
INFORMATION AND COMMUNICATION SYSTEMS USED FOR KEEPING THE REGISTER OF REAL ESTATE PRICES AND VALUES (RREPV) IN POLAND

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Abstract

The Register of Real Estate Prices and Values (RREPV) is among the sources of information used in the process of real estate value estimation. Pursuant to § 74 of the Regulation on the Land and Property Register, the register is kept by the head of the county. Currently there are 380 counties in Poland, including 66 city counties. Such a big number of administrative units within the country, combined with different information and communication system providers, results in a great diversity of software used for keeping RREPV nationwide. The purpose of the article is to present the spatial distribution of information and communication systems in which RREPV is kept. The article describes parameters that characterize the market share of specific programs existing on the market with regard to the number of implementations, estimated number of transactions entered in the system, the coverage area of the specific system and the population handled by the specific system.

Key words: *register of real estates prices and values, RREPV, geomatics, information and communication system.*

JEL Classification: *D40, D89, R50.*

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1. Introduction

Under Section 4 Point 1a of The Polish Land Survey and Cartography Act (ACT of 17 May 1989), nationwide databases are established and kept in the information and communication system, including spatial databases of spatial information infrastructure concerning (...) 7) the register of real estate prices and values. In § 74 of the Regulation on the Land and Property Register (REGULATION of 29 March 2001) the legislator specifies that the head of the county should keep the register of real property prices, indicated in notarial deeds, and real property values, determined by real estate appraisers in the real estate appraisal survey (however, under the latest amendment of the Real Estate Management Act, since September 1st 2017, real estate appraisers do not have a duty to transfer records of real estate appraisal surveys to authorities that keep the cadastre, which in practice means that RREPV will not include values of the real estate specified in real estate appraisal surveys made since the above-mentioned date). According to the legislator, the Register of Real Estate Prices and Values (RREPV) is supposed to be a spatial database, unified nationwide, in which the information is collected for the purposes of public statistics and real estate management, including value estimation.

The Central Statistical Office (GUS) is the institution that stores and processes data from the register for statistical purposes. The data stored in RREPV are also used by the Central Statistical Office for determining basic characteristics of various real estate types, such as: apartments, buildings, and land. Among the main specified parameters are: the number, the value and area of the sold real estate and the median price divided based on the country, provinces (województwa) and counties (powiaty). RREPV data are also used by real estate appraisers in the process of real estate value estimation. Bearing that in mind, the question arises of whether the Central Statistical Office and real estate appraisers, with the access to the legally unified register, may encounter problems while processing data from RREPV.

The legislator assigned heads of counties the duty to establish and keep the register mentioned above without imposing any specific information and communication system for storing data, providing only, pursuant to Appendix 7 Regulation of 29 March 2001, the range of objects and their attributes that should be entered in the register. Heads of counties had to select the information and communication system on their own, which resulted in the fact that, currently (January 2018), RREPV in Poland is kept in 12 different information and communication systems. Such a diversity of systems leads to frequent problems with processing data into a single unified form. This results from the use of different ways of presentation (table, text, etc.) or a different layout of the same data in reports based on RREPV, which, in consequence, extends the time of conducting the analysis. The objective of this article is to analyze the spatial distribution of information and communication systems in which RREPV data are collected and stored. The article describes parameters that characterize the market share of specific programs with regard to the number of implementations, estimated number of transactions entered in the system in 2017, the coverage area of the specific system and the population handled by it.

2. Literature review

An analysis of scientific literature leads to the conclusion that the article by KŁOCEK, KOWALSKA (2001), describing the experience connected with the concept and implementation of RREPV use in Olsztyn County, was one of the earliest articles devoted to RREPV. KURYJ, ŻRÓBEK (2005) conducted an analysis of RREPV as an integral part of the spatial information system used for monitoring the landed estate and real estate market. BYDŁOSZ, PARZYCH (2007) assessed the opportunities to use the register's data, real estate prices and values in the context of real estate value estimation, whereas legal aspects of using RREPV were touched on by SIEWICZ (2012). HOPFER et al. (2012) assessed RREPV with regard to the draft of the Regulation on the Integrated Real Estate Information System. One of the first studies of information and communication systems in which RREPV is kept was conducted by (BUDZYŃSKI 2012a), who analyzed counties and city counties of Mazovia Province. RREPV as a source of information on real estate was also analyzed in scientific literature in terms of its usefulness for creating cartographic presentations in the form of maps of average land transaction prices (BYDŁOSZ et al. 2010; BUDZYŃSKI 2012b). In his research, KONOWALCZUK (2014) presents theoretical considerations regarding the needs and criteria of creating ownership divisions of real estate markets for the purpose of public surveys and research using RREPV from Silesia Province. The problem of quality of data concerning transaction prices on the real estate market in the aspect of RREPV, along with postulates of suggested legal and organisational changes, was presented by KOKOT (2015). The usefulness of RREPV in appraisal by comparative methods, on the basis of Lublin Province registers, was also researched (ZYGA 2016). In his most recent study, ZYGA (2017) demonstrated the usefulness of RREPV data in real estate value estimation, touching upon issues connected with information and communication systems used for keeping the register in Lublin Province. The work by DAWIDOWICZ, ŻRÓBEK (2017) is one of the most recent publications that discusses the issue of real estate price and value registration in the context of the Integrated Real Estate Information System that is currently being conceived in Poland. Given the scientific publications mentioned above, which touch upon a wide range of issues concerning RREPV, it needs to be highlighted that no attempt to carry out a holistic analysis of information and communication systems used for RREPV nationwide has been made so far. This article aims to fill this observed research gap.

3. The area of research

This research constitutes an attempt to analyze the information and communication systems used for RREPV nationwide. Hence, 380 counties, including 66 city counties (Fig. 1) are the research area

(ANNOUNCEMENT of 23 August 2017).

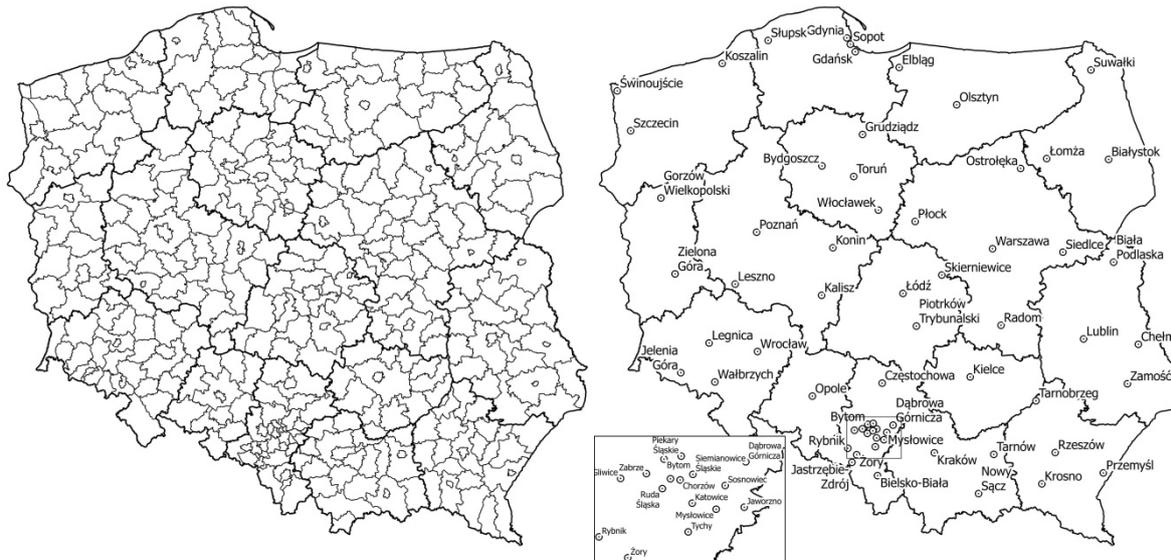


Fig. 1. Maps depicting the 380 counties and localization of 66 city counties. Source: PRG, GUS.

4. Data and Methods

The research was conducted at the turn of December 2017 and January 2018. The author conceived a research questionnaire that was sent online to all counties in Poland. It consisted of 24 questions about the way of keeping and presenting county spatial databases: the register of real estate prices and values, the land and building register and the geodetic register of the infrastructural network, all three being a part of the National Geodetic and Cartographic Resource.

The main focus was on obtaining information from heads of counties/city mayors on information and communication systems used for the spatial databases mentioned above, the number of transactions introduced to RREPV from January 1st 2017 to the questionnaire answer date, the opportunity to buy RREPV data online, additional attributes stored in RREPV besides those described in section 74 of the Regulation on the Land and Property Register (REGULATION of 29 March 2001) and the ways and range of presenting those databases on county geoportals.

Apart from the data obtained by the author from counties, the spatial database of the National Register of Boundaries (PRG) stored in the Head Office of Geodesy and Cartography (GUGiK) was also used as a cartographic base. The data stored in statistical tables of the Central Statistical Office (GUS), representing the area and population in a territorial division in 2016, as of December 31st 2017, were used for population analyses.

Analyses and cartographic visualizations were made in free software - QGIS. QGIS is geomatic software used for spatial data management, spatial analyses, creating cartographic 2D and 3D visualizations, and, as it operates in the SQL language, also allowing one to query databases very effectively (HALIK 2016).

5. Empirical results

Figure 2 presents the spatial distribution of 12 information and communication systems in which RREPV is kept in Polish counties nationwide. The green color was used to mark the most popular system, i.e. *REJECEN*, which dominates in central and eastern Poland (provinces: Warmia Masuria, Podlasie, Masovia, Łódź, Lublin, Świętokrzyskie and Podkarpacie), and has the largest number of implementations (155). Violet was used to mark implementations of the *TURBOEWID* program, the most popular one in north-western and southern Poland (provinces: West Pomerania, Pomerania, Kujawy-Pomerania, Lower Silesia and Lesser Poland), implemented in 102 counties. *GEO-INFO*, implemented in 74 counties, mostly in Greater Poland and Opole Province, is the third most popular system. In total, nationwide, all three systems: constitute 87.1% of all implementations, include 77.9% of all transactions entered in the RREPV in 2017, cover 87.9% of the area of Poland and cover 78.1% of the Polish population. As far as city counties are concerned, the three systems mentioned above:

constitute 74.3% of all implementations, include 55.6% transactions entered in the RREPV in 2017, cover 65.9% of the city county area and cover 59.2% of the city county population.

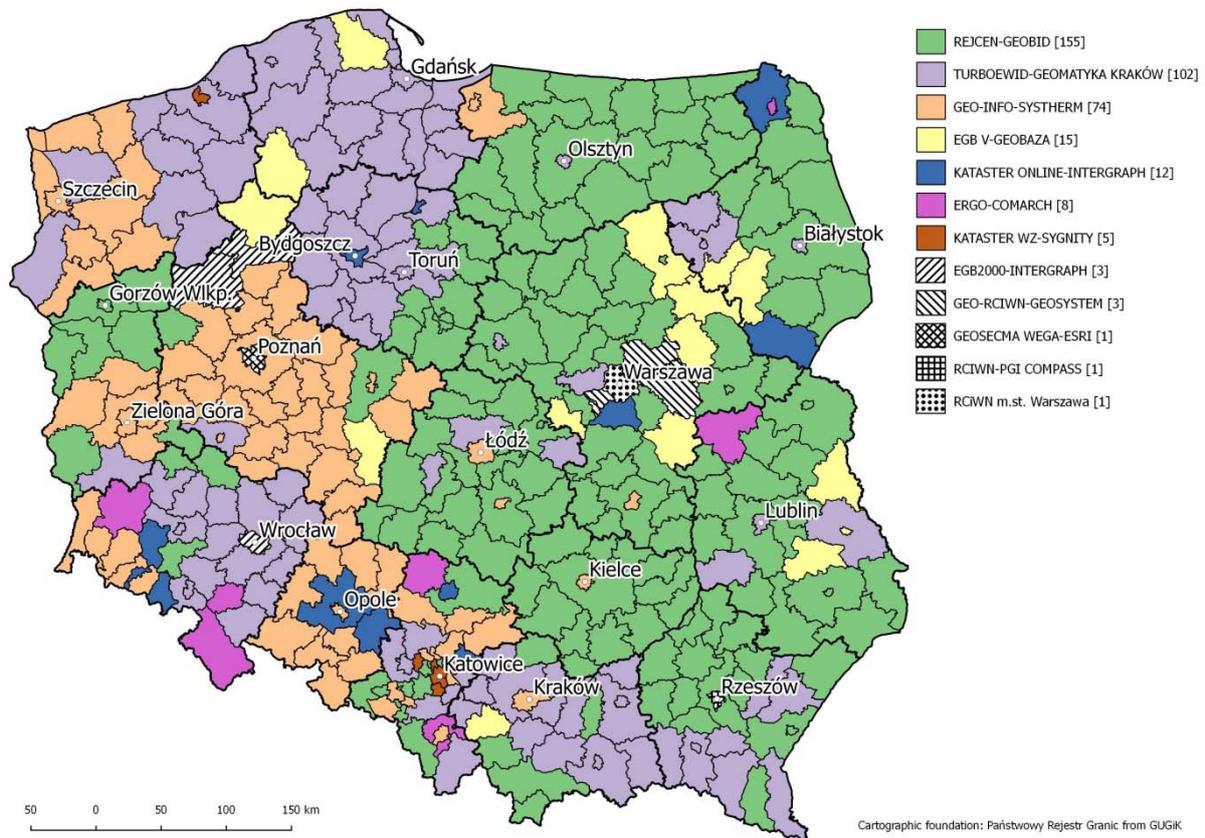


Fig. 2. Map depicting spatial distribution of RREPV information and communication systems (January 2018). Source: own study.

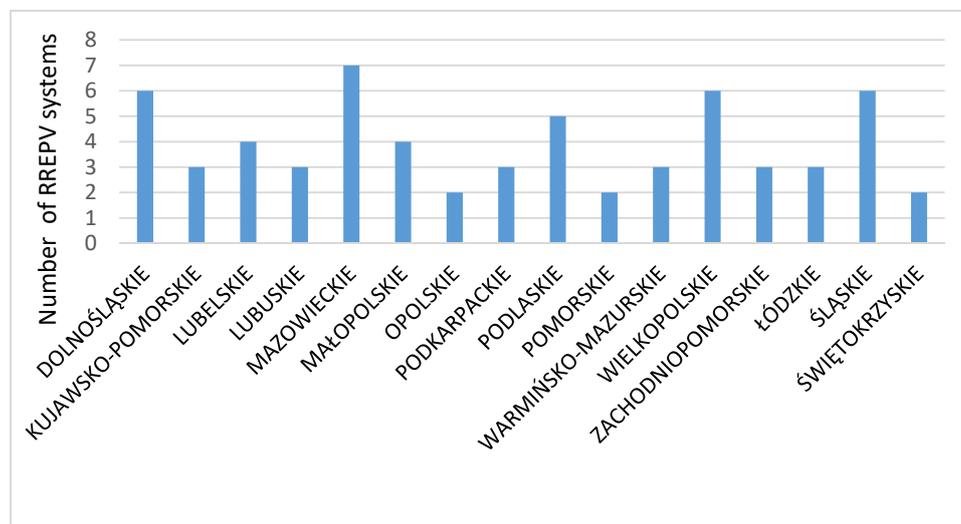


Fig. 3. Number of different RREPV information and communication systems by province (January 2018). Source: own study.

The analysis of the spatial distribution of systems for RREPV in terms of provinces (Fig. 3) leads to the conclusion that Mazovia Province is the most diverse in this respect (7 different systems); Lower Silesia, Greater Poland and Silesia Province ranked second (6 different systems). Opole, Pomerania and Świętokrzyskie Province are the least diverse in terms of the number of systems (2 different systems).

Table 1 contains the number of RREPV implementations by software. *REJCEN* has the most implementations (155, market share of 40.8%), *TURBOEWID* ranked second (102 implementations, market share of 26.8%), while *GEO-INFO* took third (74 implementations, market share of 19.5%). The other 9 systems constitute 49 implementations in total, with a market share of 12.9%. The number of implementations is different for city counties, with *GEO-INFO* being the most popular system (19 implementations, market share of 28.8%), *TURBOEWID* ranking second (17 implementations, market share of 25.8%) and *REJCEN* - third (13 implementations, market share of 19.7%). The other 9 systems have 17 implementations in total, which gives a market share of 25.7%.

Table 1

Number of implementations of RREPV by information and communication system

	Software	Producer	Total number of implementations	Percentage share in the total number of implementations	Number of implementations in the city counties	Percentage share in the number of implementations in the city counties
1	REJCEN	GEOBID	155	40.8	13	19.7
2	TURBOEWID	GEOMATYKA-KRAKÓW	102	26.8	17	25.8
3	GEO-INFO	SYSTHERM INFO	74	19.5	19	28.8
4	EGB V	GEOBAZA	15	3.9	1	1.5
5	KATASTER ONLINE	INTERGRAPH	12	3.2	5	7.6
6	ERGO	COMARCH	8	2.1	2	3.0
7	KATASTER WZ	SYGNITY	5	1.3	5	7.6
8	EGB 2000	INTERGRAPH	3	0.8	1	1.5
9	GEO-RCIWN	GEOSYSTEM	3	0.8	0	0.0
10	GEOSECMA WEGA	ESRI	1	0.3	1	1.5
11	RCIWN-PGI	COMPASS	1	0.3	1	1.5
12	RCIWN	m.st. WARSZAWA	1	0.3	1	1.5
			Σ 380	100	66	100

Source: own study.

Table 2 presents the estimated number of transactions entered in the RREPV from January 1st to December 31st 2017. This is an estimated value for a few reasons: 1) in the research, nearly 15% of counties declared delays longer than statutory 30 days in entering data on RREPV 2) there were some answers in which the number of transactions was settled according to the date of the questionnaire. The received answers were adjusted by the author to refer to December 31st 2017. In 2017, nationwide, the most transactions were entered in: *REJCEN* (~158,300 transactions, market share of 30.7%), *TURBOEWID* (~140,900 transactions, market share of 27.3%) and *GEO-INFO* (~102,600 transactions, market share of 19.9%). In the remaining 9 systems, 114,600 transactions were entered, which gives a market share of 22.1%. When it comes to city counties, the most data were entered in *GEO-INFO* (~53,000 transactions, market share of 28.8%), *TURBOEWID* (~40,800 transactions, market share of 22.2%) and the RREPV *M.ST. WARSZAWA* (~29,300 transactions, market share of 15.9%). The other 9 systems had 60,850 transactions and a market share of 33.1% in total.

Table 2

Estimated number of transactions entered in the RREPV in 2017 by information and communication system

Software	Producer	Total number of transactions	Percentage share in the total number of transactions	Number of transactions in city counties	Percentage share in the number of transactions in city counties
1 REJCEN	GEOBID	158 300	30.7	8 400	4.6
2 TURBOEWID	GEOMATYKA-KRAKÓW	140 900	27.3	40 800	22.2
3 GEO-INFO	SYSTHERM INFO	102 600	19.9	53 000	28.8
4 EGB V	GEOBAZA	10 300	2.0	450	0.2
5 KATASTER ONLINE	INTERGRAPH	14 900	2.9	9 100	5.0
6 ERGO	COMARCH	8 000	1.5	700	0.4
7 KATASTER WZ	SYGNITY	11 000	2.1	11 000	6.0
8 EGB 2000	INTERGRAPH	23 700	4.6	21 500	11.7
9 GEO-RCIWN	GEOSYSTEM	7 700	1.5	0	0
10 GEOSECMA WEGA	ESRI	8 000	1.6	8 000	4.4
11 RCIWN-PGI	COMPASS	1 700	0.3	1 700	0.9
12 RCIWN	m.st. WARSZAWA	29 300	5.7	29 300	15.9
		Σ 516 400	100	183 950	100

Source: own study.

Table 3

Coverage area of RREPV by information and communication system

Software	Producer	Coverage area [km ²]	Percentage of the coverage area	Coverage area of the city counties [km ²]	Percentage of the coverage area of the city counties
1 REJCEN	GEOBID	143 059	45.8	677	9.2
2 TURBOEWID	GEOMATYKA-KRAKÓW	81 969	26.2	1 633	22.1
3 GEO-INFO	SYSTHERM INFO	49 839	15.9	2 557	34.6
4 EGB V	GEOBAZA	17 022	5.4	35	0.5
5 KATASTER ONLINE	INTERGRAPH	7 381	2.4	692	9.4
6 ERGO	COMARCH	6 324	2.0	157	2.1
7 KATASTER WZ	SYGNITY	458	0.1	458	6.2
8 EGB 2000	INTERGRAPH	3 367	1.1	293	4.0
9 GEO-RCIWN	GEOSYSTEM	2 364	0.8	0	0
10 GEOSECMA WEGA	ESRI	262	0.1	262	3.5
11 RCIWN-PGI	COMPASS	117	less than 0.1	117	1.6
12 RCIWN	m.st. WARSZAWA	517	0.2	517	7.0
		Σ 312 679	100	7 398	100

Source: own study.

Table 3 contains the coverage area of RREPV by software. The largest area of the country is covered by *REJCEN* (143,059 km², market share of 45.8%), *TURBOEWID* (81,969 km², market share of 26.2%) and *GEO-INFO* (49,839 km², market share of 15.9%). The remaining 9 systems cover an area of 37,812 km² with a market share of 12.3%. As far as city counties are concerned, the largest area is covered by *GEO-INFO* (2,557 km², market share of 34.6%), *TURBOEWID* (1 633 km², market share of 22.1%) and *KATASTER ON-LINE* (692 km², market share of 9.4%). The other 9 systems cover the city county area of 2,531 km² in total, which makes for a market share of 34.1%.

Table 4 contains the population of RREPV by software. *REJCEN* is the system that handles the biggest population (~11.5 million people, market share of 30.0%), *TURBOEWID* ranked second (~10.4 million people, market share of 27.0%) and *GEO-INFO* - third (~8.1 million people, market share of 21.1%). The other 9 systems handle ~8.4 million people a market share of 21.9%. As far as city counties are concerned, the biggest population is handled by *GEO-INFO* (~3.7 million people, market share of 29.3%), *TURBOEWID* (~2.8 million people, market share of 22.0%) and the *RREPV M.ST. WARSZAWA* (~1.7 million people, market share of 13.8%). The remaining 9 systems handle ~4.4 million people in total, which constitutes a market share of 34.9%.

Table 4

Population of RREPV by information and communication system

Software	Producer	Population	Percentage of the population	Population of the city counties	Percentage of the population of the city counties
1 REJCEN	GEOBID	11 529 986	30.0	996 770	7.9
2 TURBOEWID	GEOMATYKA-KRAKÓW	10 385 875	27.0	2 770 663	22.0
3 GEO-INFO	SYSTHERM INFO	8 124 637	21.1	3 696 891	29.3
4 EGB V	GEOBAZA	1 264 071	3.3	64 270	0.5
5 KATASTER ONLINE	INTERGRAPH	1 440 364	3.7	883 865	7.0
6 ERGO	COMARCH	988 745	2.6	276 751	2.2
7 KATASTER WZ	SYGNITY	822 408	2.1	822 408	6.5
8 EGB 2000	INTERGRAPH	861 219	2.2	635 759	5.0
9 GEO-RCIWN	GEOSYSTEM	547 339	1.4	0	0
10 GEOSECMA WEGA	ESRI	542 348	1.4	542 348	4.3
11 RCIWN-PGI	COMPASS	185 896	0.5	185 896	1.5
12 RCIWN	m.st. WARSZAWA	1 744 351	4.5	1 744 351	13.8
		Σ 38 437 239	100	12 619 972	100

Source: own study.

6. Discussion and conclusions

Analyzing the results of the conducted research, one can conclude that, despite the access to the legally unified register, both organizations dealing with public statistics and real estate appraisers may encounter problems when processing RREPV data obtained from different counties in the country. This results from the lack of uniformity of information and communication systems used for keeping RREPV in Poland. In this case, Poland differs from Germany or France, in which cadastral data exchange standards were introduced a long time ago, unifying the way data is collected in information and communication systems (KARABIN 2002, KARABIN 2003).

The use of a uniform GML format (§ 74 2b. of the Regulation on the Land and Property Register) for data exchange is supposed to be the solution to this problem. However, one should note that not all counties have the most recent version of the software that produces data in the format mentioned

above. It needs to be highlighted that GEOBID (REJCEN), GEOMATYKA KRAKÓW (TURBOEWID) and SYSTHERM INFO (GEO-INFO) are the three biggest software providers. In all likelihood, with the passing of time there will be a migration from the more niche systems to the three companies mentioned above. In the context of upcoming new technologies of spatial data visualizations, such as augmented reality (HALIK, MEDYŃSKA-GULIJ 2017), it is necessary to take up discussion about the opportunities to unify the ways of keeping the RREPV.

The results of the research can be seen in the online map application created by the author of this paper that can be accessed at: <https://maparciwn.pl> (Fig. 4). The application works in field, on both desktop computers and smartphones (Chrome Mobile is the recommended search engine). The author intended for the website to be a possible support tool for people dealing with the real property market. The website may provide information about: the type of the information and communication system used in a specific county, formats of the data which makes it possible to export them from the RREP and additional attributes included in the RREPV but not mentioned in § 74 of the Regulation on the Land and Property Register.



Fig. 4. View of the <https://maparciwn.pl> on a desktop and smartphone devices. *Source:* own study.

The author realizes that this article does not exhaust the topic but hopes that it will initiate further debate about how to facilitate the process of obtaining data for value estimation in terms of information and communication tools applied in public administration.

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