

The use of geoinformation in rural and urban-rural gminas of Zgierz powiat – a pilot survey

Marcin Feltynowski^{CDFMR}

University of Łódź, Faculty of Economics and Sociology, Institute of Spatial Economy, Department of Regional Economics and Environment, Rewolucji 1905r. Street No. 39, 90-214 Łódź, Poland; phone: +48 426 355 351; fax: +48 426 655 750, email: marcinf@uni.lodz.pl

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Abstract. The use of geoinformation becomes more and more common due to the implementation of EU law to the regulations of individual member states. The opportunity of faster implementation of spatial information systems and geoinformation is possible thanks to the popularisation of knowledge concerning the ways of using spatial information. The pilot survey was conducted in rural and urban-rural gminas of Zgierz powiat (administrative unit of the 2nd order). The aim of the survey was to check if the officials in small gminas have knowledge and access to geoinformation. A part of the research was the identification of the sources of obtaining knowledge and sources of obtaining spatial data. The consequence of such an attitude was, as well, to prove in which areas of territorial unit activity geoinformation is used. An important element of the study was self-assessment of the knowledge level of the officials about geoinformation and spatial information systems. The study helped to determine if there is a knowledge gap in Polish gminas. The analyses allow for indicating the level and areas of geoinformation usage by the local authorities.

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Contents

1. Introduction	48
2. Research area and research methods	49
3. Research outcomes	50
4. Conclusion	53
References	53

1. Introduction

The field of geoinformation has been developing since the 1960s, however, its most dynamic development has been observed from the 1990s. The wide scope of application of spatial information is reflected in public administration activity. It is highlighted by the ‘father’ of spatial information systems R. Tomlinson who indicates the knowledge gap, which has been increasing since the beginning of the 1990s. This results from the fact that the development of the spatial information systems using geoinformation has been much faster than institutional development, especially in the field of public administration (Tomlinson, 2007). It has to be acknowledged that the system transformation, which took place in Poland after 1990, imposed changes on the management systems of gminas. It did not allow, however, for a change of the level of spatial information system use. Only entering the European Union structures became a stimulus for further changes in public administration. Thanks to the spatial information infrastructures created recently on the national level of the member states, there should be easier access to spatial data. Accessibility of databases via Internet will enable to connect information from the sources of many institutions regardless of the level of management and the field from which the spatial data come. All these operations are possible due to the implementation of Directive 2007/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). Work on this document has its began in 2002, when the memorandum appointing the INSPIRE initiative was signed. Records of the Directive indicate the necessity to build a spatial information infrastructure in the member states which will be the basis for an European spatial information infrastructure (cf. Pollard, 2003; Masser, 2010; Litwin, Rossa, 2011).

The subjective scope of the INSPIRE Directive was determined by its content (Section I, Article 3, Clause 9), where public entities are: units of government administration or another public administration including public advisory bodies at a national, regional or local level; single entities or legal entities who, by virtue of national law, perform admin-

istrative functions including some particular duties, activities or services concerning environment and single or legal entities who perform public duties or functions, or provide public services with regard to environment and are subject to the body or person mentioned above.

An important element of the INSPIRE Directive are three attachments that determine thirty-four spatial data topics, which, apart from areas connected with environment, include as well areas referring to national administrative division and anthropogenic transformations. Regardless of these, all the thematic areas may be used in the basic unit of territorial division in Poland – a gmina.

The present territorial division system in Poland was legitimised in 1998, when a division into voivodships, poviats and gminas was introduced. Authorities of the gminas have within their competence pursuing spatial policy and compiling documents connected with spatial planning. They have a direct impact on land development and there are connected with environment. Thus, it can be assumed that in the area of land use and land development gminas will be the basic suppliers of spatial data.

It is clear that the workers of municipal councils are the potential users of spatial information from all thematic areas. It may become the basis for building gmina geoportals, which is very often highlighted in the reference articles on the subject (Adamczyk, 2007; Wojsyk et al., 2009; Bielecka et al., 2010). It has to be assumed that spatial information systems and geoinformation are not commonly used in gminas. An important factor is also further education which would allow for building openness to technological innovations connected with acquiring, collecting and using geoinformation in activities undertaken by municipal councils. In territorial units’ management a crucial element is making key decisions with reference to spatial economic, social, environmental and cultural spheres, based on the conclusions drawn on the basis of data and information which have a reference to space (Beckman, 1997). Gmina space is characterised by a large variety of facilities, processes, phenomena and their changeability in time. The development and management of its territory in a way that is compatible with the idea of spatial order and balanced development require the analysis of a huge collection of information. An additional difficulty is the ne-

cessity to anticipate future social needs and also to estimate the results of the decisions made. In this regard, spatial information systems are an ideal tool in gmina management.

2. Research area and research methods

The carried out research was aimed at estimating the level of spatial information use in the gminas of Zgierz powiat (administrative unit of the 2nd order). Zgierz powiat is a part of Łódź Metropolitan Area, in the south Zgierz borders with the capital city of the Łódź voivodship. The powiat encompasses the area of 855 km². Nine gminas are included in the powiat along with three urban gminas Zgierz, Ozorków and Głowno. The other two units are urban-ru-

ral gminas: Aleksandrów Łódzki and Stryków, and four rural gminas: Głowno, Ozorków, Parzęczew and Zgierz. All rural and urban-rural gminas were selected for the research because of their comparable characteristics. The authorities of Głowno gmina did not agree to participate in the research. In consequence, five territorial units took part in the questionnaire survey concerning the scope of knowledge and areas of geoinformation usage in municipality council activities. In every municipal council there were twelve questionnaires, however, the return of completed questionnaires amounted to 73%, and the number of completed questionnaires was different in every gmina (Fig. 1). The research included employees working in departments related to: agriculture, surveying, environmental protection, public utilities, investment, European funding, and land use planning.

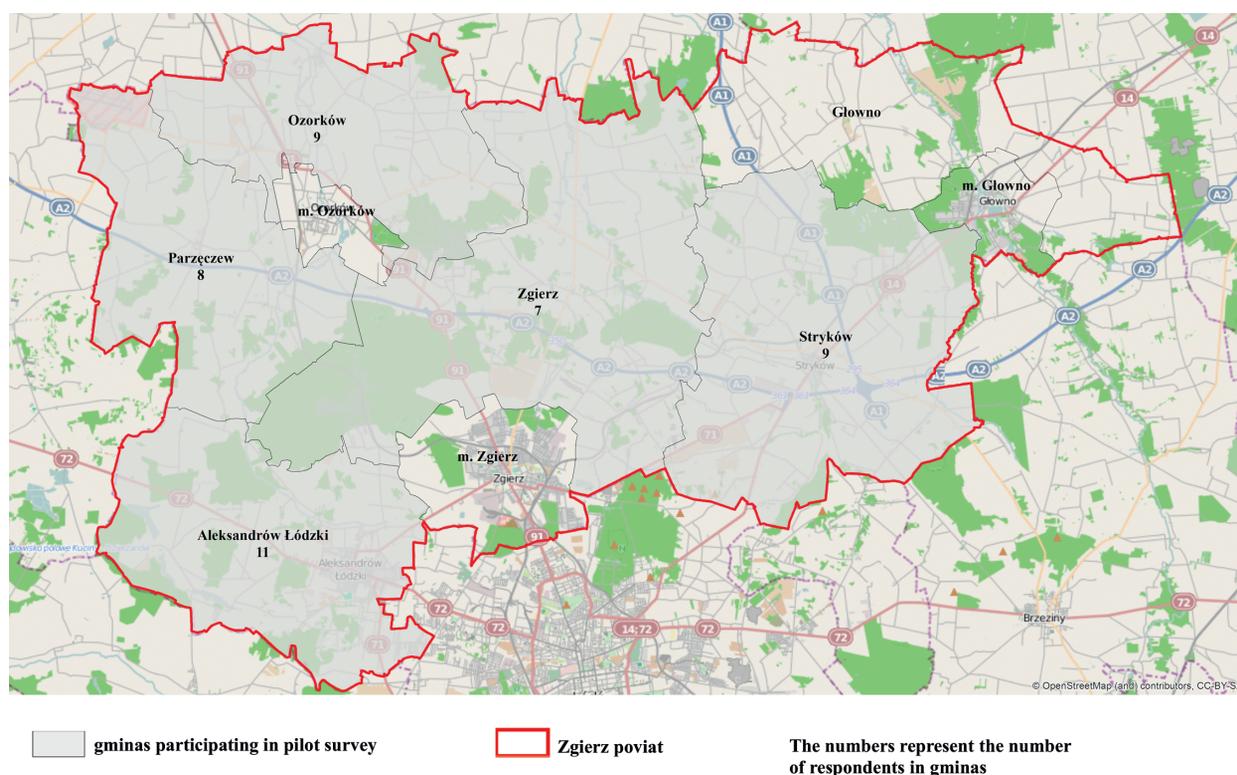


Fig. 1. Gminas of Zgierz powiat participating in the pilot survey (numbers indicate the number of respondents)

Source: Own work based on pilot survey, base layer Open Street Map

The questionnaire contained twelve questions, eight of which will be analysed in this paper. The questions were open or the respondents had to

choose from a prepared closed-ended question set. The analysis allowed to estimate the level of geoinformation usage in the gminas of Zgierz powiat and

to assess the knowledge gap which results from the willingness of the officials to use spatial information systems in the decision-making process connected with gmina management without proper competence at the same time.

3. Research outcomes

The analysis of the questionnaire results allows to assume that 70% of those polled indicated that in their territorial unit spatial information systems are used. However, it has to be emphasised that these systems are not built for the need of the gmina, and that spatial information systems, such as, for instance, the national geoportal (geoportal.gov.pl) or thematic geoportals connected with environmental protection (geoserwis.gdos.gov.pl/mapy/), are not widely used. According to 73% of the respondents, spatial information which refers to environment, culture and spatial planning is made available on the Internet websites of the gminas. It has to be acknowledged that this is not original data, which requires processing for the needs of implementing it in spatial information systems. Only 52% of the respondents use geoinformation in their professional work. The results of the research show that people who indicated geoinformation usage at work have been using it on average for 5 and a half years. It is essential that the shortest seniority in the scope of spatial information usage amounts to 1.5 year and the longest up to 20 years. Significantly, the person who has been using geoinformation for the longest is a geodesist who has worked in the office for 30 years.

The officials working in the municipality council were asked to indicate the advancement level in the scope of the capability of spatial information usage in practice. The assessment was supposed to be included within the scale between 1 to 10, where one was poor knowledge of GIS and 10 was an expert level. In this part of the research one person did not provide the answer. The most common value in the set is number 1, the median of the set is 3. The highest value indicated by an official was number 9, which appeared in the municipality council of Stryków (Table 1).

Table 1. Number and percentage of responses for the ability to use GIS

A	B	C
1	14	32.6
2	5	11.6
3	8	18.6
4	4	9.3
5	7	16.3
6	3	7.0
7	0	0.0
8	1	2.3
9	1	2.3
10	0	0.0

Explanation: A – knowledge about geoinformation; B – number of responses; C – percentage of responses

Source: Own work based on pilot survey

An essential element of the questionnaire, supplementing the question concerning the competence of municipality council officials in the scope of GIS, was indicating the sources of knowledge concerning geoinformation and spatial information systems. The respondents could give more than one answer, which allowed for obtaining 51 responses from 37 persons. The basic source of knowledge about geoinformation and spatial information systems is the Internet, which was indicated by 86.5% of the respondents. The other sources concerning geoinformation had less than 20% of the responses. Among them there were information bulletins (16.2%), trainings (13.5%), books (8.1%) and conferences (8.1%). Thematic publications had the lowest number of responses, and were used by 2.7% of the respondents. One respondent indicated that the basis of knowledge concerning geoinformation was higher education (Fig. 2).

The respondents were asked to indicate thematic areas of the INSPIRE Directive. There were 10 thematic groups in the closed-ended question sets, five of which came from the INSPIRE Directive. The correct answers included: administrative units, record parcels, addresses, geographical names coming from the first attachment, and land use from the second attachment. The selection of these topics was determined by their earliest accomplishments and availability in the national geoportal sources. The question was answered by only 32 respondents, who could choose five ques-

tions from a closed-ended question set. The total number of answers to this question amounted to 132; however, 28% of them were incorrect. It has to be assumed that the officials in the examined gmi-

nas have basic knowledge concerning the sources collected and made accessible in the national geoportals, and creating European spatial information infrastructure.

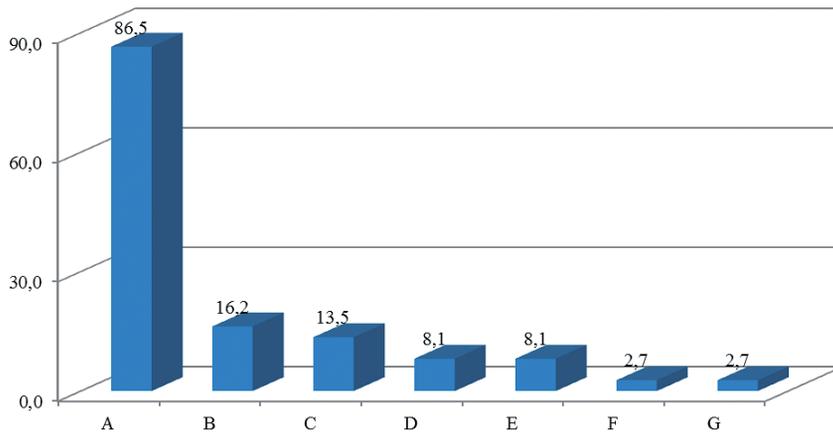


Fig. 2. Sources of knowledge about geoinformation and GIS

Explanation: A – Internet; B – newsletters; C – trainings; D – books; E – conferences; F – thematic publications; G – other

Source: Own work based on pilot survey

A key issue raised in the questionnaire survey was indicating by the officials from which sources they draw data that has a spatial reference. The answer to this question was given by 41 respondents gave answers. Among the indicated answers, the most commonly used source of geoinformation

were sources coming from the Main Office of Geodesy and Cartography, which was indicated in 22% of the responses. Plenty of spatial information used in the examined gminas comes from the orthophotomaps. This is indicated by 19% of the obtained responses.

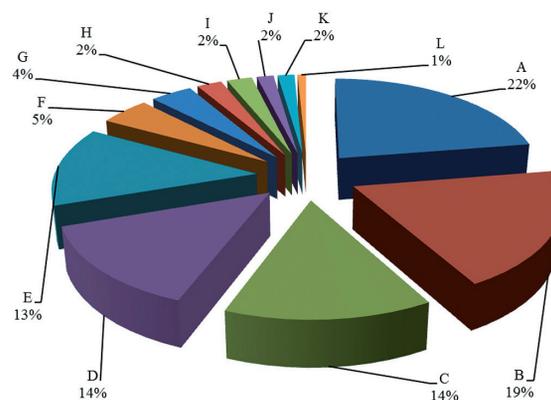


Fig. 3. Sources of the geoinformation used in gmina

Explanation: A – Data from Head Office of Land Surveying and Cartography; B – orthophotomaps; C – satellite photos; D – sites measuring; E – geoportals; F – digitised data; G – reports; H – statistical survey; I – statistical yearbooks; J – commercial database; K – field observations documents; L – geolibraries

Source: Own work based on pilot survey

Satellite images and geodetic measurements, which can be obtained from the public sources available for public administration or carried out on the municipality councils' order, received 14% of the responses each. Geoportals, including the national geoportal, were ranked fifth. This source of obtaining geoinformation received 13% of all the responses. The rest of the responses included in the closed-ended question set constituted less than 10% of all the responses. Among them there was data obtained from official material digitalisation (5% of the responses), and reports with spatial data (4%). 2% was obtained by the responses

concerning: statistical data carried out within the area of the gmina, data available in statistical yearbooks, field observations carried out by the officials and ordered by the municipality council, and data purchased from commercial vendors of databases. Only 1% of the respondents indicated geolibraries, which in Poland are not a popular source of data collection, which results from the commercial character of these sources (Fig. 3). It has to be observed that the information sources that were most often indicated by the respondents are the national geodesy sources which are easily accessible to the gminas.

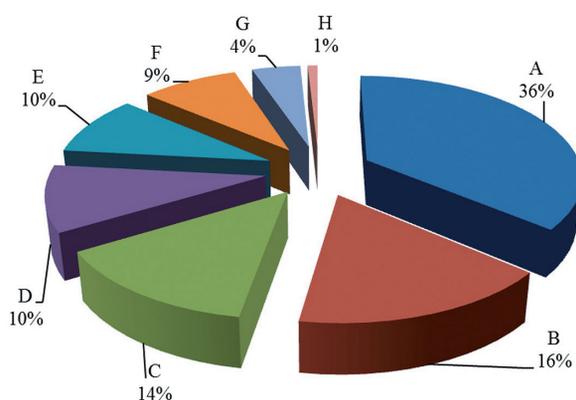


Fig. 4. Areas of using geoinformation in gmina

Explanation: A – land use planning; B – property management; C – promotion of gmina; D – investment processes; E – crisis management; F – environmental protection; G – tourism; H – other

Source: Own work based on pilot survey

Data availability conditions its use in officials' work. The respondents could choose three answers from the eight indicated in the closed-ended question set, additionally they could indicate their own answers. All the respondents answered this question. The biggest number of responses concerned geoinformation use in spatial planning. These answers constituted 36% of the whole collection. Spatial planning was indicated by 95% of the respondents. According to the respondents, geoinformation may be useful in fixed property management (16% of all the responses) and in the process of territorial unit promotion (14%). Crisis management and investment processes carried out within the gminas obtained 10% of the responses each. It is surprising

that geoinformation use in environmental protection received only 9% of the responses. It has to be emphasised that the idea of building the European spatial information infrastructure was conceived for the purpose of environmental protection. Environment is also an element used in other areas of gmina activity which is the basis for realizing the balanced development idea. An element indicated in the research was also the area connected with the accomplishment of the tourist functions in gminas. 4% of the responses pointed out this element. 1% of the responses referred to an element not included in the question set, where a respondent indicated the possibility of appointing electoral poviats through analysing spatial data (Fig. 4).

4. Conclusion

The pilot survey carried out in rural and urban-rural gminas in Zgierz powiat shows that tools connected with spatial information are used in these gminas. According to the respondents, the gminas also provide access to unprocessed geoinformation. It has to be assumed that despite some information shortages, which have an impact on creating the knowledge gap, gmina workers have theoretical knowledge about spatial information systems and the geoinformation used in them.

With regard to the described results, it is surprising that, although they possess knowledge about geoinformation, only 52% of the respondents use it, which proves that the popularisation of geoinformation in municipality council structures requires improvement through the implementation of trainings and organisation of conferences which, apart from the Internet, should become the basic source of qualifications improvement and public administration development.

The scope of sources from which the officials take spatial information should also be broadened. It would allow for connecting data coming from different sources thanks to which generating new spatial information, necessary in administrative decision-making processes, will be possible.

Improving the qualifications of municipal council officials will also allow for using geoinformation in territorial unit management, in the areas of environment, or gmina promotion, which have not been indicated in the research. The use of geoinformation in municipal councils should be evident in its use by the local community which would encounter new technologies while contacting public administration. It will allow for accelerating the process of implementing geoinformation in everyday life.

It should be noted that the conclusions of the pilot research can be generalized for every rural gmina in Poland. There is lack of knowledge and fear of using GIS in daily work in the gminas. The workers confirm that GIS technology can be useful in their work, but they also confirm that they do nothing to implement GIS in administration. It will be

a problem in the future, because Poland must implement the rules of the INSPIRE Directive and local governments must use geoinformation in decision making processes.

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