Economic and functional changes in the largest villages in Poland at the end of the 20th and the beginning of the 21st century

Dariusz Sokołowski CDFMR

Nicolaus Copernicus University in Toruń, Lwowska 1, Toruń, Poland, e-mail: sokol@umk.pl, https://orcid.org/0000-0003-0361-7017

Abstract. The article deals with selected aspects of the economic structure and functions of the largest villages in Poland. The main aim of the study is to investigate the diversity and changes that can be observed to have happened since before the fall of Communism in Poland. Large villages with populations exceeding 5,000 inhabitants are located in the same part of the rural–urban continuum as small towns, including many poviat (1) seats. For this reason, they are an interesting comparative category of settlement units. The study was based on a source database from the end of the last century and on contemporary public data from the REGON database. The comparison is based not only on various data, but also uses various research methodologies.

Contents:

1. Introduction

The largest villages constitute an interesting part of the rural–urban continuum. Despite being formally categorised as villages, their size suggests – and the results of previous studies confirm (e.g. Sokołowski, 1999, 2015) – that they may exhibit some urban features, especially in the functional and economic aspects. What is understood by "urban features" is, broadly, every socio-economic activity conducted in the town (or village), irrespective of its economic and spatial status, as seen from the perspective of both the town itself and the settlement system to which it belongs (*cf* Suliborski, 1983, 2010). Functions create the resources essential to a town/village's existence; simultaneously they make it possible to distinguish and identify a town/village in geographical space (Maik, 1992).

The main aim of the study is to characterise the analysed units by selected variables typical of their functions and – wherever possible – by the direction of changes over the period of almost three decades. No research hypotheses have been formulated, because they would have to imply specific transformation trends in the studied group of units. Two arguments prove that approach inappropriate: 1) the use of non-homogeneous data sources and the consequent composite methods of measurement may lead to ambiguous or uncertain conclusions, and 2) the impact of diverse factors in the form of profound political, economic, cultural and technological transformations, or even changes in social mentality, throughout the three decades separating the studies may make the real transformation trends appear different from the assumptions.

Wójcik (2013), relying mostly on the facts established by Suliborski (2010), distinguished five basic categories of understanding rural functions in geographical studies:

1. A function is a role played by an element (residential settlement) in the physical structure of a system (set of residential settlements). It is identified by physical features pertaining to the construction (morphology) of settlement systems.

2. A function is the kind of resident activity and facilities in a settlement. It includes the nature of residents' professional activity, socio-economic relations and their daily spatial behaviours, as well as

the technical and material asset base of the settlement. The function of the centre determines its role in the settlement system and organises the space around it. All of the activities performed in the centre are its functions.

3. A function is a concentration of places of work and residence.

4. A function is a relationship within a system. It is connected to the notion of structure, i.e. elements, and relations between them.

5. A function is a specific feature or set of features ascribed to units. A functional approach here involves matching these units to appropriate classes.

The categorisation based on the postulation that the lower limit of population was 5,000 inhabitants (following the National Population and Housing Census of 2011), derived from practical reasons and was arbitrary. It stemmed from the assumption that the studied villages should be considered as a complete set, by name. In the case of a 'cut-off' at the level of 5,000 inhabitants, the set includes over 60 units; for 4,000 inhabitants, the set almost doubles; and should the threshold be at 3,000 inhabitants, the number of units in the set would exceed 300. The application of each of those 'cut-offs' (as well as any other that would be eligible) would be equally arbitrary. It should be highlighted that each of the sets created in this way constitutes a population which is complete in its size category. For those reasons the problem of possible non-representativeness of sample does not occur here. Each of the created sets would be sufficiently abundant for the purposes of characterising both the transformations and the problems arising from a non-homogeneous source database.

There were 64 villages studied. It is worth mentioning that only two villages – Żołynia and Korczyna – are downgraded towns; the other villages which used to have urban status and are now inhabited by over 5,000 people have already been upgraded.

Studies based on the data from the turn of the 1990s served as the starting point. An important problem transpired upon realising that the previous and the present data are incomparable. The difference in the nature of source databases renders it difficult to compare either specific units. In particular, it restricts the possibility to accurately examine changes using a dynamic approach. Another aim of

this paper is to indicate specific source problems in the workshop of the present-day researcher of functional issues, in terms not only of the applicability (analysis of the present data) and comparability (dynamics) of the public databases, but also of the discontinuity of the data in those databases.

2. Data sources and methods

The information which was used for this study comes from public information sources available at different times. Older data were obtained from published and unpublished resources (e.g. specifications of the National Population and Housing Census of 1988) of the Central Statistical Office (GUS) compiled for the purposes of papers partly published in the 1990s (e.g. Sokołowski, 1999). They provided reliable information on the population size, number of people earning their living by performing non-agricultural activities, employment structure, or economic data, all of which facilitated definition of the functional character of individual villages, including the level of centrality – an index showing the functional relations between a village and its surroundings.

By contrast, current sources are neither so diverse nor so accurate. Population data were collected from the last national census (2011) (2), while the information on the economy was derived from registers held by the Polish National Business Registry (REGON) (Local Data Bank of the Central Statistical Office). The latter may be considered only as indicative values due to: 1) the inaccuracy of the database itself, which stems from, for example, long delays in deregistering business entities after they terminate their business activity, or registering large numbers of business entities irrespective of their actual location, 2) the lack of available information on the number of persons employed in particular kinds of business activity (sections, groups, etc.), 3) frequent changes in business entity classification methods (3). For understandable reasons, a definition of the economic structure only on the basis of the number of business entities in particular sections is very inaccurate. This paper takes into account only the data from the REGON database for 2016.

The analytical methods employed here – mostly comparative analysis, statistical analysis, centrality index, and others – are appropriate to the nature of the source materials (4). The construction of indicators is discussed in appropriate sections of the paper, while methods requiring a broader description are duly ascribed literature references in the text.

3. Socio-administrative and functional description of the studied set of units

Due to space limitations, most of the information characterising individual villages was presented in tabular form (Table 1). This relates to:
- administrative status (communal village (5), other),
- employment level (1988, 2011),
- percentage of non-agricultural population (1988),
- centrality level (1988),
- functional structure and dominant functions (1988, 2011).

3.1. Administrative status

Over two thirds of the studied group (44 out of 64) comprises villages where commune authorities are seated (Table 1, Fig. 1); at the turn of the 1990s (more or less 1988–90) this ratio was slightly different on account of the subsequent creation of the following communes: Lipnica Wielka, Krościenko Wyżne, Jasienica, Chełm Śląski, Goczałkowice-Zdrój and Marklowice. The last three, which were part of towns in 1988, were excluded from the analysis of functions in that period. The administrative status of these units is important inasmuch as the majority of the previous studies (*cf* i.a. Sokołowski, 1999, 2006, 2011) demonstrate their different, somewhat privileged, economic and functional condition.

3.2. Population and population dynamics

The population in the largest villages in Poland reaches 12–13,000 (Kozy near Bielsko-Biała and Koziegłowy near Poznań – *cf* Table 1). In the pe-

Fig. 1. Distribution, population and administrative status of the studied villages (as of 2011)

Source: own work

riod 1988–2011 almost all of the villages described here witnessed a growth in population; the biggest percentage rise recorded over that period was in: Józefosław (12-fold), then Mierzyn and Skórzewo (5-fold), Koziegłowy (4-fold), Plewiska, Suchy Las and Straszyn (3-fold) (6). Noteworthy is the fact that the seven most dynamically growing villages include only one with municipal status as the seat of the commune; moreover, all are located in suburban areas of large cities: there are four near Poznań and one each near Warsaw, Gdańsk and Szczecin. In absolute values, the following villages gained the most: Koziegłowy (about 9,000), Józefosław (6,600), Mierzyn, Jabłonna, Straszyn, Suchy Las, Skórzewo and Plewiska (4–5,000), and Komorniki, Gościcino, Bolszewo, Sierakowice, Chotomów, Wola, Luzino, Przeźmierowo, Kozy and Białe Błota (2,000–3,600.).

Basing on the above observations, it can be concluded that the main factor of growth is exogenous and is related to interactions with a large city tending to move part of its activities (production and some services) out into its suburban area. Particularly important factors driving this process are land rent, land consumption and level of burdensomeness (for the natural environment or for inhabitants of the surrounding areas, especially in dense, urban, building development) associated with some types of business activity. Lesser importance for growth is ascribed to the endogenous potential, which is generated by traditional functions associated with agriculture and handling of agricultural facilities or to the industry and local services which used to be present in these villages.

The percentage of individual villages in the commune population is very diverse: it ranges from just above 20% to 100%. In the period under examination it grew decidedly (by at least 5%) in 23 cases, fell (by a similar degree) in 11 villages, and was generally stable in 22 units (7). This implies that, on average, the potential for growth is higher in larger villages when compared with the direct neighbourhood, although this cannot be set as a rule.

3.3. Non-agricultural population

The percentage of people earning their living from non-agricultural sources (Table 1) has long been treated as an indicator of urbanisation (*cf* Iwan-

icka-Lyra, 1969; Eberhardt, Gontarski, Siemiński, 1973; et al.). This results from the universality of this indicator, as it refers to various aspects of the definition of that phenomenon. Not only does it pit the activities judged as typically agricultural (farming, forestry) against urban activities but – consequently – it also presents the dichotomies: rural/urban lifestyle and time management, rural/urban spatial management and features of land development, closeness/distance to nature, etc.

In 28 villages the share of people having non-agricultural income sources reached 90 or more percent in 1988; in 26 villages the index exceeded 66% – the value being a criterion for granting city rights; and only in 6 villages did it not reach that level. The lowest percentage of non-agricultural population was recorded in a few villages of the Małopolskie Voivodeship which acted primarily as service centres for the nearby rural areas (Jabłonka, Lipnica Wielka, Słopnice, Biały Dunajec).

The predominantly non-agricultural character of the majority of the studied villages had several causes, such as: the suburban location of some; location within a functionally urban area where a large percentage of work emigration is observed; development of local industry and services; and, to a smaller degree, the fact that they acted as a service provider for agricultural needs. It is difficult to overestimate (and estimate) the involvement of society- and civilisation-oriented processes which lead to, among other things, agricultural activities being abandoned in favour of other economic sectors.

Although official statistics do not presently give public access to specific information, there are some premises, such as increase in agricultural productivity, decrease in number of agricultural holdings, tertialisation of economy on the national level, influx of urban population to suburban areas, etc. (*cf* e.g. Zegar, 2000; Szymańska, 2007, 2013; Czarnecki, 2009; OECD, 2010) which indicate that the percentage of non-agricultural population has not fallen in recent years; in fact, it has probably grown in some villages. That assumption would be in line with the national trend that has been observed for a long time now and which leads towards an increase in the deruralisation and multifunctionality of rural areas, as implied in the research conducted by for example Stasiak (1989); Falkowski (1993);

Table 1. Selected characteristics of the studied villages

Voivodeship, locality	Gmina (commune) seat	Population (1988)		Population (2011)		Non-agric. pop.[1] % (1988)	Type[2] (1988)		Vc[3] (1988)	Business entities[4] (2016)	
			% pop. of gm.		% pop. of gm.		functional	MP/ MZ		total	per 1000 inhabit.
kujawsko-pomorskie											
Białe Błota	+	3973	46.7	6323	36.0	97	P	M1	38	1096	173
łódzkie											
Ksawerów	+	6269	90.4	6729	90.2	75	U	P1	39	905	134
małopolskie											
Biały Dunajec	+	4321	72.6	5251	75.1	50	R	MP	33	495	94
Chocznia (gm. Wadowice)		4785	30.4	5690	30.6	89	R	M2	17	478	84
Jabłonka	+	3927	28.1	5042	28.5	58	RU	MP	60	392	78
Jadowniki (gm. Brzesko)		4533	28.3	5048	26.5	83	R	M1	17	341	68
Jawiszowice (gm. Brzeszcze)		5925	67.9	6743	68.0	90	RP	M1	27	619	92
Klucze	+	4630	31.8	5182	33.9	97	RP	M2	45	524	101
Lipnica Wielka[5]	+	4145	94.9	5244	88.8	56	R	M1	32	272	52
Osiek	+	5861	100.0	6706	83.3	80	R	M2	59	394	59
Pcim	+	4415	48.6	5327	49.5	71	RU	M1	53	381	72
Słopnice	+	4601	100.0	6264	100.0	54	R	M1	25	455	73
Stryszawa	+	4781	42.2	5326	45.1	82	R	M1	53	338	63
Sułkowice (gm. Andrychów)		4278	22.5	5099	22.8	90	R	M2	16	455	89
Wieprz	+	4406	37.2	5030	42.2	73	R	M1	55	444	88
Wola Rzędzińska (gm. Tarnów)		4935	27.5	5886	24.2	87	RP	M1	17	395	67
Zabierzów	+	4180	21.5	5079	21.0	94	UP	MP	55	941	185
Zawoja	+	5643	71.7	6483	71.2	75	R	M1	55	585	90
mazowieckie											
Chotomów (gm. Jabłonna)		2497	33.7	5266	32.1	88	R	M2	18	940	179
Jabłonna	+	3495	47.2	8176	49.8	64	R	M1	47	1461	179
Józefosław (gm. Piaseczno)		568	4.3	7130	23.9	-	-	-	-	1982	278
Małkinia Górna	+	3736	29.4	5514	45.1	89	UP	P1	66	520	94
Raszyn	+	6269	38.3	7477	35.5	94	P	MP	50	1835	245
Rybie (gm. Raszyn)		4014	24.5	5129	24.3	94	P	M2	4	741	144
podkarpackie											
Gorzyce	+	6487	50.3	7116	52.2	95	P	P1	49	480	67
Jeżowe	+	4694	51.3	5162	51.1	69	R	M1	58	288	56
Korczyna	+	5131	51.8	6034	54.8	85	RP	M1	53	537	89
Krościenko Wyżne[6]	+	4295	100.0	5426	100.0	90	R	M2	14	499	92
Pustków (gm. Dębica)		5619	26.1	5588	22.4	85	PR	MP	25	293	52
Rakszawa	+	6140	85.9	6241	86.1	79	RP	M1	52	355	57
Żołynia	+	4773	74.8	5188	75.7	66	R	M1	64	252	49

pomorskie											
Bolszewo (gm. Wejherowo)		3748	31.6	6803	31.7	92	PR	M2	13	874	128
Gościcino (gm. Wejherowo)		2473	20.8	5784	27.0	92	P	P1	13	599	104
Luzino	+	4583	53.1	7264	51.0	91	R	MP	55	775	107
Sierakowice	+	4574	35.3	7373	41.0	88	UP	M1	70	834	113
Straszyn (gm. Pruszcz Gdański)		2163	18.4	6475	30.2	79	UP	P2	13	1477	228
śląskie											
Brenna	+	4982	58.9	6148	56.9	86	R	M1	56	635	103
Chełm Śląski[7]	+	5556	100.0	6023	100.0	-	-	-	-	534	89
Czaniec (gm. Porąbka)		4969	36.4	5680	37.1	91	R	M2	27	424	75
Goczałkowice-Zdrój[8]	+	5238	100.0	6566	100.0	-	-	-	-	831	127
Istebna	+	4480	43.3	5076	43.2	90	UR	M1	67	443	87
Jasienica[9]	+	4082	23.2	5088	23.0	87	X	M1	49	605	119
Jaworze	+	5209	100.0	6786	100.0	92	PR	M1	21	1083	160
Kozy	+	9919	100.0	12271	100.0	95	PR	M2	61	1496	122
Łodygowice	+	6260	49.4	6989	51.1	91	PR	M1	63	771	110
Marklowice[10]	+	5099	100.0	5365	100.0	-	-	-	-	348	65
Ornontowice	+	4679	100.0	5733	100.0	90	P	MP	28	503	88
Pawłowice	+	8743	54.4	9771	54.5	95	X	M2	63	774	79
Pisarzowice (gm. Wilamowice)		3726	35.2	5190	39.5	87	R	M2	21	532	103
Radziechowy	+	5021	42.7	5454	42.3	90	R	M2	49	402	74
Świerklany	+	6541	61.4	7652	65.6	94	R	M2	26	556	73
Wilkowice	+	5937	54.0	6761	52.2	95	UR	M2	52	827	122
Wola (gm. Miedźna)		5984	51.5	8657	53.9	96	U	M2	19	565	65
Zebrzydowice	+	4042	35.3	5368	41.4	93	X	MP	54	365	68
wielkopolskie											
Czerwonak	+	4631	34.5	5868	22.5	97	UP	M1	42	917	156
Komorniki	+	2600	25.9	6173	30.8	79	PR	M1	40	1526	247
Koziegłowy (gm. Czerwonak)		2901	21.6	11878	45.6	98	U	M1	9	1180	99
Plewiska (gm. Komorniki)		2176	21.7	6883	34.4	87	PR	M2	15	1813	263
Przeźmierowo (gm. Tarnowo Podgórne)		3815	30.4	6282	28.8	93	UP	P1	25	1594	254
Skórzewo (gm. Dopiewo)		1081	12.5	5121	27.6	83	RU	M2	5	1359	265
Strzałkowo	+	4219	46.1	5451	54.0	84	UP	P1	76	586	108
Suchy Las	+	2180	29.1	6385	42.7	91	PU	M1	45	1927	302
Tarnowo Podgórne	+	3007	24.0	4682[11]	21.5	72	X	MP	60	1013	216
zachodniopomorskie											
Mierzyn (gm. Dobra Szczecińska)		1180	23.0	6146	36.6	64	X	P1	10	1614	263

[1]share of population living off non-agricultural sources; [2]functional type due to the dominance of the agricultural (R), industrial (P), service (U) or mixed (X) functions; MP / MZ – relation of jobs to places of residence (M1, P1 – advantage of housing function or workplace function, M2, P2 – analogous strong advantage, MP – balanced relation); [3]centrality index (0–100); [4]business entities excluding section A (agriculture, forestry and fishing); [5]1988 in Jabłonka gmina, [6]1988 in Korczyna gmina, [7]1988 within Mysłowice city limits, [8]1988 within Pszczyna city limits, [9] 988 in Jaworze gmina, [10]1988 within Wodzisław Śląski city limits, 10in 2016

Stola (1993); Bański & Stola (2002); Szymańska & Matczak (2002); Zegar (2008) et al.

3.4. Central functions

Centrality, in the understanding of the central place theory (Christaller, 1933), defines the strength and extent of relations between a village and its surroundings (the service range area) and is usually measured by the employment level in central activities (8) and the spatial range of these activities, or by the presence of central institutions commonly accepted as having a normative function (9). The research based on the data from the period of 1988/1990 (Sokołowski, 1999) took into account the employment level in about fifty kinds of central activities and may be considered accurate enough to define the hierarchy of villages in that period (10).

The measurement is characterised by clear separability of the two administrative categories of villages: villages that are the seat of commune authorities and other villages, thus leaving barely any room for their "mixing" (Table 1, Fig. 2). The second characteristic feature of this measurement is found in the substantial range of the index values: from above 70 points (Strzałkowo, Sierakowice) in villages far away from a large city, poorly connected with urban labour markets and services and developing mainly owing to endogenous functions; to below 30 points – typically in villages not a seat of commune authorities (at the end of the 20th century there were only a few exceptions: Jaworze, which was not the seat of commune authorities back then, and Świerklany and Ornotowice, which are surrounded by towns and thus are deprived of their own service area).

Nowadays it is next to impossible to acquire data of that kind, and therefore the registers held by REGON are the only available sources that can be used (Fig. 3). A set of activities with central characteristics was distinguished, whereby a large part of the employed labour force was involved in provision of services to people. The distinction was made on the basis of the PKD sections (11), which entails a remarkable inaccuracy of calculations. The REGON database is so limited in its usefulness for measuring centrality because of two other issues. Firstly, it does not make it possible to differentiate endoge-

nous employment, i.e. that oriented at services provided to the inhabitants of a particular village, from exogenous employment, i.e. that generally related to the handling of services covering the broader village area. For example, on the basis of the available REGON data, it is impossible to make separate categories of primary school and high school education, with the former – by being of service almost exclusively to inhabitants of a given village – having little impact on centrality, while the latter affects a particular area, particularly in the case of small centres (villages, small towns). The second shortcoming of this database (in the publicly available version) is in its lack of information on the employment level in particular sections, groups, etc. For those reasons, the information derived from the REGON database which was used in the study does not allow an accurate calculation of centrality and is only indicative in nature.

The data from 2016 are surprising when juxtaposed with the older set of data. The administrative function seems to be insignificant from the perspective of centrality; communal villages and other villages are mixed both at the top and at the bottom of the scale and the highest values are reached by units located within the direct impact range of large cities. Rather than being only a change it is a complete reversal of the situation observed three decades ago, when it was mostly the administrative function (the seat of commune authorities) that defined the functional scope of services provided to people.

To some extent, this situation is an effect of the above-mentioned methodological and source-related imperfections, i.e. the inaccurate distinction between central and non-central activities, and the limited possibility to measure centrality by mere reliance on the number of business entities; still, the established regularities are too distinct to be attributed solely to the inaccuracies in measurement. The most evident factor determining centrality seems to be identified with the suburban location of a village. Location in the vicinity of large cities is particularly attractive to different kinds of business activity, both production and services in their broad meaning. At this point it should be highlighted that central activities are, by definition, universal, while (due to the deconcentration of urban activities) suburban villages are more likely to have specialist service providers whose market area stretches far beyond the

local scale. Thus, what deserves special emphasis is that an increase in the role of the suburban location of services for people is all the more important. This growth is definitely propelled by a rise in social mobility, as a result of which the matter of distance loses (to some degree) its significance.

The observations imply that for some time we have been witnessing a new phenomenon in the classical understanding of centrality. More precisely, the hierarchy of settlements which has been associated with centrality so far, in some simplified terms, was tantamount to hierarchical matching of smaller units to bigger units, i.e. villages to towns/cities, or low-rank administrative units to high-rank administrative units. A reflection of specific functional and spatial relations could be found, for instance, in journeys from smaller units to larger ones taken to satisfy certain socio-economic needs. Excess services and production generated by suburban units lead to a peculiar inversion revealing itself in the fact that town/city inhabitants ever more often have their needs satisfied in suburban villages. This is a phenomenon which disrupts the traditionally perceived functional and spatial relations in services for people. Its range, however, is only local and does not apply to the settlement system on the national nor regional scale.

An attempt was made to achieve a more precise separation of specialist services from universal services (strictly central) by narrowing down the number of PKD sections treated as central. Figure 4 presents the results obtained upon taking into account only those activities related to the hospitality industry, catering services, public administration, education, health care, welfare services, culture, entertainment and leisure activities (sections: I, O, P, Q, R). Despite the substantial reduction in the number of business entities taken into consideration, the situation essentially remained unchanged: 1) the prevalence of suburban villages in service provision was maintained, 2) large villages became very similar to each other in this aspect, irrespective of them being the seat of commune authorities.

3.5. Functional structure

The functional structure of villages in 1988 was established in the sectoral approach (see Table 1).

Nearly half of the villages were dominated by the agrarian function (types: R – agriculture – 21; RP – agriculture and industry – 5; RU – agriculture and services – 3). Industry was prevalent in a total of 15 villages (P – 6, PR – 7, PU – 1), while services were the main focus of 14 villages (U – 5, UP – 7, UR – 2). Five villages had a balanced proportion of the three sectors (X). Doubts may arise from the remarkably high percentage of villages identified as agricultural since in almost all villages the majority of inhabitants claim to have non-agricultural income sources. This apparent contradiction stems from the fact that: 1) non-agricultural income sources were defined by people's place of residence, while the functional typology was based on employment levels calculated for the place of work; the biggest differences occur in villages with a developed residential function (M1, M2 in Table 1), i.e. when a large part of the population works beyond the place of living, 2) some of the sources of income are non-commercial – people with this kind of livelihood increase the population earning their living from non-agricultural activities but they are not included in the typology.

The spatial distribution of villages representing particular functional types demonstrates some regularities: units where the agricultural function dominates are located, apart from a few exceptions (Chotomów, Jabłonna, Luzino, Skórzewo), in southern Poland (regions of Małopolska and Podkarpackie), which is characterised by an above-average fragmentation of agricultural holdings and a low level of technical infrastructure in agriculture (*cf* Rudnicki, Wiśniewski & Kluba, 2015). The supremacy of the industrial function, as is the case with services, is mostly typical of villages located within the direct impact range of the biggest cities (exceptions include: Małkinia Górna, Sierakowice, Strzałkowo, Istebna). No correlation has been found between the functional type and the administrative status of the village.

Functional types for 2016 could be specified only on the basis of the number of business entities, without accounting for the employment level. This obviously implies some form of "shift" towards those sectors of economy which are mostly represented by smaller entities (overrepresentation in relation to the number of working people); moreover, it practically eliminates agriculture, because
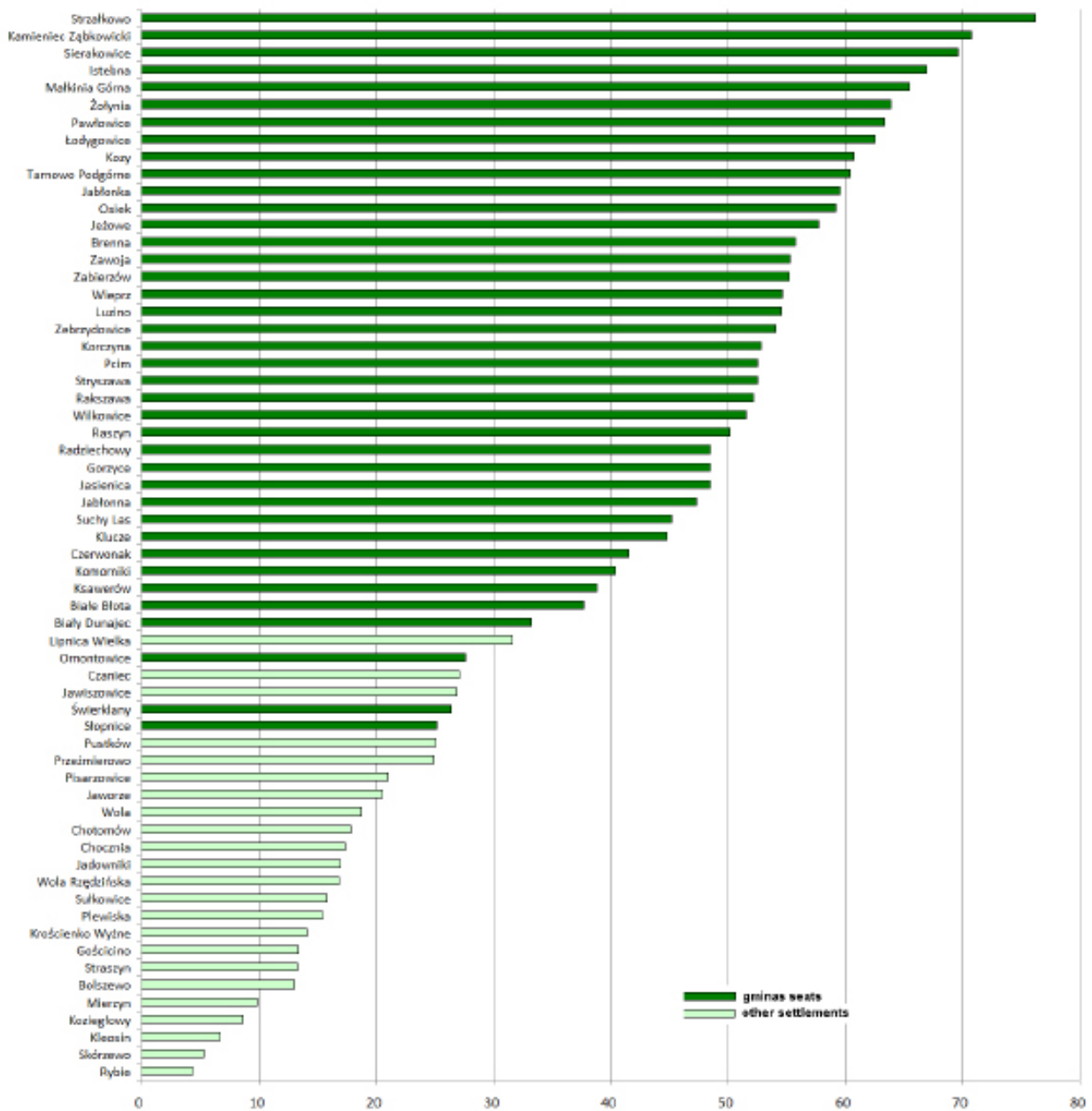
Fig. 2. Index of centrality for the villages studied in 1988

Source: own work

the majority of individual farmers do not feature in the REGON register. In the light of the above, the structure of business entities was analysed with regard to: 1) industry, including – according to PKD 2007 classification – sections B and C, i.e. mining and manufacturing, 2) centrally-oriented activities, mentioned in the section dealing with central functions, and 3) other activities, including mostly communal activities and building industry (sections D, E, F, L, N).

The functional structure of individual villages demonstrates a large similarity within the whole group (12), regardless of their administrative status or suburban location (Fig. 5). In the vast majority of villages the percentage of centrally-oriented business entities (calculated above as an extended variant) ranges between 50 and 75% and is far greater
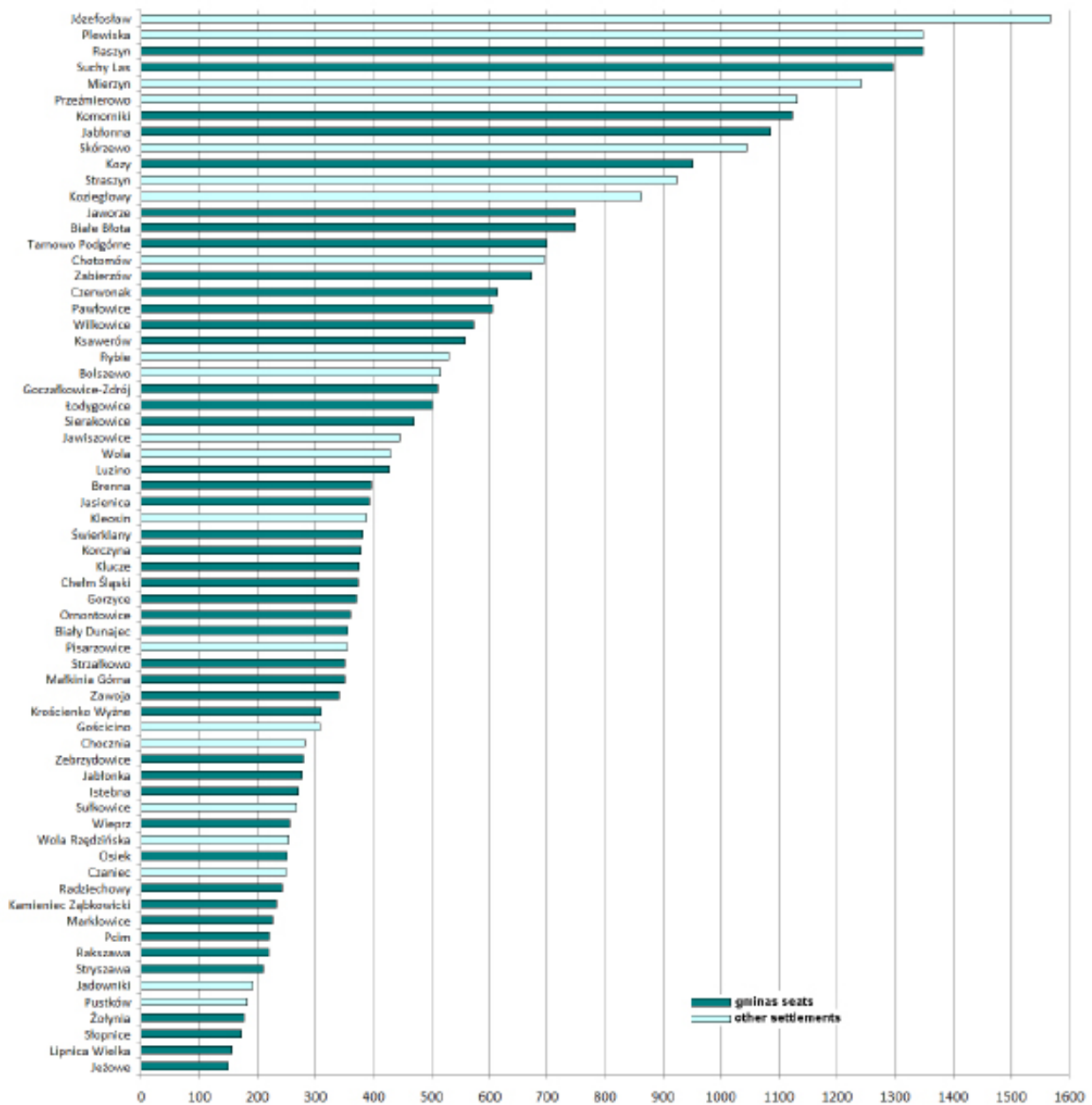
Fig. 3. Number of centrally-oriented business entities registered in REGON database in 2016

Source: own work

than the percentage of industrial entities and other kinds of business activity. The fact that the results of individual units are from specific ranges is obviously consequent upon the arbitrarily applied data aggregation; therefore, it is – when used specifically – of secondary importance. What constitutes the crux of the matter is, however, the similarity of particular units.

Finally, noteworthy is the total number of business entities in individual villages (*cf* Table 1), as that number reflects economic activity. In the light of the previous analyses, the results do not surprise: the highest activity is found in suburban villages, with about 1–2,000 registered business entities. Those villages also take the lead position if the analysis includes relative values: exceeding 100 or 180 business entities per 1,000 inhabitants in a few cas-
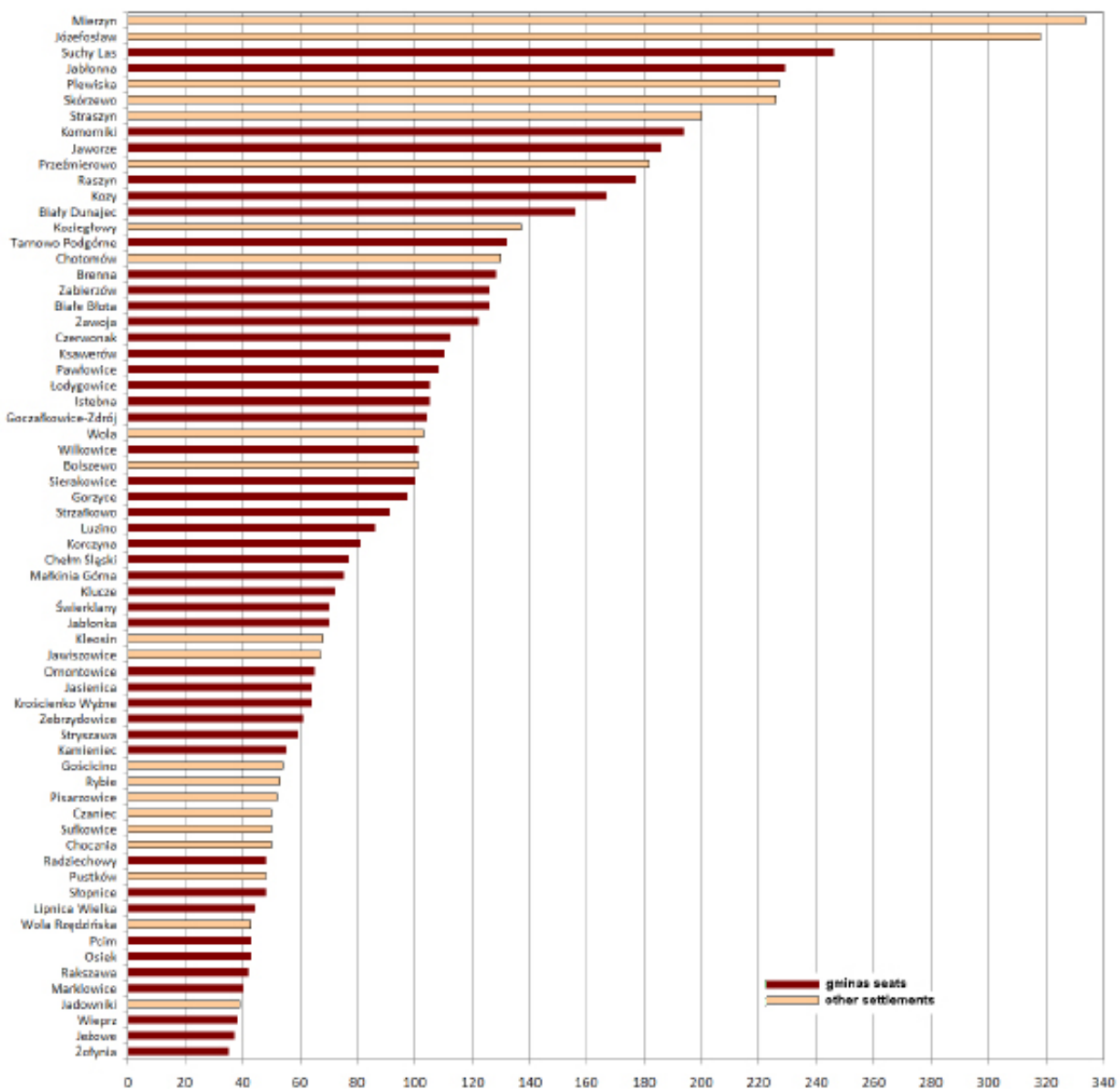
Fig. 4. Number of centrally-oriented business entities registered in REGON database in 2016 (by section: I, O, P, Q, R)

Source: own work

es (Plewiska, Komorniki, Przeźmierowo, Raszyn), or even 200 (Józefosław, Skórzewo, Suchy Las, Mierzyn).

4. Attempted identification of specific regularities upon analysis of averages

The observations and conclusions from the data analysis were confirmed by statistical method. The analysis of averages based on Student's *t*-test proved sufficient – it provided unambiguous results.

In the studied group of units, in every calculation, villages which are not seats of commune authorities (Table 2) have higher averages of economic indexes (absolute number of business entities, number of business entities in industry, number of business entities with central functions, number of business entities providing other services). To a large extent, this is an effect of the dynamic growth of villages located in suburban areas of large cities (mostly Poznań, Warsaw, the Gdańsk Tricity).
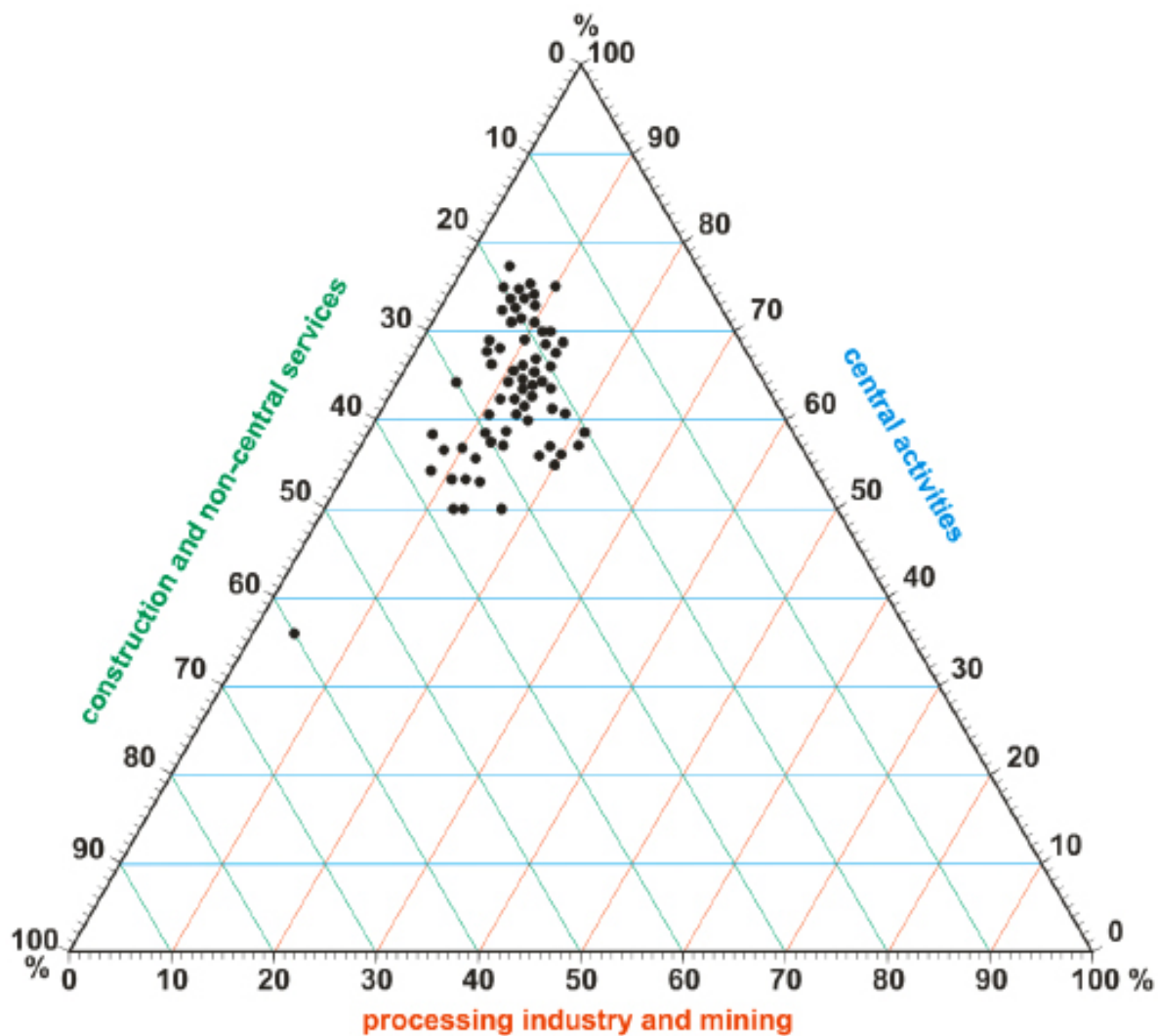
Fig. 5. Structure of business entities in large villages in 2016

Source: own work

Statistically though, the differences are insignificant ($t_\alpha = t_{0.05} = 2.00$), which confirms the previous conclusions about the mixture of communal villages and other villages on particular scales. A different situation was encountered in 1988, when in the studied group of units, communal villages featured a higher average employment level and substantially higher centrality (the differences between the categories are significant both at the level of $\alpha = 0.05$ and $\alpha = 0.01$). Slight dissimilarities can be found with regard to the percentage of non-agricultural population, where a higher value in the category of villages without the seat of commune authorities was associated with a remarkably high degree of indus-

trialisation in some units (e.g. Gorzyce, Pawłowice, Wola, et al.).

5. Conclusions

The study demonstrated several regularities pertaining to a group of the largest villages, upon which specific conclusions on transformation trends can be made; it also proved the advisability of the unitary approach, which is due to the diverse character of villages in individual sets.

For almost three decades, from the turn of the 1990s until now, in many spheres the largest vil-

Table 2. Arithmetic means and Student's t-test for communal villages and other villages

Specification	Non-agricultural population 1988	Central-ity index 1988	Population			Non-agricultural business entities (2016)					
			1988	2011	in industry	in non-central services and construction	in central activities		a total of 1000 inhabitants	in central activities	
								narrowly understood		for 1000 inhabitants	share (%)
G [1]	83	50	4971	6298	84	179	467	96	111	73	62
N [2]	88	16	3559	6303	94	205	629	121	143	100	65
t [3]	-2.37	14.89	5.96	-0.02	-0.76	-1.00	-1.62	-1.15	-1.66	-1.82	-1.52

[1]arithmetic mean of commune villages; [2]arithmetic mean of other villages; [3]the value of the t-test; negative values occur when the lower average is characterised by commune villages; bold – statistically significant values ($\alpha=0.05$, $\alpha=0.01$)

lages have been experiencing major changes. The political transformation and civilisational changes brought, for example, substantial disagrarisation of the local economy structure with a simultaneous growth in economic activity and a rise in the level of multifunctionality. In functional terms, the analysed category of villages exhibits a remarkable similarity to towns/cities. An increase in the level of multifunctionality of rural areas and villages was observed even in the last decades of the 20th century (e.g. Stasiak, 1989; Stola, 1993; Falkowski, 1993), and geographical studies (e.g. Adamowicz & Zwolińska-Ligaj, 2009; Falkowski, 2009; Heffner, 2001, 2011, 2012; Wlazły, 2018; et al.) confirmed further progress of this process, often coupled with sustainable growth.

Important conclusions point to a decline in the role of the administrative status (namely, being the seat of commune authorities) in the formation of economic structures in large villages; on the other hand, a rise was observed in the significance of the land rent in the suburban areas of large towns/cities. Another fact not to be neglected is the above-average population dynamics in the majority of the studied units, when compared to both towns/cities and smaller villages.

A few concluding remarks should be made with reference to the source database which was the basis of the analyses of economic structures and the related functions of settlement units. Its diversity, accuracy and availability leave much room for improvement and its usefulness to specific purposes is much lower than in the case of analogical sources from the period of the People's Republic of Poland. Numerous phenomena and processes are not

even registered, or the information relevant to them is incomplete and only intermittently sampled, such as the analyses of commutes to work (which used to be performed as part of personnel censuses) or even the countless descriptions traditionally included in national censuses. The so-called National Population and Housing Census of 2011, largely based on samples and thus in the case of many characteristics "descending" merely to the level of *poviats*, failed to satisfy the conditions required of a national census, which – by definition – is a comprehensive study taking into account even the smallest spatial units (13). Aggregation of abundant data for such big units detracts from their usability for studies on settlements.

Another issue worth referring to in highly critical terms is the fact that a lot of data available in specific state offices are withheld from the public, e.g. data on employment levels by PKD groups or even sections. Information which does not require confidentiality is often labelled as such, the incorrectness of which is shown by practices in other states of the European Union where analogical data is commonly used for scientific purposes. Over-rigorous interpretation of the law on the protection of personal data is widespread in Poland and the implementation of the GDPR (14) is likely to escalate the absurdities witnessed so far.

In research oriented at human settlements, limitations arising from shortcomings in resources increasingly often lead to a departure from comparative studies in favour of case studies, where researchers themselves collect data. For obvious reasons the information is selective with regard to the issues, limited in spatial scope and incomplete

– in the sense that a small research sample is usually used.

In the comparison of specific studies on the economic structure of villages and of the analyses of the service function, the present study is inferior to previous ones because: 1) the number of business entities is an inaccurate basis for such studies and its comparative value is limited; 2) the lack of data on the number of working people not only causes poor accuracy of the functional structure definition but also hinders the estimation of centrality, and obstructs attempts to separate centrality from nodality or to identify the (not examined in this study) economic base in villages; 3) the inaccurate distinction between particular kinds of activity based on the REGON (among other things, this mainly applies to the inability to make distinctions in education or healthcare sectors by kinds and levels) also considerably reduces the usefulness of this information to the analysis of the service function.

Notes

(1) *Poviat* – the second-order administrative division in Poland.

(2) The census was partly representative; therefore, some of the results are inaccurate.

(3) Until 1999 the Polish system operated on the basis of the European Classification of Activities [EKD], equivalent NACE Rev.1 – Statistical Classification of Economic Activities in the European Community, then the Polish Classification of Activities [PKD] was instituted (1998–2003 for two years it was in place simultaneously with EKD), subsequently (2004–2007) PKD 2004 and (since 2008) PKD 2007 (following NACE Rev.2).

(4) At this point it is worth mentioning that there are other methods of analysing village functions, e.g. methods derived from the concept of economic base (*cf* Sokołowski, 2008; Wójcik, 2010).

(5) The seat of the *gmina* (the third-order administrative division in Poland), hereinafter referred to as a 'communal village'.

(6) The average population dynamics of large villages rank them high above the national average. Incomplete data after 2011 point to a deceleration in growth in some villages and even a decrease in population in some other villages due to substantial emigration and advanced processes of ageing.

(7) The analysis left out 8 villages which are single-village communes, i.e. the communal village makes 100% of the commune.

(8) Those activities included primarily trade, numerous kinds of services, public administration, etc.

(9) More on the methods of measuring the level of centrality can be found in studies by Maik (1977, 1992) and Sokołowski (1994, 2006).

(10) The centrality index is standardised and has a uniform, 100-point scale for all villages and towns (1988) with population below 10,000.

(11) Included (in accordance with PKD 2007): G (wholesale and retail trade; repair of motor vehicles and motorcycles), H (transportation and storage), I (accommodation and food service activities), J (information and communication), K (financial and insurance activities), M (professional, scientific and technical activities), O (public administration and defence; compulsory social security), P (education), Q (human health and social work activities), R (arts, entertainment and recreation), S (other service activities).

(12) An exception was found in Słopnice (Małopolskie Voivodship), which is a single-village commune, different due to its decidedly lower percentage of centrally-focused activities.

(13) Census units included in the previous National Population and Housing Censuses covered about 1,000 inhabitants on average.

(14) Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

References

Adamowicz, M. Zwolińska-Ligaj, M. (2009). *Koncepcja wielofunkcyjności jako element zrównoważonego rozwoju obszarów wiejskich*, www.wne.sggw.pl/czasopisma/pdf/PEFIM_nr_51_2009_s11.pdf (access 20.05.2019)

Bański, J. (2006). *Geografia polskiej wsi*. PWE, Warszawa.

Bański, J. Stola, W. (2002). Przemiany struktury przestrzennej i funkcjonalnej obszarów wiejskich w

Polsce. Komisja Obszarów Wiejskich PTG, PAN IGiPZ. *Studia Obszarów Wiejskich*, 3.

Christaller, W. (1933). *Die zentralen Orte in Süddeutschland*, Gustav Fischer, Jena.

Czarnecki, A. (2009). *Rola urbanizacji w wielofunkcyjnym rozwoju obszarów wiejskich*. Wydawnictwo IRWiR PAN, Warszawa.

Eberhardt, P. Gontarski, Z. Siemiński, J. (1973). Koncepcje delimitacji aglomeracji miejskich w Polsce. *Biuletyn KPZK PAN* 79: 187-219.

Falkowski, J. (1993). *Przekształcenia funkcjonalno-strukturalne i przestrzenne obszarów wiejskich Polski (Ujęcie diagnostyczno-modelowe)*. Wyd. Naukowe UMK, Toruń.

Falkowski, J. (2009). Przekształcenia funkcjonalno-przestrzenne obszarów wiejskich w strefach podmiejskich obszarów metropolitalnych Polski. In: T. Komornicki, R. Kulikowski (ed.), *Miejsce obszarów wiejskich w zagospodarowaniu przestrzennym*, Studia Obszarów Wiejskich, Wydawnictwo IGiPZ PAN, Warszawa: 49-69.

Heffner, K. (2001). Transformacja układów osadniczych wsi a wielofunkcyjny rozwój obszarów wiejskich. In: A. Rosner, I. Bukraba-Rylska (Ed.) *Wieś i rolnictwo na przełomie wieków*, Instytut Rozwoju Wsi i Rolnictwa PAN, Warszawa: 109-132.

Heffner, K. (2011). Problemy zagospodarowania przestrzeni wiejskiej. In: I. Nurzyńska, M. Drygas (Ed.), *Rozwój obszarów wiejskich w Polsce. Diagnozy, strategie, koncepcje polityki*, Instytut Rozwoju Wsi i Rolnictwa PAN, Warszawa: 175-194.

Heffner, K. (2012:). *Ewolucja funkcji w zagospodarowaniu przestrzeni wiejskiej w Polsce*. In: A. Rosner (Ed.) *Rozwój wsi i rolnictwa w Polsce*, red. nauk. A. Rosner, Instytut Rozwoju Wsi i Rolnictwa PAN, Warszawa: 39-60.

Iwanicka-Lyra, E. (1969). *Delimitacja aglomeracji wielkomiejskich w Polsce*. Prace Geogr. IG PAN, 76.

Maik, W. (1977). A graph theory approach to the hierarchical ordering of elements of the settlement systems. *Quaestiones Geographicae* 4: 95-108.

Maik, W. (1992). *Podstawy geografii miast*, Wyd. Naukowe UMK, Toruń.

OECD/China Development Research Foundation, (2010). *Trends in Urbanisation and Urban Policies in OECD Countries: What Lessons for China?*, OECD Publishing, Paris, https://doi.org/10.1787/9789264092259-en.

Rudnicki, R. Wiśniewski, Ł. Kluba, M. (2015). Poziom i struktura przestrzenna rolnictwa polskiego w świetle wyników Powszechnego spisu rolnego 2010. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, 17, 3: 337-343.

Sokołowski, D. (1994). *Hierarchia miejscowości centralnych w makroregionie dolnej Wisły*. Acta Univ. Nicolai Copernici, Geografia 26, Wyd. Naukowe UMK, Toruń: 107-124.

Sokołowski, D. (1999). *Zróżnicowanie zbioru małych miast i większych osiedli wiejskich w Polsce w ujęciu koncepcji kontinuum wiejsko-miejskiego*. Wyd. UMK, Toruń.

Sokołowski, D. (2006). *Funkcje centralne i hierarchia funkcjonalna miast w Polsce*. Wyd. UMK, Toruń.

Sokołowski, D. (2008). The Economic Base of the Major Cities in Poland in the Political and Economic Restructuring Period. *Current Politics and Economics of Russia, Eastern and Central Europe*, 23, 3/4, Nova Science Publishers, New York: 269-286.

Sokołowski, D. (2011). Centralność większych miast Polski. Rola czynnika administracyjnego i globalizacji. In: B. Namyślak (ed.), *Przekształcenia regionalnych struktur funkcjonalno-przestrzennych, tom 2: Zmiany funkcjonalno-przestrzenne miast i obszarów wiejskich*, Rozprawy Naukowe IGiRR Uniwersytetu Wrocławskiego, 20, Wrocław: 11-23.

Sokołowski, D. (2014). New towns in Poland. *Bulletin of Geography. Socio-economic Series* 23: 149-160. DOI: : http://dx.doi.org/10.2478/bog-2014-0010

Sokołowski, D. (2015). Zróżnicowanie funkcjonalne miast zdegradowanych i restytuowanych na tle miast i wsi podobnej wielkości w Polsce Wschodniej. In: Krzysztofik R., Dymitrow M. (Eds), *Degraded and restituted towns in Poland: Origins, development, problems / Miasta zdegradowane i restytuowane w Polsce. Geneza, rozwój, problemy*, University of Gothenburg & Uniwersytet Wrocławski, Gothenburg–Wrocław: 249-269.

Stasiak, A. (1989). I etap raportu-ekspertyzy PAN pt. „Problematyka sytuacji gmin wraz z prognozą kierunków ich rozwoju w najbliższych 15-20 latach". In: *I etap badań nad stanem gmin w Polsce i perspektywami ich rozwoju*, KPZK PAN: 3-36.

Stola, W. (1993). *Struktura przestrzenna i klasyfikacja funkcjonalna obszarów wiejskich Polski*. Dokumentacja Geogr. IGiPZ PAN, 3.

Suliborski, A. (1983). Niektóre problemy badań funkcji miast w świetle podstawowych założeń koncepcji

systemowej. *Acta Universitatis Lodziensis, Folia Geographica* 2: 3-16.

Suliborski, A. (2010). *Funkcjonalizm w polskiej geografii studia nad genezą miast i pojęciem funkcji*. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Szymańska, D. (2007). *Urbanizacja na świecie*. Warszawa: Wyd. PWN.

Szymańska, D. (2013). *Geografia osadnictwa*. Warszawa: Wyd. PWN.

Szymańska, D. Matczak, M. (2002). Urbanization in Poland: Tendencies and Transformation. *European Urban and Regional Balances*, 9(1): 39-46. https://doi.org/10.1177/096977640200900104

Wlazły, A. (2018). Zrównoważony rozwój obszarów wiejskich w aspekcie teorii wielofunkcyjności. *Progress in Economic Sciences* 5: 65-94. DOI: https://doi.org/10.14595/PES/05/005

Wójcik, M. (2013). Funkcjonalizm w geograficznych badaniach wsi. Zarys problemu. In: R. Borówka, A. Cedro, I. Kavetsky (ed.), *Współczesne problemy badań geograficznych*. Uniwersytet Szczeciński, Szczecin: 198-204. DOI: https://doi.org/10.13140/2.1.2797.4729

Wójcik, M. (2010). Zmiany funkcji obszarów wiejskich w województwie łódzkim w ujęciu koncepcji bazy ekonomicznej (1999-2007). In: M. Wójcik (ed.), *Studia nad bazą ekonomiczną miast i rynkiem pracy w województwie łódzkim*, Karpacki Instytut Rozwoju Regionalnego w Nowym Sączu, Zakład Geografii Regionalnej i Społecznej UŁ, Nowy Sącz-Łódź: 57–69.

Zegar, J. (2000). Kierunki rozwoju rolnictwa i obszarów wiejskich - uwarunkowania regionalne. In: A. Stasiak (ed.), *Możliwości wielofunkcyjnego rozwoju wsi polskiej w kontekście integracji z Unią Europejską*, PAN, SGGW, Warszawa.

Zegar, J. (2008). Refleksje nad ewolucją wsi, *Wieś i Rolnictwo*, 3: 37–48.