastre and in the land register. Cadastral maps constitute the official documentation of land registry units. Spain utilizes a tax-oriented cadastre model; this means that its primary function is to enable the collection of property taxes [22]. This is different in Poland: the notification of the purchase of real estate is reported by the notary both to the Land and Mortgage Register and to the authority that is responsible for keeping the Real Estate Cadaster. Therefore, both systems should have the same owner disclosed.

Lithuania's Land Information System (LIS) serves as a tool for aiding in solving problems that are related to land reform, spatial planning, agriculture, and rural development in countries with varying levels of development. Users of LIS in Lithuania have access to free, convenient, and easy-to-use electronic services; these can

be accessed through the LIS map browser. The data that is contained in LIS includes a cartographic base of land-related data sets, thematic land data sets, and a range of information that is relevant for cadastre, land registries, and real estate information systems. An analysis of the survey data indicated that LIS was not among the most popular systems – it ranked third, receiving 9.5% of the respondents' votes. The Lithuanian LIS is a well-developed and continually evolving area of information technology, offering significant potential for wider applications in Lithuania (both in the public and private sectors) as well as in other countries [23].

Poland's Integrated Real Estate Information System (IREIS) was created for a variety of reasons; one of these was to develop a land administration system that contained information about real estate. Reliable and up-to-date real estate data is essential for real estate management. Real estate management is a process that involves many actors (both private and public) as well as various types of real estate. The implementation of IREIS was a lengthy and costly process; therefore, the extent to which the information that is collected by IREIS is useful for various real estate management processes should be examined in order to assess the applicability of this system.

IREIS integrates the following real estate registers:

- Real Estate Cadaster (Cadaster);
- Land and Mortgage Register (EKW);
- register of taxpayers;
- National Register of Boundaries (PRG);
- National Official Register of Territorial Division of Country (TERYT);
- Geoportal;
- population register (PESEL);
- National Official Business Register (REGON);
- National Register of Agricultural Producers (KSEP);
- local zoning plans;
- notarial register;
- Central Register of Heritage Property (CBDoZ);
- Central Register of Nature Conservation Sites (CRFOP);
- Register of Localities, Streets, and Address Points (EMUiA);
- Register of Real Estate Prices (RCN).

Not all of the above registers and databases contain information about real estate. For example, the PESEL system contains population data. However, every Polish citizen receives a PESEL number, and this number can be used in other databases to identify the real estate that is owned by individuals. Therefore, information about the owners of private property can be acquired solely based on the owner's PESEL number. This number can be used by legal officers such as bailiffs to obtain information about a debtor's assets. Therefore, a platform that integrates systems that contain real estate data and personal data may have numerous practical applications.

The development of land administration promotes the establishment of various systems that facilitate land management. The creation of IREIS paved the way for the establishment of other systems that are not directly linked to IREIS but rely on IREIS data or are modeled on this system. These include the following:

- Forest Data Bank (FDB);
- Geoserwis – General Directorate for Environmental Protection (Geoserwis GDEP);
- Hydroportal.

These systems contain technical data that can be used by both public administration agencies and individuals; therefore, the extent to which these systems facilitate land administration procedures should be examined.

Real estate information systems are valuable tools that enable public administration agencies to effectively perform their tasks and responsibilities. However, these systems can also be used by individuals to manage private property. In addition, properly functioning systems that contain current or historical data provide valuable insights into the ways in which human activities influence the surrounding spaces. In addition to strictly technical data, some systems such as the Forest Data Bank also contain information that is useful for the general public (such as information about tourist facilities).

The aim of this study was to propose a method for analyzing the applicability of real estate information systems. Examining whether real estate information systems can be useful is important, as it allows us to determine whether and to what extent these systems should be further developed. It should also be remembered that any created systems should be useful for the end user; therefore, it is essential to identify the direction in which the development of these systems should proceed.

The research hypothesis states that the proposed methodology for analyzing the applicability of real estate information systems can be used to evaluate the utility of all systems in land administration proceedings.

In this context, applicability is defined as the degree to which a product, system, or service enables users to achieve their goals in an efficient, effective, and satisfactory manner. Therefore, the applicability of a real estate information system was examined by evaluating the extent to which these systems can be used to achieve a specific goal. The goals that were analyzed in this study were related to land administration. An effective system should enable specific users to achieve specific goals in an effective and satisfactory manner.

2. Materials and Methods

2.1. Methodology

The creation of the applicability of real estate information systems test method came about as a response to the increasing creation of such a system and its

increasing usage. The creation of property information systems based on legal presumptions is important; however, it is whether such systems are useful that determines their relevance. It is therefore necessary to examine whether and to what extent these systems are useful and whether there is a need for changes to make them more useful to the end user.

The development of the applicability of real estate information systems study assumed that the systems must allow recipients to obtain the necessary data to carry out real estate procedures. The main assumption was that a person using the system would obtain the necessary data and would not need to obtain it from other sources. The method was developed based on literature research and current legislation.

The study was divided into the following stages to achieve the research objective and validate the research hypothesis:

1. The types of real estate information systems that were implemented in Poland were identified.
2. The extent to which the identified systems could facilitate land administration processes was determined.
3. A methodology for analyzing the applicability of real estate management information systems was proposed.
4. The proposed methodology was tested in the context of selected land administration procedures.

The analysis was based on a review of the scientific literature and those legal regulations that were related to real estate information systems. The extent to which different types of data should be made available to system users in accordance with regulatory requirements was also determined in the study. The types of data to be included in a given system and the main purpose of a given system were set forth by the relevant laws. These factors were taken into consideration to determine whether the existing systems had been fully implemented.

This article shows how the developed method was applied and what the limitations were.

2.2. Real Estate Information Systems

The identified systems are listed and briefly described in Table 1. The list includes IREIS, which combines the identified systems. The option of viewing data from various systems on a single platform has led to the creation of a separate system. IREIS is not an open access system; however, it should be considered as the most comprehensive source of information about real estate and its owners and users in the analysis. Table 1 provides detailed information about each system, including the organization or entity responsible for its maintenance, the availability of open access to users, whether the system is accessible online, and the scope and type of data contained within each system. This comprehensive overview facilitates easy comparison of these systems in terms of their functionality and accessibility.

Table 1. Selected real estate information systems

System	Responsible entity	Open access	Online availability	Content of the system
Integrated Real Estate Information System (IREIS)	Head Office of Geodesy and Cartography	Available only to authorized users	Yes	System integrates data from Real Estate Cadaster, Register of Real Estate Prices (RCN), Land and Mortgage Register, PESEL, REGON, and other registers
Digital Land and Mortgage Register (EKW)	Ministry of Justice	Users must enter number under which property is listed in register	Yes	Register contains information about property owners, limited property rights, and mortgages
Real Estate Cadaster (Cadaster)	County councils	Users must demonstrate legal interest in property	No	Cadaster contains information about property boundaries, buildings, owners, and land-use types
National Register of Boundaries (PRG)	Head Office of Geodesy and Cartography	Yes	Yes	Register contains information about boundaries and areas of administrative units in three-tier territorial division of Poland (municipalities, counties, voivodeships), cadastral units, cadastral districts, special-purpose boundaries, and address points and their geographic locations
National Official Register of Territorial Division of Country (TERYT)	Statistics Poland	Yes	Yes	Register contains identifiers and names of administrative units (municipalities, counties, voivodeships) based on their hierarchy in three-tier territorial division of Poland
Local zoning plans	Municipalities	Yes	Yes /No	Local zoning plan describes permissible land-use types and types and sizes of buildings that can be erected in given zone
Central Register of Heritage Property (CBDoZ)	National Heritage Board of Poland	Yes	Yes	Register contains digital information about monuments of heritage and cultural properties in Poland

Table 1. cont.

System	Responsible entity	Open access	Online availability	Content of the system
Central Register of Nature Conservation Sites (CRFOP)	General Directorate for Environmental Protection	Yes	Yes	Register contains information about various categories of nature-conservation sites in Poland
Register of Localities, Streets, and Addresses (EMUiA)	Head Office of Geodesy and Cartography	No	Yes	Register contains information about localities, streets/squares, and address points
Register of Real Estate Prices (RCN)	County councils	No	No	The register contains information about real estate transactions
Geoportal	Head Office of Geodesy and Cartography	Yes	Yes	Geoportal provides access to spatial data, cadastral maps and other geographically referenced data
Forest Data Bank (FDB)	State Forests National Forest Holding	Yes	Yes	System contains and processes information about public and private forests in Poland
Geoserwis – General Directorate for Environmental Protection (Geoserwis GDEP)	General Directorate for Environmental Protection	Yes	Yes	Geoserwis contains spatial data, including information about various categories of nature-conservation sites in Poland
Hydroportal	National Water Management Authority	Yes	Yes	System contains information about management of national water resources

The information that was presented in Table 1 indicates that Poland has many real estate information systems that are kept by various authorities and differ in terms of open and online access. Systems that are intuitive and easy-to-navigate are most desirable from the users' point of view because they facilitate searches for required information. Systems that are complex and not intuitive may discourage users from searching for information. Not all registers are open access; in some systems, the users must demonstrate legal interest in a property or must enter the number of the property in the Land and Mortgage Register to access the required information. In a decision from January 28, 2025 (Ref. III OSK 6508/21), the Supreme Administrative Court ruled that an entry in the Land and Mortgage Register contains personal data that is legally protected and may not be disseminated. While protecting individuals and their rights to privacy, the above decision limits access to real estate information systems because a unique property registration number is required to use digital land records.

3. Results

3.1. Land Administration Systems

Systems that contain real estate information should be linked with formal procedures that justify the existence and usefulness of these databases. The development of systems that serve no apparent purposes is uneconomical and pointless; therefore, the situations and procedures in which these systems can be used should be identified. Obviously, the potential applications of each system are largely determined by the quantity and quality of the aggregated data as well as by specific user needs. It is up to users to decide which system contains information that best meets their needs.

The applicability of the examined real estate information systems can be determined by testing their usefulness in selected land administration procedures. Only those systems that contained real estate data were listed; any system that collected information about property owners and users was disregarded. Those systems that contained only general information about a property's location but not its specific attributes were also excluded from the analysis.

Table 2. Applicability of real estate information systems for land administration

Land administration component	Real estate information system										
	IREIS	EKW	Real Estate Cadaster	Real Estate Price Register	Geoportal	Local zoning plans	CBDoZ	CRFOP	FDB	Geoserwis	Hydroportal
Land Tenure (e.g., registration of land titles)	+	+	+	–	–	–	–	–	+/–	–	–
Land Value (e.g., property appraisal, taxation)	+	+	+	+	+	+	+	+	+/–	+/–	+/–
Land Use (e.g., land use planning)	+	–	–	–	+	+	+	+	+/–	+/–	+/–
Land Development (e.g., zoning changes)	+	+	+	–	+	+	–	+	+/–	+/–	+/–

IREIS – Integrated Real Estate Information System; EKW – Digital Land and Mortgage Register; CBDoZ – Central Register of Heritage Property; CRFOP – Central Register of Nature Conservation Sites; FDB – Forest Data Bank.
"+" symbol indicates that system contains the necessary information; "–" symbol indicates that system doesn't contain the necessary information; "+/–" symbol indicates that system might be applicable when specialized information is required.

As indicated in Table 2, the analyzed real estate information systems may be used in land administration. Those systems that contain technical data are particularly useful for managing properties that are located in forests or other nature-conservation sites; therefore, a system can be regarded as being useful if it can be applied for land administration purposes. However, the extent to which these systems facilitate specific land administration procedures should also be examined.

3.2. Applicability of Real Estate Information Systems

The applicability of real estate information systems should be determined by considering whether these systems contain sufficient data for conducting various land administration procedures. A goal has been effectively achieved if any measures that are undertaken by the user produce anticipated results. These measures are initiated to accomplish a given plan, the results are satisfactory if they are consistent with this plan, and the achieved goals provide benefits.

A goal is achieved effectively if the effort, time, and cost that are invested in the process can be minimized and whether time, energy, and resources were not wasted during the process. The achieved goal should also be consistent with expectations. Real estate information systems should enable users to achieve their specific goals. In an ideal scenario, the user should be able to reach their intended goal by relying solely on real estate information systems without the need for other data sources.

The applicability of real estate information systems should be determined by analyzing their suitability for selected land administration procedures. As previously indicated, numerous systems and databases aggregate various types of information (including real estate information). Land administration procedures also involve individuals, which is why only open-access systems where users do not have to present additional information or prove legal interest were selected for the next stage of the study; these were as follows:

- Geoportal;
- FDB;
- Geoserwis GDEP;
- Hydroportal.

Despite the fact that IREIS is not an open-access system, it was included in the study for comparison purposes because it was designed as a tool for finding information about real estate and property owners/users. The system was designed specifically for those public agencies that were responsible for land administration, which is why the functionalities that are offered by IREIS were considered in the presented analysis.

The applicability of the examined systems was determined by evaluating the extent to which they could be used in selected real estate management processes.

Therefore, one land administration procedure that represented each sector was selected for the needs of the study; also, the suitability of the analyzed systems for these procedures was assessed. The types of information that were required for each procedure were identified; those systems that contained the necessary information were marked with a "+" sign (1 point), whereas those that did not received a "–" sign (0 points). Those systems in which the required information was only partly available were marked with a "+/–" sign (0.5 points). The awarded points were summed up and converted to percentage points, and the tested systems' applicabilities for land administration procedures were evaluated on a four-point Likert scale with the following intervals: 0–25%; 26–50%; 51–75%; and 76–100%. On a ranking scale of 1 to 4 points, '1' denoted those systems with low applicabilities, and '4' points denoted those with high applicabilities. A four-point grading scale did not allow for a neutral option, and the applicability of each system needed to be assigned to a specific category.

The following land administration procedures were selected for the analysis:

- land tenure – data that was required for registering property in Land and Mortgage Register;
- land value – data that was required for property-appraisal report;
- land use – data that was required for developing local zoning plan;
- land development – data that was required in process of applying for construction permit.

Land Tenure

Land-tenure procedures include the registrations of property titles. Property registration is an important process because it provides information about individuals or entities who have legal rights to real estate. In addition to ownership rights, the register also contains information about encumbrances, liens, and liabilities (such as mortgages) that affect the use or ownership of property. Property registration not only protects owners but also third parties who have legal titles to properties.

The information that is required for registering property in the Land and Mortgage Register is indicated in Table 3, as are the systems that contain the necessary information.

A property-registration request should contain an applicant's personal data as well as information about the property to be registered into the Land and Mortgage Register. As indicated in Table 3, all of the information that is required to create a new entry in the Land and Mortgage Register is available in IREIS; therefore, this system is highly useful for administrative procedures that are related to land tenure. The analysis revealed that Geoportal is less useful despite the fact that this open-access platform is available online. The applicability of Geoportal was assessed as being satisfactory – mainly, because the system does not contain information on property titles; therefore, the types of real estate cannot be identified.

Table 3. Applicability of selected real estate information systems for registering property in Land and Mortgage Register

Information required for registering property in the Land and Mortgage Register	IREIS	Geoportal	FDB	Geoserwis GDEP	Hydroportal
Type of property	+	–	–	–	–
Location of property (voivodeship, county, municipality, town/city, district)	+	+	+	+	+/–
Address and area of cadastral plot (street, plot number, name and number of cadastral district area)	+	+	–	+	–
Address and area of building (street, building number, number of floors, usable floor area)	+	+	–	–	–
Address and area of apartment (street, building number, apartment number, floor, usable floor area, type and number of rooms, share of common area)	+	–	–	–	–
Sum	5	3	1	2	0.5
Applicability [%]	100	60	20	40	10

IREIS – Integrated Real Estate Information System; FDB – Forest Data Bank.
Key:

76–100%	high	26–50%	moderate
51–75%	satisfactory	0–25%	low

Land Value

The applicabilities of the examined systems for determining the values of property were determined in the next step of the analysis. Property appraisers require extensive data to assess the value of real estate; a reliable assessment is based not only on information about the property in question but also on information about similar types of real estate. Property-appraisal reports are required for public administration procedures as well as real estate transactions that are conducted by individuals. An appraisal provides an official value of a property that is used by lenders to approve a mortgage or by public authorities to calculate property taxes and other fees. Table 4 shows the extent to which real estate information systems can be used for property appraisals.

Table 4. Applicability of selected real estate information systems for property appraisals

Information required for property appraisals	IREIS	Geoportal	FDB	Geoserwis GDEP	Hydroportal
Number of properties in Land and Mortgage Register	+	–	–	–	–
Location of property (voivodeship, county, municipality, town/city, district)	+	+	+	+	+/–
Address and area of cadastral plot (street, plot number, name and number of cadastral district area)	+	+	–	+	–
Address and area of building (street, building number, number of floors, usable floor area)	+	+	–	–	–
Address and area of apartment (street, building number, apartment number, floor, usable floor area, type and number of rooms, share of common area)	+	+	–	–	–
Zoning designation	+	+	–	–	–
Other	+	+	+	+	+
Sum	7	6	2	3	1.5
Applicability [%]	100	85.7	28.6	42.9	21.4

IREIS – Integrated Real Estate Information System; FDB – Forest Data Bank.
Key:

76–100%	high	26–50%	moderate
51–75%	satisfactory	0–25%	low

IREIS and Geoportal are highly useful data sources for preparing property-appraisal reports; this is because both systems contain the cadastral data that is required during the valuation process. The necessary information is only partly available in the remaining systems. Property appraisers can use FDB and Geoserwis GDEP to determine whether an assessed property is situated in a forest or on a nature conservation site. Geoserwis GDP contains some cadastral data, and it can be used to obtain information on cadastral plots.

Land Use

Land-use planning is a particularly important consideration in land administration, as it promotes the sustainable and harmonious development of urban areas. Land-use planning constitutes the responsibility of local governments, which initiate zoning procedures and develop local zoning plans. Private property owners can participate in this process by applying for the adoption of a new zoning plan that covers their property or the modification of an existing zoning plan. The types of information that should be included in an official request for a zoning change or review are presented in Table 5.

Table 5. Applicability of selected real estate information systems for requesting changes in local zoning plans

Information required for requesting changes in local zoning plans.	IREIS	Geoportal	FDB	Geoserwis GDEP	Hydroportal
Identifier of cadastral plot	+	+	–	–	–
Zoning designation	+	+	–	–	–
Sum	2	2	0	0	0
Applicability [%]	100	100	0	0	0

IREIS – Integrated Real Estate Information System; FDB – Forest Data Bank.
Key:

76–100%	high	26–50%	moderate
51–75%	satisfactory	0–25%	low

Only limited information is needed to submit a zoning-change request. The applicant must specify the identifier of a cadastral plot and the designation of the property in the local zoning plan; this data is available in both IREIS and Geoportal. The remaining systems do not contain the required information. Geoserwis GDEP contains the number that is assigned to a land plot in the Land and Building Register but not the identification number of a cadastral plot.

Land Development

Land-development procedures are initiated for a variety of purposes, including the issuances of construction permits. A building permit must be obtained before any construction work can begin; this permit contains information about the building that is being constructed as well as the zoning requirements that apply to the developed site. Table 6 shows the extent to which real estate information systems can be used in the issuance of construction permits.

Table 6. Applicability of selected real estate information systems in process of applying for construction permit

Information required when applying for construction permit	IREIS	Geoportal	FDB	Geoserwis GDEP	Hydroportal
Information about property (voivodeship, county, municipality, street, building number, town/city, identifier of cadastral plot)	+	+	+/–	+/–	+/–
Site layout plan, contour map, existing and planned buildings/structures (including utility networks and structures that are situated outside developed property)	+	+	–	–	–
Sum	1	1	0.5	0.5	0.5
Applicability [%]	100	100	25	25	25

IREIS – Integrated Real Estate Information System; FDB – Forest Data Bank.
Key:

76–100%	high	26–50%	moderate
51–75%	satisfactory	0–25%	low

Investors who apply for a construction permit do not have to acquire large amounts of information about a property; the relevant data can be obtained from both IREIS and Geoportal. A building plan and site-layout plan must be attached to the application. Layout plans are developed by surveyors; they are not available online.

4. Discussion

This study demonstrated that information about real estate is aggregated by numerous systems and databases. Despite the fact that not all systems are linked with IREIS, they contain technical data that can be used in various land administration procedures to obtain detailed information about properties and their surrounding spaces. Real estate information systems are valuable sources of data in administrative procedures that are initiated by individuals, businesses, and public agencies. The Polish Land Administration System was designed specifically for public administration agencies that are responsible for keeping and updating the Real Estate Cadaster, individuals and entities who require access to real estate data (including

citizens, businesses, public administration units, institutions of the national justice system), and other e-service users (such as notaries public and bailiffs). The literature also contains studies that show that valuers would also benefit from access to the system [24]. All of the entities and agencies should have access to real estate information systems in order to effectively perform their tasks and responsibilities.

Table 7. Applicability of selected real estate information systems in various land administration procedures [%]

Land administration procedure	IREIS	Geoportal	FDB	Geoserwis GDEP	Hydroportal
Land Tenure	100	60	20	40	10
Land Value	100	85.7	28.6	42.9	21.4
Land Use	100	100	0	0	0
Land Development	100	100	25	25	25
Applicability	100	86	18	27	14

IREIS – Integrated Real Estate Information System; FDB – Forest Data Bank.

The overall applicability of the examined real estate information systems in land administration procedures is presented in Table 7. The results indicated that IREIS and Geoportal were highly useful tools, whereas the remaining systems were less applicable. As shown by this study and previous research, the utility of the evaluated systems depends on the procedure for which they are used. IREIS is characterized by the highest applicability, as it contains a wide range of data that can be used in numerous processes and scenarios. Geoportal is also a highly useful tool that visualizes various types of data on maps; its main weakness is its lack of legal information (i.e., the number under which a property is listed in the Land and Mortgage Register). Sector-specific systems are developed by teams of experts to collect specialized and technical data; this category includes FDB and Hydroportal, which are highly useful for obtaining information that is tailored to the specific needs of development projects. These observations corroborate previous research findings. Previous research showed that FDB is a useful tool for managing forest resources [25]. She also found that Hydroportal is a valuable source of information for managing groundwater resources [26]. Therefore, those systems whose applicabilities for land administration were assessed as being moderate or low could be highly useful in the procedures for which they were designed.

The results of this study indicated that the proposed method could be used to assess the applicabilities of various real estate information systems – both those that

contain general information as well as specialized data. The described method can also be applied to evaluate the usefulness of the systems in other countries.

The obtained results confirmed the research hypothesis; the proposed method for assessing the utility of real estate information systems has many practical applications. The utility of systems can be validated by examining whether a given system contains sufficient data for conducting specific procedures. In addition, the proposed method is universal and can be used to test the applicabilities of various types of systems.

5. Limitations

The main limitation of the present study was that the validity of the information that was provided by the analyzed systems could not be reliably ascertained by data users. In many administrative proceedings, the applicants are additionally required to submit documents that have been issued, signed, and stamped by the appropriate authorities. Therefore, any technical data that has been obtained from the Geoportal website may not be submitted in lieu of an extract from the Real Estate Cadaster. Both sources contain identical data, but property owners must obtain official documents from the appropriate authority in order to initiate administrative procedures such as land divisions or property sales. This is a significant disadvantage, as such open-access systems can often only serve as sources of information that need to be validated by the relevant authority before it can be used in administrative proceedings.

6. Conclusion

The results of this study confirmed the research hypothesis and indicated that the proposed method for evaluating the applicability of real estate information systems could be used to assess all of the systems that contained the necessary information for property management. The study revealed that the applicability of the analyzed systems could be considered to be equivalent to the possibility of obtaining the required information for land administration procedures. The proposed method can be used to test systems that contain both general information and specialized technical data.

It should be noted that IREIS is still in its development phase, and not all of the designed functionalities have been implemented. After the system has been fully implemented, however, IREIS should be a comprehensive source of real estate information; it will considerably facilitate and speed up land administration proceedings. Nevertheless, it should be noted that some of the information that is provided by the system must be confirmed by the relevant authorities before it can be used for real estate management or property-development purposes.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interests

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work that was reported in this paper.

Data Availability

No Data.

Use of Generative AI and AI-Assisted Technologies

No generative AI or AI-assisted technologies were used in the process of writing the manuscript.

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