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CHANGES IN THE LEVEL OF DEVELOPMENT OF RURAL AREAS IN POLAND AFTER ITS ACCESSION TO THE EUROPEAN UNION – RESULTS OF COMMUNE CATEGORISATION

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ABSTRACT

The aim of the paper was to present the analysis and evaluation of economic development in rural areas in Poland within a 10-year span between 2003 and 2012, i.e. in conditions of deepening integration process, when the Cohesion Policy was being implemented after accession to the European Union. The paper presents the results of research conducted by the authors across the entire country at the level of communes that employed Regional Data Banks (RDBs) of the Central Statistical Office (GUS) and GIS techniques. Allowing for comparable criteria covering eight analysed factors, relative level of development in individual communes – high, medium or low (category A, B or C, respectively) – was determined independently for four years (2003, 2008, 2010, and 2012). Then it was used as a basis for delimitation (on the national and provincial level) of areas varying in terms of the level of development (A, B and C) independent for each of these four years, and as a basis for identifying alterations in the area and population ranges in areas belonging to particular categories and their locations within the studied 10-year period.

Key words: Polish economy, rural areas, territorial variation in economic development, dynamic approach, local and regional level of analysis

INTRODUCTION

Divergent prerequisites (historical, social, economic and natural) of territorial development foster differentiation of the speed of growth and the level of economic development in space. Numerous studies [Rokicki 2004, Geodecki 2006, Miazga 2007, Adamczyk-Łojewska 2007 and 2016] confirm the observed tendency to concentrate activity in areas that have already been economically developed, particularly including development centres consisting of large urban agglomerations and their immediate vicinity [Markowski and Marszał 2006, Gaczek 2015]. In such centres with well-developed service and production functions, despite increased costs of obtaining resources, positive externalities (arising from the agglomeration, including the development of technology, knowledge, and information as well as from the ability to imitate various entrepreneurial behaviours in the environment) generally provide higher productivity of production factors, and this attracts capital and qualified workforce.

Business activity concentrated in development centres can have a beneficial effect on the development of distant regional background, including rural areas. This is the case when there are centrifugal processes of development propagation and innovation diffusion, e.g. as a result of establishing cooperation ties of various kinds within a network organisation or as a result of business delocalisation. This is fostered by

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technical progress, including the development of new information technologies, and advantages of external costs of agglomerations decreasing with intensifying concentration. The positive impact of development centres on the regional background can also be a result of the process of migration and commuting, where, as a result of the outflow of workers from overcrowded agriculture, labour productivity and income in the neighbouring areas increase [Kusideł 2010, Gaczek 2011, Adamczyk-Łojewska 2016].

With large delays in the process of structural changes and the monofunctional character of development in the regional background as well as the absence of broader intraregional cooperation ties, negative processes of excessive economic divergence and territorial polarisation of the economy can intensify as well [Adamczyk-Łojewska 2016]. For as the strength and significance of connections between large centres increases (also on a global scale), the weakening of traditional economic relations between large cities and their more distant regional background is progressing, which is characteristic for the metropolisation processes [Smętkowski 2001, Jewtuchowicz 2005]. This can lead to island-type (enclave-type) development and a specific duality – the development of two speeds. When this type of diversity becomes excessively deep and the problematic areas cover a large part of the country area and population, this may lead to macroeconomic waste of significant resources (e.g. labour), reduced management efficiency and limited rate of growth [Adamczyk-Łojewska 2007].

In areas that have not reached a certain threshold level of development in structural changes, disadvantageous conditions of development may compound. Reduction of the developmental differences in such areas is possible but it is a difficult task. It requires long-term investment expenditures aimed at accelerating beneficial structural transformations, e.g. the development of human and social capital as well as socio-economic, technical and institutional infrastructure [Siwiński 2005, Tokarski 2007], and at improving endogenic preconditions for multifunctional economic development.

In many countries, especially within the EU, efforts are made to counteract excessive territorial divergence. Within the EU, structural policy, including regional policy, is implemented and significant financial resources are allocated for achieving the objective related to real economic convergence [Klamut 2008, Kudełko et al. 2011, Dorożyński 2012]. The need to ensure an effective economic and social policy as well as intervention activities undertaken at various levels of territorial organisation – at the national level and at individual local government levels – require good identification of spatially varied and temporally fluent development prerequisites. The diagnosis resulting from the analysis of aggregated, and hence average, regional data is generally insufficient to reveal the existing differences and development problems. To identify this type of problem areas, it is important to undertake research at the level of local territorial units.

The aim of this paper was to present the results of research conducted by the authors at the local level in Poland and taking the years 2003–2012 into account, where an attempt was made to analyse and evaluate economic development of rural areas in the country in conditions of deepening integration process when the Cohesion Policy was being implemented after accession to the EU. This research was specifically aimed at determining:

- the extent to which the territorial scope of rural areas having a relatively high as well as medium and low level of development changed, and the number of citizens in such areas;
- the course of the analysed changes during the favourable economic climate of 2003–2008 and the slowdown in growth after 2008;
- whether there were differences in the course of developmental processes at the intraregional and interregional territorial level.

RESEARCH METHOD AND DATA SOURCE

As indicated in literature on the subject [Stanny 2013], the general notion of rural area development is complex, interdisciplinary, and unambiguous, whereas the more narrow concept of economic development, which is the subject analysed in this paper, is generally understood as the entirety of quantitative changes

related to production volume (goods and services) and qualitative changes in the structure of economy[1].

In case of research on economic development at the local level (communes or districts), the basic limitation is the absence of relevant statistical data (such as e.g. gross domestic product or gross value added) characterising changes in production volume at this level. The level of economic development and its variation can only be investigated as approximations by analysing a number of factors indirectly characterising the advancement of economic development at the same time. This approach was adopted in the present study, where a multifactorial method of assessing the level of development in communes was used (the table). Data necessary for this type of multifactorial analysis was provided by computer Regional Data Banks (RDBs) published by the Central Statistical Office for individual years, while using GISs (geographic information systems) enabled problem maps to be created.

In the beginning, the multifactorial method of assessing the level of development in communes had been used by the authors for analyses statistically

Table. List of studied features and value ranges of these features in group I (high level of development) and group II (medium level of development)

Feature		Feature value ranges in group	
		I	II
Persons working mainly in non-agricultural enterprises per 100 citizens in 2003, 2008, 2010 and 2012		> 35	30–35
Business entities of natural persons (registered in the REGON system) per 100 citizens in 2003, 2008, 2010 and 2012		> 8	6–8
Commune income from the share in taxes that constituted government budget income (PLN per citizen) [a]	in 2003	> 200	175–200
	in 2008, 2010 and 2012	> 480	420–480
The unemployed registered in communes per 100 citizens in 2003, 2008, 2010 and 2012		< 6	6–10
Migration balance (internal migration and migration abroad) per 1,000 citizens [b]	between 1999–2003, 2004–2008	> +20	0 to +20
	between 2009–2010, 2011–2012	> +8	0 to +8
Percentage of working age population in the general population in 2003, 2008, 2010 and 2012		> 58	56–58
Percentage of persons (aged 15 years or above) working at independent farms in the rural population in 2003, 2008, 2010 and 2012		< 10	10–15
Population density per 1 km^2 of rural areas in 2003, 2008, 2010 and 2012		> 80	60–80

[a] Value ranges for commune income from the share in taxes (that constituted government budget income) were different for 2003 than they were for other years due to statutory amendments introduced at the beginning of 2004 concerning the financing of local government units. In 2003, the percentage contribution of the commune to receipts from the income tax, paid by natural persons residing in the area of a given commune, was 16%, and in case of legal persons – 5%, whereas from 2004 these were equal to 39.34 and 6.71%, respectively. Corresponding (ca. 2.4-fold) increases in value ranges for the given feature compared to ranges from 2003 were estimated allowing for the extent of implemented changes and proportions of receipts from both taxes mentioned above.

[b] Value ranges for migration balance per 1,000 citizens were similarly differentiated, this time depending on the number of years taken into account, for which the total index was calculated. Value ranges covering five-year periods – 1993–2003 and 2004–2008 – are correspondingly greater, whereas the ranges used for analysing the two-year periods – 2009–2010 and 2011–2012 – are proportionally smaller.

[1] Wide overview of interpretations of this concept in literature and of factors taken into account was presented e.g. by Siudek and Vashchyk [2014].

characterising territorial variations in development; it was only at a later stage when the method was adjusted for the purposes of dynamic approaches as well – it was used to monitor changes in time. This required the same factors to be allowed for in analyses referring to different periods and comparable assessment criteria to be adopted, including, but not limited to, value ranges for individual features. A significant hindrance in this respect were the changes occurring across data sets published in Regional Data Banks (RDBs), e.g. those working in non-agricultural and agricultural enterprises, which necessitated adoption of simplified criteria[2].

Eight factors, shown in the table, were used to analyse the level of development in individual territorial units (rural communes and rural areas in rural/urban communes). Their selection was a result of a compromise between the desire to take into account significant features indirectly and approximately characterising the level of economic development and the ability to obtain comparable data for the entire 10-year period.

By setting two value ranges for each of the eight studied features: I for the higher level of development and II – for the medium level (the table) as well as by developing uniform principles of area classification, three categories of rural areas were identified: category A, where the level of development was relatively high and at least six features met the requirements of group I or II, including at least three features meeting the requirements of group I; category B, where the level of development was relatively average and at least four features met the requirements of group I or II; and category C where the level of development was relatively low and requirements for category A or B were not met.

Determination of the categories for all communes with rural areas across the four aforementioned years became the basis for delimitation (on the national and provincial level) of areas varying in terms of the level of development (categories A, B, and C) independent for each of these four years and a basis for identifying alterations in the area and population ranges in areas belonging to particular categories and their locations within the studied 10-year period.

RESULTS AND DISCUSSION

The categorisation of communes (rural communes and rural areas in urban/rural communes), performed independently for each of the four years (2003, 2008, 2010, and 2012) and allowing for comparable criteria within the eight studied factors, showed that in 72% of such territorial units (i.e. in 1,564 communes) the transformations that were taking place between 2003 and 2012 in the realm of the studied factors were not significant enough to affect the category (A, B or C) illustrating the level of commune development, according to the criteria applied. Category shift attested in the study for 2012 (compared to 2003) took place in case of only 28% of the territorial units with rural areas (i.e. in 607 communes). In the overwhelming majority of these communes (535, i.e. in 24% of such units in total), the shift was positive and signified improvement in the level of development measured by a shift in category: from C to B (in 350 communes), from B to A (in 163 communes), and from category C to A (in 22 communes). However, in a number of communes (72, i.e. in 3.3% of communes in total) the shift was detrimental and associated with reverting level of development in the studied years: from category B to C (in 59 communes) and from A to B (in 13 communes).

Delimitation of areas varying in terms of the level of development carried out across the entire country at the level of communes for the four years revealed that the total number of communes with rural areas fulfill-

[2] Initially (until 2003), data published for the employed covered communes, later it covered districts only. This necessitated reanalysis and commune categorisation for 2003 taking into account new criteria, modified (simplified) for the employed – the same for all years covered in the study. Data for the number of the employed was averaged in analysis at the district level. Workplaces located within districts were treated as places with employment potential for the general population of citizens of a given district. This solution provides a reasonable justification for the rising mobility of citizens, including rural citizens, in Poland as a result of developments in the automotive industry and broadened range of commuting [GUS 2014].

ing the criteria of relatively high level of development (i.e. category A) increased in balance terms in the studied 10-year period by 172 territorial units (from 203 to 375). At the national level, the surface area of such category A rural areas increased in each subsequent studied period and the increase across the entire decade (2003–2012) reached ca. 140% (from 16,700 to 40,000 km^2), while its share in rural areas in total rose from 5.7 to 13.8%. The population in these areas was on the rise as well and it expanded by 93% (i.e. from 2.1 to 4 million people) during the entire analysed period, whereas its share in the general population living in rural areas rose from 14 to 26% (Fig. 1)[3].

The total number of communes with rural areas classified as category B communes – medium level of development – in the country increased in balance terms in the years 2003–2012 by 142 territorial units (from 536 to 678). The surface area of rural areas falling within category B expanded by 41.8% (from 62,400 to 88,500 km^2) and its share in rural areas in total rose from 21.4 to 30.4% during the entire decade studied (i.e. in 2012 relative to 2003). As opposed to category A areas, the total surface area of category B areas was subject to variation during the studied period. It substantially increased (by 49.5%) in the period of favourable economic climate in 2003–2008, then it saw a slight decrease during the period influenced by worldwide financial and economic crisis, and slowdown in growth (by 1% in 2009–2010 and by 4.2% in 2011–2012). The population of category B rural areas underwent similar changes – it expanded significantly in the first five years studied (by 1.1 million people) but was on the decrease in subsequent years studied. In consequence, the population in areas classified as averagely developed (Cat. B) rose in the entire 10-year period by about 14% (i.e. by 0.6 million people) only, and its share in total population living in rural areas increased from 30.6 to 33.6% (Fig. 1).

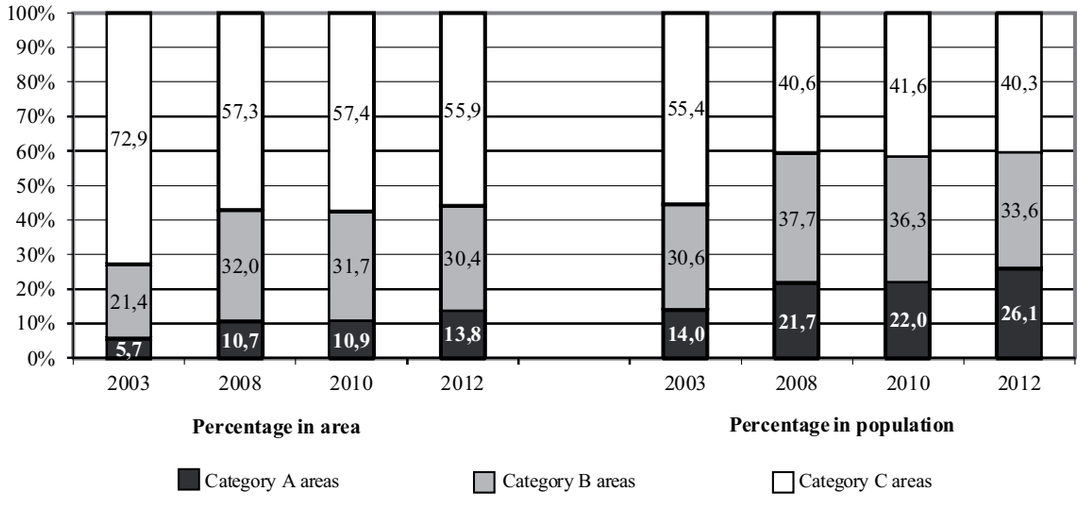


Fig. 1. The share of rural areas with high (category A), medium (category B), and low (category C) level of development in the total surface area of rural areas and in the rural population of the country in the years 2003–2012

Source: Own work based on the performed commune categorisation and delimitation of areas varying in the level of development.

[3] The much higher reported share of category A areas in population than in surface area evidences relatively high population density of such highly developed areas. In addition, the difference in the discussed percentages (for both area and population) declining across the studied period indicates that the extent of category A areas was expanding to include territories with ever smaller population density.

As the percentage of rural areas with a high and medium level of development (categories A and B) was increasing in respect of area and population, the percentage of areas lagging behind in development – category C areas – was decreasing correspondingly in the studied period. The surface area of category C rural areas in the country dropped by 23.4% (from 212,400 to 162,600 km^2) during the entire 10-year period (2003–2012), while the population of these areas dropped by 24.8% (2 million people). The share of category C areas in the total surface area of rural areas dropped down from slightly less than 73 to 56% between 2003 and 2012, whereas the share of people living in such areas lagging behind in development in the general rural population dropped from 55.4 to 40.3% (Fig. 1). The group of territorial units (rural communes and rural areas in urban/rural communes) classified as category C units shrank in balance terms by 312 (from 1,432 to 1,120) in the entire studied period.

Although the communes (with rural areas) where the level of development improved in 2012 in comparison to 2003 (as measured by a shift in category) were located in all provinces, their territorial distribution was highly varied. At the provincial level, the share of communes with improved level of development (better category) in the general number of territorial units with rural areas was found to be the highest in the western, south-western, and north-western part of the country (in the Lubuskie, Śląskie, Opolskie, Zachodniopomorskie and Kujawsko-Pomorskie Voivodships), somewhat lower in central Poland (in the Wielkopolskie, Kujawsko-Pomorskie, Łódzkie and Mazowieckie Voivodships), and the lowest in eastern and south-eastern voivodships[4] (Fig. 2).

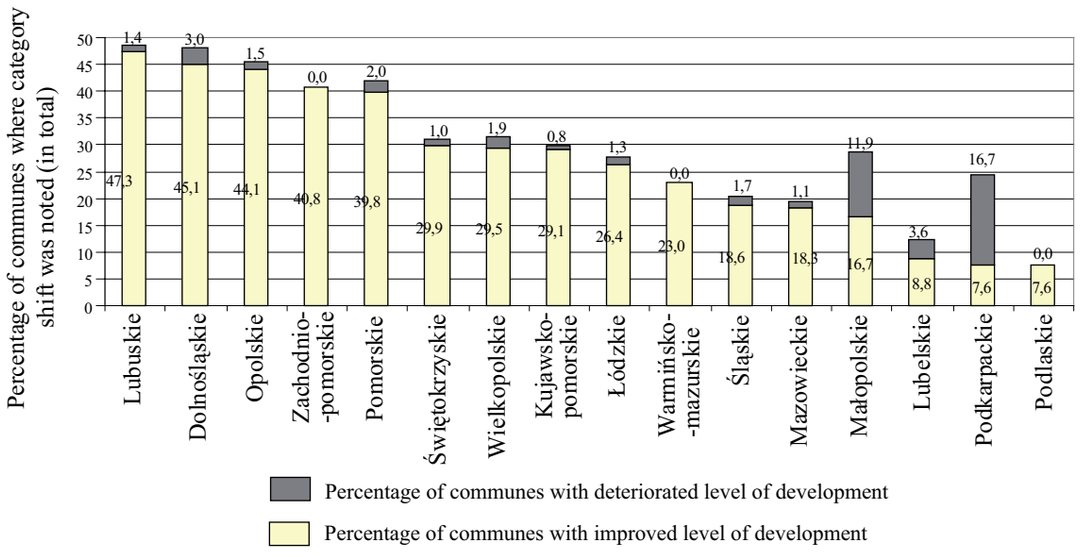


Fig. 2. The share of communes with improved and deteriorated level of development (as measured by category shift in 2012 relative to 2003) in the total number of communes with rural areas

Source: Own work based on the performed commune categorisation and delimitation of rural areas.

[4] The number of communes where the level of development (category) improved during the studied decade, which is partially a derivative of province size, was the largest in the Wielkopolskie (61 communes), Dolnośląskie (60) and Mazowieckie Voivodships (51), and the lowest in the Podlaskie (8), Podkarpackie (11) and the Lubelskie Voivodships (17) [Adamczyk-Łojewska 2016].

On the other hand, the communes where the level of development deteriorated (as measured by a shift in category) were located predominantly (70%) in three voivodships – Podkarpackie (24 communes that constituted 16.7% of communes with rural areas in total), Małopolskie (20, i.e. about 11.9% of the communes, respectively) and Lubelskie (7, i.e. 3.6% of the communes). The only province in the country where the number of communes with deteriorated level of development (13 of them) prevailed over the number of communes where the level had improved was the Podkarpackie Voivodship (Fig. 2).

In the first five years covered by the study (2003––2008), the percentage of rural areas classified as category A and B areas as a whole increased in all provinces, with the largest increase seen in western provinces. However, after 2008, during the period influenced by worldwide financial and economic crisis and slowdown in growth, increase in the percentage of such rural areas was much lower and did not occur in each province. In two provinces (Podkarpackie and Małopolskie Voivodships), the percentage of category A+B areas in respect of surface area and population decreased in 2012 relative to 2008. While in the Małopolskie Voivodship in 2012 the discussed percentage remained relatively high, it plummeted (by 9.6%) below the value noted in 2003 in the Podkarpackie Voivodship (Fig. 3).

The process of business agglomerisation around the largest cities, and, to a lesser extent, around other big and medium-sized cities as well, was clearly progressing in the studied decade. The extent of influence of the mentioned cities widened in 2012 relative to 2003. The ring of rural communes undergoing urbanisation in the close vicinity of these cities that met the criteria for category A, and later for category B, expanded. Centres of intensive concentration of such areas have formed around Olsztyn, Toruń, Gorzów Wielkopolski, Zielona Góra, Legnica, Opole and Częstochowa, as well as in the more distant regional background areas around large agglomerations, mainly in the Wielko-

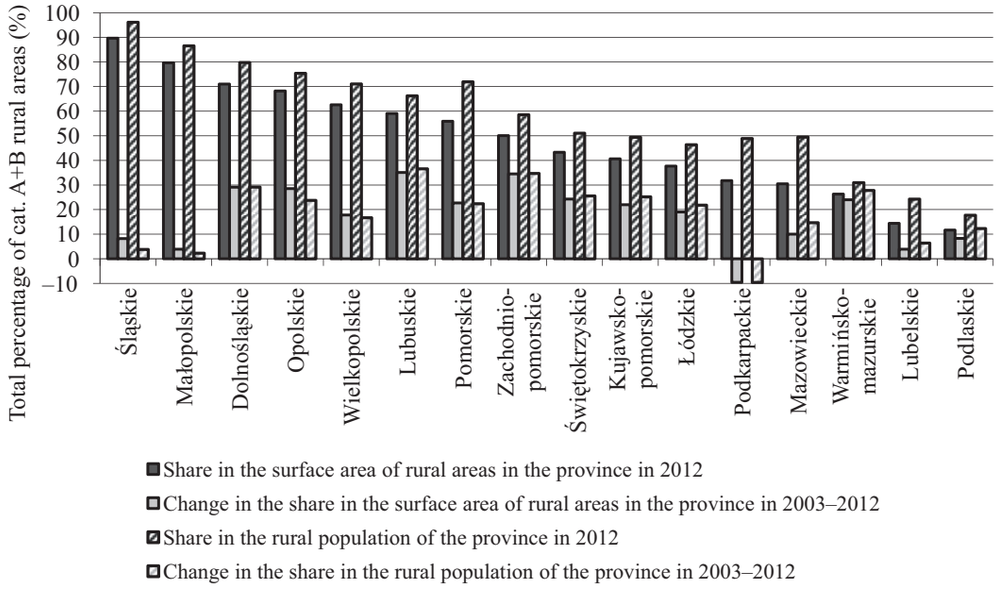
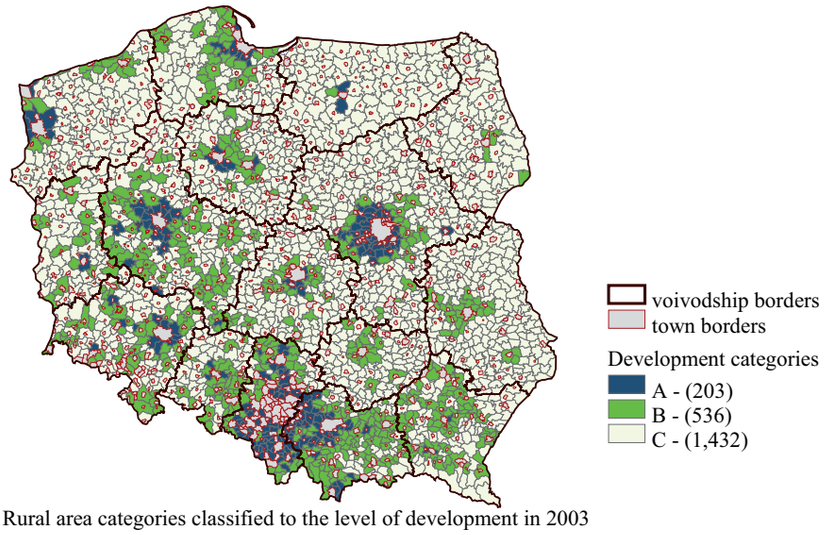


Fig. 3. The share of areas classified as category A+B areas in the total rural area surface and population of individual voivodships in 2012 and changes in the shares in years 2003–2012 (the voivodships are presented in descending order according to the share of category A+B areas in the surface area in 2012)

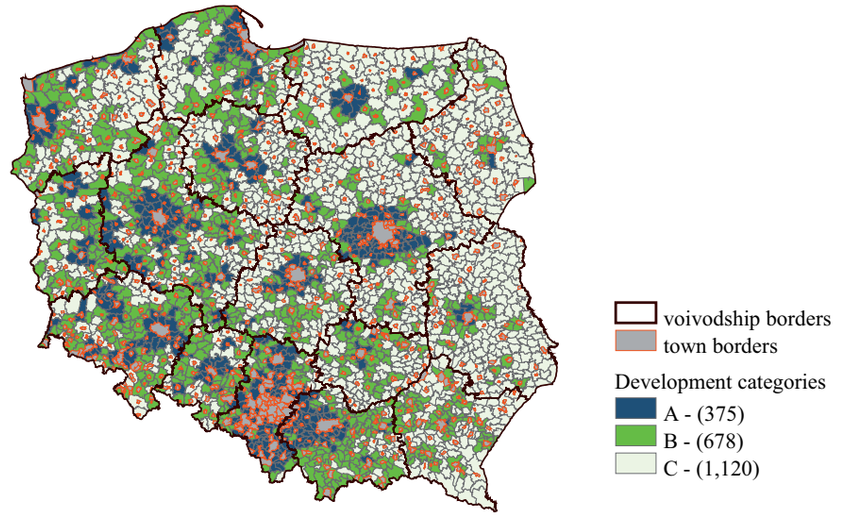
Source: Own work based on the commune categorisation and delimitation of rural areas performed on the national level.

polskie Voivodship and other western voivodships, and in the coastal belt.

In 2012, rural areas with low level of development (classified as category C areas) were found mainly in places whose location was peripheral in relation to the cities (especially large cities), most of them lying in eastern and north-eastern Poland, and, to a lesser extent, in central Poland. In 2012, the Podlaskie, Lubelskie and Warmińsko-Mazurskie Voivodships were still characterised by a very large (70–80%) percentage of rural areas with low level of development (category C); on the other hand, in the Łódzkie, Podkarpackie and Mazowieckie Voivodships this percentage was in the 60–70% value range (Figs. 3 and 4).



Rural area categories classified to the level of development in 2003



Rural area categories classified to the level of development in 2012

Fig. 4. Rural areas with various levels of development (categories A, B and C), in Poland in 2003 and 2012, determined on the basis of the executed categorization of communes for these years (in brackets the number of municipalities in a given category)

Source: Own work.

The presented research results suggest that economic development of rural areas is polarised in two dimensions, at the intraregional level (where a centre of development and peripheral areas can be distinguished) and, in particular, at the interregional level (the regions of western vs. eastern Poland). It should also be noted that the revealed results converge to an extremely large extent with results of a similar study on variation in socio-economic development, which was conducted at the level of communes and employed as much as 47 empirical indicators [Rosner and Stanny 2014].

CONCLUSIONS

The foregoing experiment of the authors, employing a multifactorial method used to evaluate the level of development of all communes in the country, including rural areas and using data from RDBs of the CSC, suggests that it is possible to monitor developmental changes in such local territorial units across time and to identify problem areas. These possibilities are indispensable in adoption of an effective economic policy at various levels of territorial organisation. The study, covering a 10-year period (2003–2012) and including the same eight factors and comparable assessment criteria, facilitated characterisation of a relative level of development in all territorial units with rural areas (i.e. rural communes and rural areas in urban/rural communes) and their classification (according to the applied principles) in one of the three categories (reflecting a relatively high, medium, or low level of development, i.e. category A, B or C, respectively). Commune categorisation of this kind performed independently for four years (2003, 2008, 2010 and 2012) was used as a basis for delimitation (on the national and provincial level) of areas varying in terms of the level of development (categories A, B and C) independent for each of aforementioned years, which gave way to the following conclusions:

- In the studied decade (2003–2012), the share of rural areas classified as highly and averagely developed areas (categories A and B) in the total rural area and population increased at the national level. As a result, the share of areas with low level of development (category C) in the total rural area and rural population decreased accordingly (from 73 to 56% and from 55 to 40%, respectively).
- While the percentage of category A areas rose in each of the four analysed periods, the percentage of category B areas rose in the years 2003–2008 and then slightly dropped compared to 2008 in conditions of unfavourable economic climate.
- Rural areas were found in all provinces; their level of development (as measured by a shift in category) improved in 2012 relative to 2003. However, improvement processes varied significantly in terms of location. The percentage of communes with category shift noted in 2012 relative to 2003 was the largest in the western, south-western, and north-western part of the country (the improvement affected 47–40% of the total number of communes in individual voivodships), somewhat lower in central Poland (within ca. 30–18%), and the lowest in eastern and south-eastern voivodships (less than 10%).
- Communes where the level of development deteriorated in the years 2003–2012 (which was measured by a shift in category) were located in 13 voivodships, usually with a few such communes (1–4) per voivodship. The number of regressive communes was significant in three provinces only (Podkarpackie, Wielkopolskie, and Lubelskie Voivodships).
- In the studied decade, the process of business agglomerisation around cities, predominantly large cities, was progressing. The territorial extent of influence of such cities on the rural areas surrounding them widened significantly. Centres of intensive concentration of rural areas with high and medium level of development have formed in the more distant background areas around large urban agglomerations, mainly in Wielkopolskie Voivodship and other western voivodships as well as in the coastal belt.
- Rural areas classified in 2012 as category C areas (low level of development) were generally located in peripheral regions relative to large cities, chiefly in eastern, north-eastern, and south-eastern Poland, and partially in central Poland. In consequence, the differences between the western and the eastern parts of the country became more pronounced.

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ZMIANY POZIOMU ROZWOJU OBSZARÓW WIEJSKICH W POLSCE PO AKCESJI DO UNII EUROPEJSKIEJ – WYNIKI KATEGORYZACJI GMIN

STRESZCZENIE

Celem artykułu jest przedstawienie analizy i oceny rozwoju gospodarczego obszarów wiejskich w Polsce w dziesięcioletnim okresie 2003–2012, tj. w warunkach pogłębiającego się procesu integracyjnego i realizowania polityki spójności po akcesji do Unii Europejskiej. W opracowaniu przedstawiono wyniki badań przeprowadzonych przez autorów w skali całego kraju w przekroju gmin, w których wykorzystano banki danych regionalnych (BDR) GUS i techniki GIS. Ze względu na brak syntetycznych mierników (PKB czy WDB) w odniesieniu do gmin, zastosowano wieloczynnikową metodę oceny poziomu rozwoju. Uwzględniając porównywalne kryteria w zakresie ośmiu analizowanych czynników, określono oddzielnie dla czterech lat (2003, 2008, 2010 i 2012) relatywny poziom rozwoju poszczególnych gmin: wysoki, średni lub niski (odpowiednio kategorii A, B lub C). Stało się to podstawą dla przeprowadzenia (w skali kraju, a także województw) czterech odrębnych delimitacji obszarów różniących się poziomem rozwoju (A, B i C) w badanych latach, a także określenia w badanym dziesięcioleciu zmian w zakresie powierzchni i liczby mieszkańców obszarów poszczególnych kategorii oraz ich lokalizacji.

Słowa kluczowe: gospodarka Polski, obszary wiejskie, terytorialne zróżnicowanie rozwoju gospodarczego, ujęcie dynamiczne, lokalny i regionalny wymiar analizy

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MEAT CONSUMPTION AS AN INDICATOR OF ECONOMIC WELL-BEING — CASE STUDY OF A DEVELOPED AND DEVELOPING ECONOMY

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ABSTRACT

The aim of the study was to verify the criterion of meat consumption as a marker of economic well-being, in economies at different phases of development. Meat consumption per capita is a widely used variable which is used to indicate the economic bases for the exclusion of meat and meat products from the diet. The study was performed simultaneously in Austria (a developed country) and Poland (a developing country) in 2015. Descriptive statistics, econometric and descriptive models were used to process the research material. Respondents were classified according to the wealth criterion, measured by the average income per household member in a given country. In the case of the developing economy, it was discovered that the meat consumption function takes the shape of an indifference curve. In the developed economy, once the income per household member exceeds 157% of the average national income, consumers exclude meat and other meat products from their diet for health reasons and reservations concerning the quality and origin of the meat. The consumption of meat in Poland is determined by income amount, at a greater degree than in a developed economy. Low income in Polish families is the reason for the exclusion of meat consumption.

Key words: well-being, meat, consumption, consumer preferences, incomes, household

INTRODUCTION

Meat is the basic group of food in many consumers' diet both in the developing and in the developed countries as it is a source of protein, ferrum, B vitamins, as well as elements important for building healthy tissues [Cosgrove et al. 2005, McAfee et al. 2010]. What is more, Johnson [2015] indicates this is an important dietary component in every age group. It promotes proper growth and development in children and ensures wellbeing and health of adults and seniors. The global per capita meat consumption reached 41.3 kg in 2005 when compared to 30 kg in 1980. Those changes were different in the developing and in the developed countries. Depending on the economic development level and the society wealth, it was found out that the meat consumption increased from 76.3 to 82.1 kg per capita in the developed economies and from 14.1 to 30.9 kg per capita in the developing economies. Importantly, according to FAO prognosis [2006], meat consumption will double by 2050 because of increased income in the developing countries and will result from the economic growth [Delgado 2003]. Additionally, according to the prognoses, in the decades to come meat consumption will approach a high though stabilising meat and meat product consumption level in the developing countries, similar to the one found in the developed ones [Vranken et al. 2014].

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The major purpose of this study was to verify the meat consumption index as the social prosperity indicator, taken as the relationship between income per one household member and the level of meat and meat product consumption broken down into consumers from a developed country, namely Austria (per capita GDP of more than EUR 47 thousand in 2016), and from a developing country, i.e. Poland, with the per capita GDP of about EUR 26 thousand).

LITERATURE REVIEW

Prosperity is a highly complex notion, and its nature has been studied by both economists and philosophers for ages. Prosperity should be understood as "doing well", as derived from Latin *prosperus*. However, a question emerges of how this doing is to be manifested and what spheres of social life it is to cover. According to Biernacki [2006], "doing well" or well-being satisfies the needs of a person with respect to basic goods, and since the goods should be useful, consuming them serves to satisfy those needs. It is important to prioritize those needs. For some people it is a priority to satisfy the necessities (eating, drinking), while others believe a sign of good life is to fulfill their spiritual needs. Such a diversity makes the definition and then measurement of prosperity ambiguous in terms of methodology and interpretation. Usually we speak of an economic prosperity and a social prosperity. According to Sen [1991], the economic prosperity is used to measure and evaluate the social prosperity, indicating the ethical value or "goodness" of interests of the whole community. The economic prosperity, on the other hand, means the utility of income [Kasprzyk 2012]. The prosperity measurement cannot be, however, reduced to measuring the economic development level of a state, as Kuznets turned the attention of NATO in 1934 to the fact that the welfare of a nation may be only slightly connected with the national income [Cobb et al. 1995]. The debate subject is, therefore, still the problem of what should be included in the prosperity calculation. According to Drabsch [2012], the aspects to be included in the deliberations on prosperity, are happiness, life satisfaction or quality of life. The prosperity concept based on the anticipated utility theory is a direction of a broadly studied quality of life which takes its single aspect in economy, i.e. the economic prosperity. Although this is a far-reaching simplification, it has been proved that there is a relation between income and the economic prosperity and this is a positive one. According to Campbell [1976], it cannot be assumed nonetheless that the objective improvement of living conditions is accompanied by the satisfaction with its current level.

Economic sciences have attempted to determine the prosperity levels in particular countries or regions, but prosperity has still been a multi-dimensional and highly subjective phenomenon. The complexity of this phenomenon is confirmed by the report published in 2009 by a commission led by Stiglitz, postulating development of further indicators describing the prosperity of individuals, societies and the sustainable development. However, despite efforts and searches no uniform prosperity measurement has been developed. Obviously, for international comparisons HDI, (human development index) is used, being a synthetic measurement of e.g. prosperity, including three fields of life [Nefs 2009]:

- life expectancy (average life expectancy);
- knowledge, evaluated based on the illiteracy and solarization;
- life standard, assessed based on the per capita GDP.

As human development index was assessed to be a measure not reflecting the social prosperity level fully, other measures were developed to determine the level of socio-economic development, including also the prosperity level. Those are the quality of life index (QLI) and the better life index (BLI) developed by OECD. The latter enables to compare the prosperity of countries based on such categories as housing conditions, financial expenditure, income, work safety and other. The studies carried out by Łopatka [2015] reveal that with respect to income, life satisfaction and housing situation Poland has achieved results below the average, while in such categories as security or education it is a leader, coming even before Austria which leads in terms of social prosperity calculated based on BLI.

The economic prosperity is a social prosperity component and is defined as a relationship between increasing wealth and its distribution in the society. As a result it should be claimed that depending on the dis-

tribution method and the capacities of wealth development by individuals creating the society, there may be significant differences in the prosperity level. A human creating a household which strives to achieve a specific standard of life in its actions, and the level of its prosperity is conditional primarily on the spendable income per one family member, is a part of the community. The income height, in turn, determines the living standard diversification in terms of quantity and quality [Kołodziejczak 2013]. The quantitative changes are reflected by the changed consumption volume which, according to Keynes [1956], is the only and ultimate business activity objective. Consumption results in increased domestic product and, consequently, the overall prosperity level. Although consumption has been criticised many times, it is beyond doubt that consumption is a component facilitating economies' growth although this may be just a short-term effect.

In the context of consumption, attention should be paid to food consumption, including meat. As indicated in the reference works, the income increase is accompanied by greater meat consumption in the developing countries, characterised by higher opulence of the society [Meissner et al. 2013], which may in turn lead to increased prices and destabilise food security [Hermann 2009]. However, as mentioned by Škare et al. [2016], the wealthy countries are expected to get even reacher, and the poor ones to get poorer. No outlook on the changes in meat consumption should neglect the fact that higher income enables the consumers to eat food of higher quality [Simo-Kengne et al. 2015] which is important both from the perspective of climate protection or health aspects, i.e. increased risk of cardiovascular diseases [Frazer 1999, Kelemen et al. 2005, Kontogianni et al. 2008] or of cancer [Cross et al. 2007, Kimura et al. 2007, Kabat et al. 2009].

As indicated by Vranken et al. [2014], the relationship between meat consumption and income may take the shape of upturned U because of problems related to environmental pollution and adverse effect of meat on health. However, it should be kept in mind that not all countries must be characterised by such a relationship because of the cultural and religious differences between them that affect the meat consumption level. As mentioned by Hubel et al. [2006], nationality has a significant impact on decisions related to food product purchase and consumption. What is more, there are certain mentions of doubts concerning the growth limit for the meat consumption [Vranken et al. 2014], concerns paying attention to the dependence between education and meat consumption level [Allais et al. 2010] and studies pointing to the need to consider ethical behaviour towards animals [Holm and Møhl 2000], or ensuring animal well-being in meat production. In developed economies consumers are interested to a higher degree in food production ensuring animal well-being [Henchion et al. 2014].

According to Henchion et al. [2014], the consumption trends indicate that the price and income will be less decisive for changes in this area. Most researchers claim that in the future the consumer choices will depend more on the quality or other factors, i.e. nutritive values or health-promoting properties. Obviously, the food quality is assessed subjectively by consumers (usually as sensory values), but the consumers demand food products (including meat ones) to be safe, healthy and guarantee high quality [Trienekens et al. 2012].

Nonetheless, the global meat consumption keeps increasing and is driven by population and income increase. However, price changes and other factors shaping meat consumption will affect not only the change in its consumption volume but rather choices of consumers who will decide to resign from red meat consumption for the benefit of white meat, produced in a way friendly for the environment and considering animal well-being (and consequently more expensive and healthier).

DATA AND METHODS

The study was carried out from January to March 2015 in two independent study samples, i.e. among Austrian and Polish consumers. To collect the study material, the diagnostic polling method, with the survey technique based on standardised survey questionnaire, was used. Likert and Guttman scales were used to create the survey questionnaire. Conclusions from the results obtained were drawn based on the description of the diagnosed phenomena and prospective regularities using the cause and effect analysis. Identification of a relationship between the income per one household member and the meat and meat product consumption

level was examined using an abridged econometric model verification procedure. The following assumption was made:

economic well-being = f(society wealth)
society wealth = Σ of household income
meat consumption = f(household income, culture, religion, other)
meaning: economic well-being ≅ f(meat consumption)

As the objective of this study was not to measure the effect of culture and religion on the meat consumption volume and as we compare European countries where certain differences in approach to meat consumption may take place but both countries originate from a similar culture, we decided the deviations in this respect should be considered a residual component (and together with other not included variables deemed incidental variables).

In connection with the proposed above-mentioned objective, two hypotheses were formulated:

- H.1. The consumption of meat and meat products increases together with the increase in the income per one household member among Polish respondents.
- H.2. The consumption of meat and meat products increases together with the increase in the income per one household member among Austrian respondents.

The identification of the relationships between the endogenous variable (meat consumption in kg) and the exogenous variable (per capita household income) was carried out based on the non-linear regression analysis. The studied relationships, expressed in algebraic terms, were subject to simplified verification procedure, suitable to study the econometric model goodness measures [Kufel 2011], eliminating the non-fitting observations.

The study of Austrian respondents enabled to gather 468 completed questionnaires and the one of Polish respondents brought 1,248 ones, meaning 1,716 respondents were examined altogether. To verify the relationship between the per capita income in a household and the meat and meat product consumption level, the answers of respondents who resigned from eating meat for any non-economic reasons where eliminated from both study samples. As a result, the basic sample of Austrian respondents comprised 419 observations, and the one of Polish respondents 1,232 records (with 1.3% of observations removed). Such a sample was subject to further verification procedure, its first stage being elimination of any discrepant observations. From both study samples, the observations discrepant from the theoretical line of the estimated model much above the calculated standard error (the standard deviation value would change during every consecutive model estimation by a repeated regression analysis) were removed. The elimination criterion adopted was the range equal to 2σ. This meant the observations where the residual component, resulting from the differences between value $\overline{Y}$ of the estimated model and the actual Y, went beyond the $(-2\sigma; +2\sigma)$ were eliminated. This was repeated until the maximum permissible number of observations was eliminated, i.e. to the limit of 20% of observations [Gawlik 2008], or until the residual component did not exceed $-/+2\sigma$. Following each elimination of a group of observations exceeding $(-2\sigma; +2\sigma)$, a repeated regression analysis was carried out to identify the best relationship possible. Having eliminated the maximum number of non-fit cases, the final regression analysis was carried out, resulting in the algebraic econometric model form. For those relationships, the following were analyzed: the goodness measures and the multiple correlation coefficient, standard error, Spearman's rank correlation coefficient and variation coefficient.

Eventually, 19.89% of observations were eliminated from the study sample in the developing country, meaning the final, refined study sample included 987 observations. For Austria, those were 19.57% and 337 observations respectively. For both study samples the regression lines, determining the actual data to the highest degree, were estimated based a on non-linear estimation.

Consumer preferences related to buying and eating meat and meat products were studied, considering also the income criterion. For every country, a group of consumers with income above the median for the sample, i.e. a group of wealthy consumers (marked as POL1, AUS1), and a group POL2, AUS2, including consumers with the per capita income below the me-

dian for the sample, i.e. a group of less wealthy consumers were distinguished. Table 1 presents the basic statistics describing the income value in Poland and Austria.

Table 1. Statistics describing the level of per capita income in the studied countries (EUR) in 2015

Specification	Poland	Austria
Minimum	160.00	316.00
Maximum	1 000.00	3 850.00
Mediana	480.00	1 610.00

Source: Own calculations based on the collected data.

The assessment of income per one household member revealed that for Polish respondents this was the amount of about PLN 1,852.71 (i.e. about EUR 450) when compared to about EUR 1,616.49 per one household member among Austrian respondents). This distinct difference in the income value between Polish and Austrian respondents results from the economic development level in the two countries and the social wealth. For Austrian consumers, it was found out that the poorest group of consumers has the income per one household member of about EUR 316. For Polish consumers, the lowest income value per one household member is about PLN 709 (EUR 160). The wealthiest households among the respondents from Austria had the average income per one household member of EUR 3,850 when compared to PLN 4,380 (ca. EUR 1,000) of the average income per one household member in Poland.

The data in Table 1 prove also that about a half of Polish consumers had the income below EUR 480 while in Austria that was 1,610, meaning that a "poorer" household member in Austria could spend the amount more than three times higher than the one in Poland.

RESULTS

The first step to assess the significance and scale of meat and meat product consumption depending on the income per one household member was the choice of consumers who did not eat meat or meat products for any reasons other than the income limitations and/or excess meat and meat product prices. The scale of excluding meat and meat products from the diet among Austrian respondents was higher than for the Polish ones, reaching the level of 10.5%, when compared to 2.1% of the Polish consumers. The diagnosed difference may be related to the consumers' habits, tradition and the specific nature of the national or regional cuisine [Stoličná 2011]. The diagnosed reasons for meat exclusion and the scale of this phenomenon in the studied countries are presented in Table 2.

Table 2. Reasons for meat exclusion from the diet among respondents in Poland and Austria (%)

Reason for exclusion	Poland	Austria
Vegetarian, vegan	9.52	36.00
Meat products are unhealthy	11.00	32.00
Low taste properties	17.00	26.00
High price	39.00	0.00
Low quality of meat products	19.00	0.00

Source: Own calculations based on the collected data.

Among the Austrian respondents, no difference was noticed in relation to the consumers' motives for eliminating meat from their diet from the income criterion perspective. The Austrian consumers' motives related to excluding meat and meat products were, therefore, independent from the income. Among the Polish respondents, it was noticed that the excess price criterion was selected in more than 74% of cases by the consumers classified into POL2 group of respondents. Similar results were obtained by Szwacka-Mokrzycka [2016, 2017]. That criterion was less important among consumers with higher income, i.e. POL1 group. In this group, the factors related to quality, sensory values and health-promoting properties of meat dishes were much more significant. Unfortunately for some Polish respondents meat and meat products are excluded from the diet due to their high price when compared to the income earned, for them meat and meat products may be almost luxury goods for this group. This insight is, therefore, an important indicator of poverty of some part of the society which was forced to resign from certain product types because of insufficient funds. Consequently, this motive does not belong to conscious convictions of customers

and is a result of economic constraints. This situation, i.e. poverty of families, is improving thanks to the social benefit programmes implemented in Poland, which have contributed to the significant reduction in poverty areas, especially among children.

The graphic presentation of the modelled relationships is shown in Figure 1.

The verification of hypotheses H1 and H2 did not provide any explicit results. The hypotheses assumed the positive value of the coincidence coefficient and the proportional (linear) increase in meat consumption in relation to the income level increase. For econometric verification of hypotheses H1 and H2 the goodness measures were used, the values of which are presented in Table 3. The relevant numbers are listed in Table 3.

The study of goodness measures for the model created to verify the study hypothesis H1 did not confirm its correctness due to the excessive (above 10%) value of the variation coefficient. It was similar for the hypothesis H2.

The verification of goodness measures for the model relationships between the level of per capita household income and the meat and meat product consumption did not corroborate the econometric correctness of the observed relationships.

Table 3. Goodness measures for the developed models

Hipothesis	Multiple correlation	R^2	V_e (%)	R_S	$\overline{R^2}$
H1	0.818	0.6693	18.14	0.7800	0.6689
H2	0.867	0.7515	11.25	0.7982	0.7500

Source: Own calculations.

The estimated relationships, though not confirmed econometrically, were characterized by very high multiple correlation coefficient values and high determination coefficient values. This means they are grounds for observing certain regularities resulting from the estimated regression functions. From the perspective of verifying the formulated study hypotheses, attention should be paid also to the shape and direction of the observed relationships.

For Polish consumers, it was found out that, in line with the hypothesis H1 proposed, the consump-

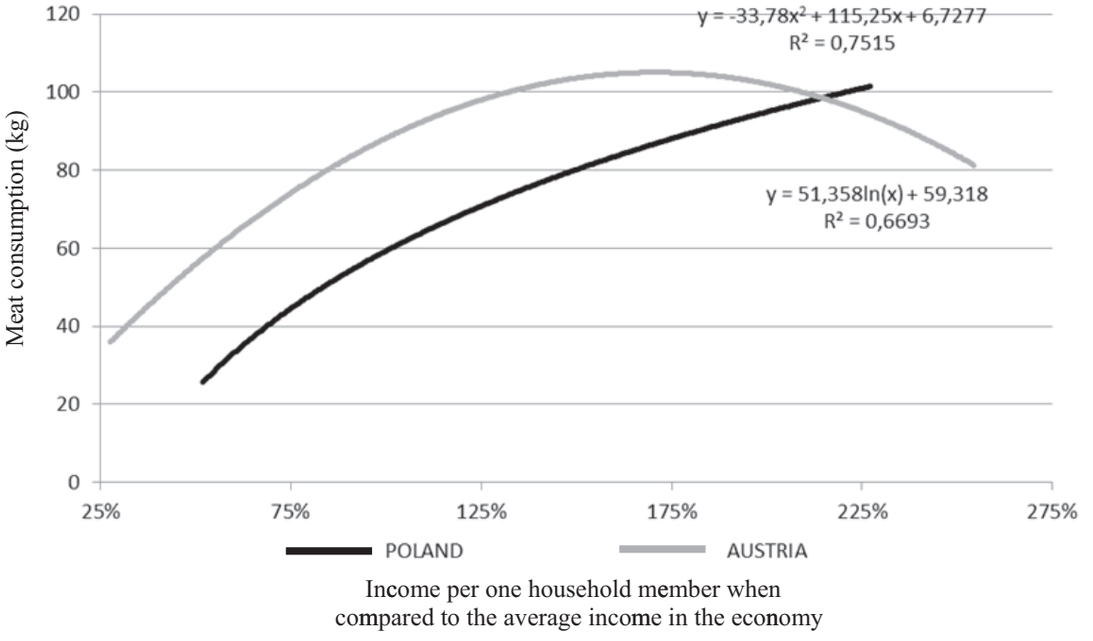

Fig. 1. Per capita household income and the meat and meat product consumption level in Poland and Austria

Source: Own compilation.

tion of meat and meat products grows together with the increase in the income per one household member. The increase in consumption, however, decelerates, meaning further income rise leads to the lower than proportional increase in meat and meat product consumption. Consequently, the estimated regression line takes the shape of a logarithmic function. From the economic perspective, it takes the shape similar to the utility function. This means we should point to the diminishing marginal utility of every meat and meat product unit consumed additionally. This can be grounds also for concluding that the demand for meat and meat products in the developing economy is not satisfied and is largely predetermined by the income height, as proven by the monotonic function. Consequently, although the econometric correctness of the estimated model has not been proven, there are grounds to confirm the hypothesis H1. Meat and meat products are considered to be ordinary goods by consumers from a developed country.

For Austrian consumers, it was found out that in accordance with the hypothesis H2 presented, the increase in the income per one household member is accompanied by the increase in meat and meat product consumption, but solely when the income does not exceed 170% of the average income per one household member in Austria. The estimated function maximum is at (170.59%; 105.03 kg), being the function extremum. Particular attention should be paid to the fact that just like for the consumers from a developed economy, the income rise leads to a lower than proportional increase in meat and meat product consumption (for $x \in (0 ; 170.59\%)$. The estimated quadratic function becomes a decreasing function as the domain of a function increases above 170.59%. As a result, along with a subsequent income growth, consumers resign from eating meat and meat products. This is indicative of a substitution effect. In such a situation meat and meat products are considered inferior goods, and as the income grows, they are replaced with other food products. As the estimated function is not monotonic, the hypothesis H2 was verified negatively.

The study carried out enabled also to determine the scale of spending on meat and meat products as percentage of income per one household member. The study was broken down into wealthy and less wealthy customers in two independent study samples. The list of results obtained is presented in Figure 2.

The list of spending on meat and meat products, presented in Figure 2, shows that the Polish and Austrian family uses 10% of its income for that purpose on average. At the same time, it should be stated that there are significant differences in the scale of

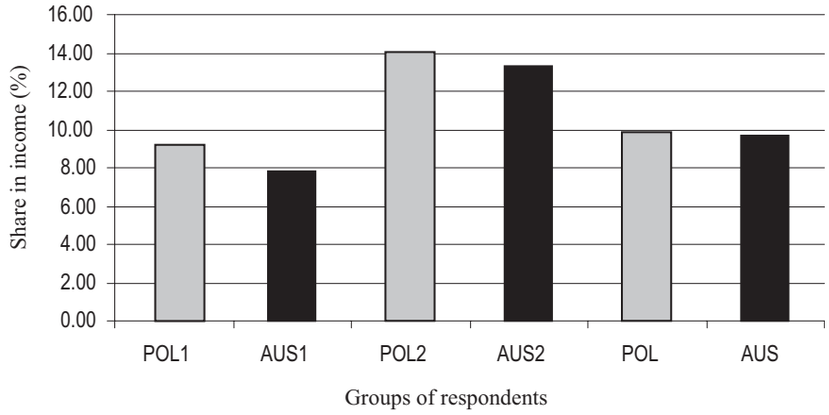

Fig. 2. Share of spending on meat and meat products in the income based on separate groups of respondents (description in the text)

Source: Own research.

spending between the groups of wealthy consumers (POL1, AUS1) as those households spent 9 and 7% of their income respectively to buy meat and meat products. The households with lower income (POL2, AUS2) spent about 14% of their income on that type of goods. The study carried out revealed that the respondents classified as less wealthy spend 4.6 p.p. on average, expressed as percentage of the income, on meat and meat products. Despite a lower nominal level of spending on meat and meat products among less wealthy consumers, because of the clearly lower average income level among the less wealthy respondents, the ultimate share of spending on meat and meat products among the less wealthy respondents is clearly higher than for the wealthier ones. The identified regularity indicates a lower meat consumption level among less wealthy consumers or purchase of food of inferior quality, which is cheaper. The presented results of studies among the Polish and Austrian respondents enable also to classify meat and meat products economically from the income flexibility perspective. On that basis it was calculated that the income flexibility of demand for meat and meat products among Polish respondents equals 0.31, when compared to 0.18 among Austrian respondents. In both cases, meat and meat products can be considered ordinary, basic goods, as confirmed also by the study results of Kwasek [2008]. Among the Polish respondents, the income flexibility value was higher, meaning the income rise results in increased demand for meat and meat products to a higher degree. Simultaneously, the income decrease may result in lower meat and meat product consumption to a higher degree than among the Austrian respondents. The identified difference proves the higher sensitivity of the Polish respondents to the income constraints which may result from still low income when compared to highly developed countries, e.g. Austria.

The diagnosed difference between the Polish and Austrian respondents may suggest that a tendency perceivable since 2011 may become stronger in the Polish society in the future, in accordance with which consumers reduce consumption of meat and meat products despite the increased social wealth. This change in most cases is not accompanied, however, by any economic pressure but it is a conscious choice of consumers. Simultaneously, the rule that less wealthy respondents declared lower consumption of meat than the wealthier ones has been observed both among Austrian and Polish respondents. Consequently, it can be declared that the economic criterion related to the per capita income in a household may be significant for the amount of the meat and meat products consumed. In both groups of respondents it was found out that the consumption of meat and meat products is lower among less wealthy respondents by about 11 p.p. on average.

The study revealed also the approach of consumers in the developed and in the developing country to meat and meat products. In the developing economy, it was found out that the income is a significant determinant of the meat and meat product consumption level. However, meat is considered to be ordinary goods, with the effect of diminishing marginal utility to be considered. This effect grows as the income rises. The study also indicated existence of similar relationship among consumers from the developed country, with this result observed solely among the less wealthy group of consumers. The increase in the consumers' wealth led to reduced consumption of meat and meat products, as indicated by the substitution effect. This group of respondents considered meat to be inferior goods.

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SPOŻYCIE MIĘSA JAKO WYZNACZNIK DOBROBYTU EKONOMICZNEGO – PRZYPADEK GOSPODARKI ROZWINIĘTEJ I ROZWIJAJĄCEJ SIĘ

STRESZCZENIE

Celem badania była weryfikacja kryterium konsumpcji mięsa jako wskaźnika dobrostanu ekonomicznego w gospodarkach na różnych etapach rozwoju. Zużycie mięsa na osobę jest powszechnie stosowaną zmienną, która służy do wskazywania ekonomicznych podstaw wykluczania mięsa i produktów mięsnych z diety. Badanie przeprowadzono równolegle w Austrii (kraj rozwinięty) i Polsce (kraj rozwijający się) w 2015 roku. Do przetworzenia materiału badawczego wykorzystano statystyki opisowe, modele ekonometryczne i modele opisowe. Badanych klasyfikowano według kryterium zamożności mierzonego średnim dochodem na członka gospodarstwa domowego w danym kraju. W przypadku rozwijającej się gospodarki odkryto, że funkcja konsumpcji mięsa przyjmuje kształt krzywej obojętności. W rozwiniętej gospodarce, w której dochód na członka gospodarstwa domowego przekracza 157% średniego dochodu narodowego, konsumenci wykluczają mięso i inne produkty mięsne ze swojej diety ze względów zdrowotnych i z powodu zastrzeżeń w kwestii jakości i pochodzenia mięsa. Konsumpcja mięsa w Polsce jest determinowana przez wielkość dochodów w większym stopniu niż w rozwiniętej gospodarce. Mały dochód w polskich gospodarstwach domowych jest przyczyną wyłączenia mięsa z konsumpcji.

Słowa kluczowe: dobrobyt, spożycie mięsa, preferencje konsumentów, dochody, gospodarstwa domowe

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DIFFERENTIATION OF SOCIAL CAPITAL LEVEL IN RURAL CITIES OF THE WEST POMERANIAN VOIVODESHIP ACCORDING TO THE CRITERION FOR INCOME – RESEARCH RESULTS

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ABSTRACT

Evolution of societies means that factors that generate socio-economic development also evolve. Classic growth determinants are not enough to further improve the economic situation. The paper draws attention to the so-called soft factors, which are increasingly important in generating progress in highly developed countries, and focuses on one of them, i.e. social capital. It forms on the basis of trust, cooperation, participation, and these components have the strongest influence in the immediate environment. At the same time, the strength of their impact decreases with the increase of the radius of range. Therefore, it implies the selection of measurement tools which optics should be limited locally. Therefore, the aim of the article is to present the relationship between social capital and income at the local level, i.e. in rural communes of the West Pomeranian Voivodeship. This is important due to the search for categories that could contribute to creating and multiplying social capital.

Key words: trust, commitment, participation, income, social capital, soft factors

INTRODUCTION

Evolution of societies means that factors that generate socio-economic development also evolve. The focus of development stimulators over the centuries has shifted from physical strength, through material and human capital, shifting the economic framework of growth determinants. Classic factors are no longer enough to drive progress. This is particularly noticeable in highly developed countries, in which researchers deepened the analysis aimed at seeking sources of growth. At the end of the last century, much attention was paid to information as a key element of success. Then they turned to knowledge as a category that creates progress. In the meantime, efforts in further searches, which conclusions indicate the so-called soft factors as the main determinants of socio-economic development of countries that have already achieved a high level of development and a sufficient level of saturation of the high-quality economy with classical factors of production, i.e. labor, land, and capital. Less developed countries still have the opportunity to grow by improving the quality of the listed classical factors, however, in the best-developed countries, their possible development is no longer translated into economic growth. Due to the assumption in the theory of economy that the consumer prefers more than less, the characteristic feature of modern societies – including the most developed ones – is not so much the maintenance of *status quo*, but the pursuit of further enlargement of various socio-economic categories. Hence the focus on factors that will continue to support socio-

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-economic development in highly developed countries. The subject of this article is the concentration on social capital, as one of the soft factors which key importance in the development of highly developed economies is indicated in the literature of the subject. Social capital is an intangible category, and therefore also difficult to measure, hence every attempt to observe and look for its sources and dependencies contributes to its closer knowledge and better understanding.

Social capital is created on the basis of trust, cooperation, participation, etc., and these are the components that have the strongest impact in the immediate environment, and the strength of their impact decreases with the increase in the radius of range. Therefore, it implies the selection of a measurement instrumentation which optics should be limited locally. In connection with the above, this article focuses on the study of the level of social capital and its dependence on income at the local level, i.e. in rural communes of the West Pomeranian Voivodeship. The aim of the paper is to present the relationship between social capital and other categories that could contribute to creating and multiplying social capital. Due to the limited scope of this study, individual components of social capital have been referred to the income of households. Verification of the existence of a positive relationship between the level of income and the level of social capital was verified.

Social capital is an interdisciplinary category which has been taken over by economics from sociology and which is still living at the junction of these two disciplines. To be precise, it should be said that although it is most widely discussed by economists and sociologists, it was also noticed by psychologists, politicians, culture experts, anthropologists, etc. Social capital is defined ambiguously due to its intangibility and difficulty of measurement. Additional difficulties arise from its multifaceted nature, which is often the resultant of various goals that individual researchers carry out. According to Coleman [1990], it is a set of resources rooted in family relationships and in the social organization of a given community. Putnam [1995] identified social capital with the structures of civil society, while according to the OECD, social capital is a network of dependencies created by norms, values and beliefs that facilitate cooperation within and between social groups. The immanent feature of social capital, however, is evident in every definition that it is based on trust, cooperation or commitment.

According to the World Bank, social capital refers to institutions, norms and relations that shape the quality and quantity of social interaction of a given community, but it is not only the sum of institutions that are the basis of society, but is a kind of glue, a binder that connects them [ONS 2001]. Thus, the social capital, by its very nature, is part of the trend of the new institutional economy focusing on the role of institutions in the efficient functioning of the economy. At the same time, the institutions defined by cultural norms, customs and traditions can be formal and informal, because they are "formal rules, informal coercion and ways to impose and enforce them" [North 1986]. Institutions identified with the rules of behavior, structures and social systems, norms and customs influence the level of transaction costs that are also the focus of the new institutional economy. And social capital, as the literature of the subject indicates, lowers transaction costs, facilitates operations and makes them safe [Moroń 2009].

In Poland, the importance of social capital and the need to conduct research in this area were also recognized, acknowledging that social capital is, apart from the land, labor, financial, physical and human capital, a determinant of the development of economies [Matysiak 1999, Kaźmierczak 2007, Sztompka 2016, Tarkowski 2017]. Polish researchers define it as "the individual's ability to obtain valuable material or symbolic goods through social relations or group membership, as well as the collective ability to take collective action, through voluntary participation, trust in the institution and following recognized standards of conduct" [Sztompka 2016] or as a "component of skills of co-action and co-operation of individuals within social groups, social organizations and institutions of various types (not only economic) for the implementation of common goals" [Januszek 2005]. Matysiak defines it through elements such as: social trust, legal institutions regulating the interaction between people and their rights to resources, norms of reciprocity. The emergence of a new pro-development factor in the awareness of researchers has become the premise for conducting research on social capital. Partial results in this area are presented, for example, in the *Social Diagnosis* published every two years by

Czapiński and Panek [2015]. They cover the whole area of the country, but concern selected aspects of social capital. In-depth research, though on a smaller scale, as regards Wielkopolska, were conducted by a scientific team from the Poznan University of Technology, under the supervision of Skawińska [2011] as part of the project *Study of social capital as a factor determining the effectiveness of the social policy strategy in Wielkopolska*. The effect of these studies was, among others stating that the level of social capital depends on such features as: age, sex, education, place of residence and work experience. On the local scale, the impact of social capital was also analyzed by Gwiaździńska-Goraj, Goraj, Sobolewska-Węgrzyn [2017], while in the context of rural development, it was emphasized, among others, by Miś [2015]. A lot of place in Polish scientific literature is also taken by emphasizing in the creation of the development of rural areas of entrepreneurship, activity and despite the lack of direct indication in the titles of the publications of social capital itself, these are its inherent components, which also indirectly confirms its pro-development character [Rosner and Stanny 2007, Pomianek 2010, Knapik 2017].

MATERIAL AND METHODS

The results of the analyzes presented in this paper come from surveys conducted using a questionnaire survey among residents of rural communes in the West Pomeranian Voivodeship. After rejecting incomplete and/or illogical questionnaires, 2,409 respondents were qualified for the analysis. Most of the respondents were women (58%). Almost half of the respondents did not exceed 30 years of age.

Due to the limited volumetric framework of this publication, only three components of social capital were considered, namely trust that consisted of generalized trust, trust in the commune authorities and trust in the institution, participation in elections and involvement manifested in membership in non-governmental organizations, attempts to exert influence or doing something for the commune and activities for the benefit of the local community.

RESULTS AND DISCUSSION

The results of the most important variables, i.e. participation, trust and commitment, and social capital as the sum of the above-mentioned elements were compared in groups differentiated in terms of average monthly income. For this purpose, the significance of differences in individual outcomes between respondents with different income levels was examined. Table 1 presents the results of the abovementioned research on the significance of differences.

As can be seen from data in Table 1, people with different income levels differed statistically significantly in terms of both social capital ($P < 0.001$) and each of its elements separately ($P < 0.001$). In each case studied, statistically significant differences were found between the different groups. In the further part

Table 1. Investigation of the importance of differences with regard to the social capital between groups diversified in terms of income (results of variable analysis)

Variable	Variable analysis Selected effects are significant at the level $P < 0.05000$							
	SS effect	*df* effect	*MS* effect	*SS* error	*df* error	*MS* error	*F*	*P*
Participation	369.00	5	73.800	1 314.72	2 409	0.54712	134.8886	0.00
Trust	19 754.21	5	3 950.843	24 937.94	2 409	10.37783	380.7001	0.00
Commitment	2947.89	5	589.578	5 093.75	2 409	2.11975	278.1364	0.00
Social capital	40 299.70	5	8 059.940	42 620.40	2 409	17.73633	454.4312	0.00

SS – sum of squares of the tested effect and error; *df* – intergroup and intra-group degrees of freedom; *MS* – mean sum of effect and error squares; *F* – statistics value; *P* – test probability.

Source: The author's own research outcomes.

of the paper, there are drawings depicting basic descriptive statistics (M – median, and SD – standard deviation) concerning individual elements of social capital and social capital itself, recorded in groups differentiated in terms of income. Their analysis allowed to verify the differences between particular groups, which – as demonstrated by the analysis of variations – are statistically significant.

The respondents with average monthly net income of up to PLN 10,000 most often voted in the last municipal elections (Table 2), of which the highest percentage of such indications concerned people earning PLN 1,001–2,000 (95.7%), while the smallest – PLN 2,001–4,000 (43.5%). In turn, people with incomes in excess of PLN 10,000 in the majority admitted that they did not vote in the last local elections (56.4%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and voting in the last local elections ($P < 0.001$).

Persons earning up to PLN 1,000 and from PLN 1,001 to 2,000 recorded a similar, quite high level of participation, amounting to 0.86 and 0.9 on average, with standard deviations equal to 0.5 and 0.4, respectively (Fig. 1). In the group of people earning PLN 2,001–4,000, the level of participation was much smaller and amounted to an average of 0.1 (standard deviation – 0.9). Then, along with incomes (up to PLN 6,001–10,000 inclusive), the average level of participation grew and amounted to 0.2 (standard deviation – 0.9) – PLN 4,001–6,000 and 0.6 (standard deviation

Table 2. Vote in the last launching self-government between groups diversified in terms of income (results of variable analysis) (%)

Item	Average monthly net income (PLN)						Results of the test
	up to 1 000	1 001–2 000	2 001–4 000	4 001–6 000	6 000–10 000	over 10 000	
Yes	93.0	95.7	43.5	56.7	73.9	43.6	$\chi^2 = 659.632$; $df = 10$; $P = 0.000$
No	7.0	4.3	37.5	34.5	11.3	56.4	
Don't know	0.0	0.0	19.0	8.8	14.8	0.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Source: The author's own research outcomes.

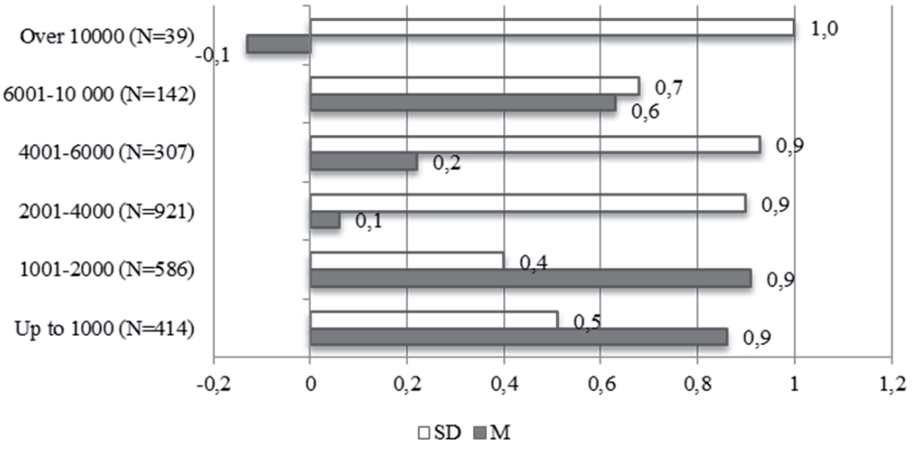

Fig. 1. The level of participation divided into the income of the respondents (basic descriptive statistics)

Source: The author's own research outcomes.

– 0.7) in the PLN 6,001–10,000 group respectively. Whereas in the group of people with income exceeding PLN 10,000 per month, the level of participation was the lowest of all and at the same time negative, amounting to –0.1 (standard deviation – 1.0) on average.

The respondents earning a maximum of PLN 4,000 and more than PLN 10,000 mostly expressed the opinion that caution in dealing with people is never too much (53.9–95.4%) (Table 3). In turn, people earning from PLN 4,001 to PLN 10,000 most often did not have an opinion on this subject (72.3 and 50.0%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and trust towards other people ($P < 0.001$) – Table 3.

The group earning PLN 2,001–4,000 had the highest percentage of people who did not trust most institutions (Table 4). This applies to entities such as commercial banks, where the respondents earning PLN 2,001–4,000, most often from all groups, indicated lack of trust (84.9%), and people earning over PLN 10,000 most often trusted the institution (53.9%). In addition, the list of such entities included: the Sejm (the lower house of the Polish parliament) (95.3% of people from the PLN 2,001–4,000 group did not trust this institution), people from the PLN 4,001–6,000 group most often trusted it (37.5%); the President (64.6%), who most often trusted people from the PLN 1,001–2,000 group (56.3%); European Parliament (51.5%), most often trusted by people from the PLN 6,001–10,000 group (38.7%); Police (69.9%), most often trusted by people from the PLN 1,001–2,000 group (51.2%); the government (75.1%) most often trusted by people from the group of over PLN 10 000 (48.7%); ZUS (The Polish Social Insurance Institution – state organisational unit) (86.2%), most often trusted by people from the group of over PLN 10,000 (41.0%); OFE (Open Pension Funds) (70.4%), most often trusted by people from the group of over PLN 10,000 (23.1%) and insurance companies (76.8%), most often trusted by people from the group of over PLN 10,000 (48.7%).

In the case of courts, people earning PLN 2,001––4,000 at the same time most trusted (53.8%) and distrusted (42.2%) this institution – this was due to the fact that this group was the most determined in terms of trust in the courts (only 4.0% of respondents in this group indicated the answer "hard to say", while in the remaining groups the percentage of such responses fluctuated between 18.8 and 37.3%). In second place in terms of trust in the courts there were people earning PLN 1,001–2,000 (47.3%), and in terms of distrust – up to PLN 1,000 (35.0%), respectively.

The National Bank of Poland was most often trusted in all groups of people earning PLN 2,001–4,000 (79.8%), and people earning up to PLN 1,000 (35.5%) most often indicated a lack of trust in this institution, respectively. In turn, people earning over PLN 10,000 most often trusted the stock market (38.5%), and the lack of confidence in this institution was most often indicated by people earning up to PLN 1,001–2,000 (50.7%), respectively.

However, the majority of people earning a maximum of PLN 10,000 trusted the family members and neighbors (87.4–95.7% and 54.5–95.7%, respectively). The respondents earning over PLN 10,000 much less often trusted family members (43.6%) – more often they were unable to determine whether they trust them (48.7%), and most people in this group did not

Table 3. Trust in people in income groups (%)

Item	Average monthly net income (PLN)						Results of the test
	Up to 1 000	1 001–2 000	2 001– 4 000	4 000–6 000	6 001–10 000	over 10 000	
Most people can be trusted	40.3	7.0	4.2	23.8	39.4	43.6	$\chi^2 = 1\,925.777$; $df = 10$; $P = 0.000$
Can't be too careful	58.0	91.5	95.4	3.9	10.6	53.9	
Hard to say	1.7	1.5	0.3	72.3	50.0	2.6	

Source: The author's own research outcomes.

Table 4. Institutional trust in income groups (%)

Trust		Average monthly net income PLN						Results of the test
		up to 1 000	1 001–2 000	2 001–4 000	4 001–6 000	6 001–10 000	over 10 000	
Commercial banks	yes	30.7	31.6	6.5	38.8	38.7	53.9	$\chi^2 = 606.195$; $df = 10$; $P = 0.000$
	no	33.1	41.0	84.9	29.3	31.0	20.5	
	hard to say	36.2	27.5	8.6	31.9	30.3	25.6	
National Bank of Poland	yes	29.7	36.0	79.8	29.0	35.9	43.6	$\chi^2 = 518.064$; $df = 10$; $P = 0.000$
	no	35.5	31.7	13.5	34.5	31.7	33.3	
	hard to say	34.8	32.3	6.7	36.5	32.4	23.1	
Sejm	yes	5.8	1.7	0.7	37.5	27.5	18.0	$\chi^2 = 814.678$; $df = 10$; $P = 0.000$
	no	70.1	78.2	95.3	30.3	38.0	61.5	
	hard to say	24.2	20.1	4.0	32.3	34.5	20.5	
President	yes	32.9	56.3	31.6	33.9	26.8	38.5	$\chi^2 = 436.438$; $df = 10$; $P = 0.000$
	no	37.2	31.1	64.6	31.6	34.5	41.0	
	hard to say	30.0	12.6	3.8	34.5	38.7	20.5	
European Parliament	yes	29.0	34.3	13.7	35.2	38.7	23.1	$\chi^2 = 145.661$; $df = 10$; $P = 0.000$
	no	37.0	34.6	51.5	30.6	25.4	28.2	
	hard to say	34.1	31.1	34.9	34.2	35.9	48.7	
Police	yes	41.3	51.2	26.7	30.0	34.5	35.9	$\chi^2 = 423.402$; $df = 10$; $P = 0.000$
	no	32.6	32.6	69.9	37.1	32.4	35.9	
	hard to say	26.1	16.2	3.4	32.9	33.1	28.2	
Government	yes	28.5	6.5	3.0	30.3	31.7	48.7	$\chi^2 = 432.947$; $df = 10$; $P = 0.000$
	no	48.1	71.0	75.1	32.3	34.5	23.1	
	hard to say	23.4	22.5	21.8	37.5	33.8	28.2	
ZUS	yes	7.0	2.6	1.1	36.8	34.5	41.0	$\chi^2 = 690.602$; $df = 10$; $P = 0.000$
	no	67.4	77.7	86.2	29.6	33.1	25.6	
	hard to say	25.6	19.8	12.7	33.6	32.4	33.3	
Stock market	yes	33.6	19.5	5.2	30.9	25.4	38.5	$\chi^2 = 257.172$; $df = 10$; $P = 0.000$
	no	36.5	50.7	43.2	34.5	41.6	33.3	
	hard to say	30.0	29.9	51.6	34.5	33.1	28.2	
Open pension funds (OFE)	yes	4.1	2.4	0.4	22.2	18.3	23.1	$\chi^2 = 297.697$; $df = 10$; $P = 0.000$
	no	61.4	65.9	70.4	44.0	50.7	46.2	
	hard to say	34.5	31.7	29.2	33.9	31.0	30.8	
Courts	yes	43.7	47.3	53.8	34.9	33.1	41.0	$\chi^2 = 219.407$; $df = 10$; $P = 0.000$
	no	35.0	34.0	42.2	32.9	29.6	30.8	
	hard to say	21.3	18.8	4.0	32.3	37.3	28.2	
Insurance companies	yes	10.6	2.9	1.3	32.3	34.5	48.7	$\chi^2 = 506.275$; $df = 10$; $P = 0.000$
	no	57.7	66.9	76.8	34.5	38.0	35.9	
	hard to say	31.6	30.2	21.9	33.2	27.5	15.4	
Family members	yes	93.0	95.7	87.4	95.1	88.7	43.6	$\chi^2 = 151.449$; $df = 10$; $P = 0.000$
	no	1.7	1.5	2.7	1.3	1.4	7.7	
	hard to say	5.3	2.7	9.9	3.6	9.9	48.7	
Neighbors	yes	93.0	95.7	54.5	81.4	88.7	43.6	$\chi^2 = 611.192$; $df = 10$; $P = 0.000$
	no	5.3	2.7	40.2	3.9	10.6	53.9	
	hard to say	1.7	1.5	5.3	14.7	0.7	2.6	

Categories add up to 100%.

Source: The author's own research outcomes.

trust their neighbors (53.9%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and confidence in each of the above institutions and people ($P < 0.001$).

The respondents earning up to PLN 1,000 and from PLN 4,001 up most often trusted the commune authorities (43.6–89.1%) – Table 5. In turn, people with incomes from PLN 1,001 to 4,000 most often did not trust the commune authorities (39.4 and 47.2%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and trust to the commune authorities ($P < 0.001$).

In terms of the level of trust, the respondents with different income can be divided into two groups – earning a maximum of PLN 4,000 and earning a minimum of PLN 4,001 (Fig. 2). The respondents earning a maximum of PLN 4,000 recorded a negative average level of trust, which means that they did not trust different institutions and people more often. What is more, in this group, the level of trust decreased along with the increase in income. Among people earning up to PLN 1,000, the level of trust was on average –1.9, PLN 1,001–2,000 –4.3, while those earning PLN 2,001––4,000 –6.8. However, the respondents earning a minimum of PLN 4,001 recorded a positive level of trust, which in turn means that they trusted different institutions and people more often. Moreover, in this group – as in the previous one – the level of trust decreased along with the increase in income. Among those earning PLN 4,001–6,000, the level of trust was on average

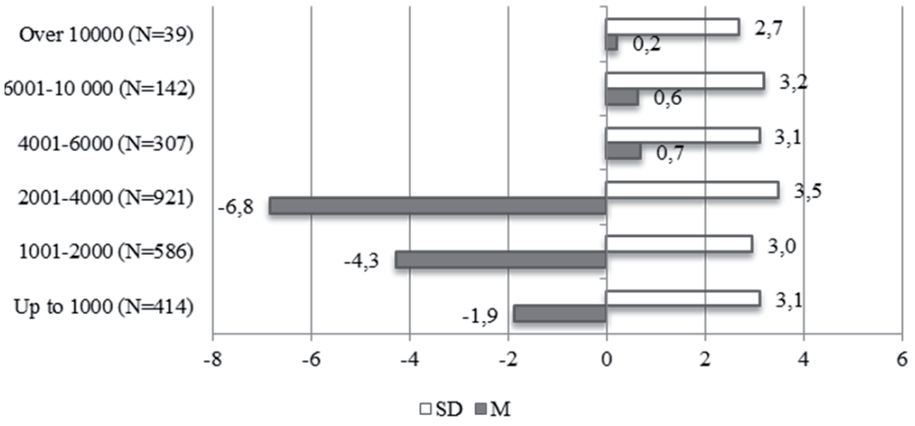

Fig. 2. Trust among groups diversified in terms of income (basic descriptive statistics)

Source: The author's own research outcomes.

Table 5. Trust in the commune authorities among groups diversified in terms of income (%)

Item	Average monthly net income (PLN)						Results of the test
	up to 1 000	1 001–2 000	2 001–4 000	4 001–6 000	6 001–10 000	over 10 000	
Definitely yes	2.2	9.6	2.4	0.0	0.0	0.0	$\chi^2 = 1308.892$; $df = 20$; $P = 0.000$
Rather yes	89.1	25.6	10.4	80.1	85.9	43.6	
Rather no	4.1	39.4	47.2	17.3	7.0	20.5	
Definitely no	2.7	11.8	5.0	1.3	1.4	15.4	
Don't know	1.9	13.7	35.0	1.3	5.6	20.5	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Source: The author's own research outcomes.

0.7, among those earning PLN 6,001–10,000 – 0.6 respectively, and those earning over PLN 10,000 –0.2. In turn, the values of standard deviation were similar in all groups and fluctuated from 2.7 (among those earning over PLN 10,000) to 3.5 (among those earning PLN 2,001–4,000).

The respondents from each income group in the majority indicated that they do not belong to any social organization (Table 6), the highest percentage of such indications concerned people earning up to PLN 2,001–4,000 (98.2%), while the smallest – above PLN 10,000 (53.9%). Only those who earned PLN 4,001––6,000 belonged to such an organization (12.7%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and affiliation to some social organization ($P < 0.001$).

Almost all respondents – apart from those earning from PLN 4,001 to PLN 10,000 – usually never attempted to exert any influence, to do something for the commune (48.1–65.2%) – Table 7. However, the vast majority of people earning from PLN 4,001 to PLN 10,000 have ever made such attempts (80.1% and 88.7%). The results of the χ^2 test indicate that there was a statistically significant relationship between income and making any attempt to exert influence to do something for the commune ($P < 0.001$).

The respondents with incomes up to PLN 1,000 and from PLN 4,001 to 10,000 usually played the role of an active participant in activities for the benefit of the local community (40.3–66.1%) – Table 8. People with income between PLN 1,000 and 4,000 usually acted as a passive participant (64.3 and 46.3%). In turn, most people earning over PLN 10,000 (56.4%) were unable to clearly determine their role in activities for the benefit of the local community. The results of the χ^2 test indicate that there was a statistically significant relationship between income and making any attempt to exert influence, to do something for the commune ($P < 0.001$).

The respondents earning up to PLN 1,000 showed a positive level of involvement (median 1.2, standard deviation 1.8), as well as people with income above PLN 4,000 (Fig. 3). People from income groups PLN 1,001–2,000 and PLN 2,001–4,000 recorded a negative average commitment level of –0.5 (standard deviation 1.3) and –0.9 (standard deviation 1.1), respectively. In contrast, in the remaining groups of

Table 6. Belonging to a social organization among groups diversified in terms of income (%)

Item	Average monthly net income (PLN)						Results of the test
	up to 1 000	1 001–2 000	2 001– 4 000	4 001– 6 000	6 001–10 000	over 10 000	
Yes	0.0	0.0	0.0	12.7	0.0	0.0	$\chi^2 = 564.297$; $df = 10$; $P = 0.000$
No	89.6	96.4	98.2	62.9	77.5	53.9	
Don't know	10.4	3.6	1.9	24.4	22.5	46.2	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Source: The author's own research outcomes.

Table 7. To do something for the commune among groups diversified in terms of income (%)

Item	Average monthly net income (PLN)						Results of the test
	up to 1 000	1 001–2 000	2 001–4 000	4 001–6 000	6 001–10 000	over 10 000	
Yes	32.6	5.8	3.4	80.1	88.7	43.6	$\chi^2 = 564.297$; $df = 10$; $P = 0.000$
No	48.1	65.2	64.9	19.9	11.3	56.4	
Don't know	19.3	29.0	31.7	0.0	0.0	0.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Source: The author's own research outcomes.

Table 8. Role in activities for the local community among groups diversified in terms of income (%)

Item	Average monthly net income (PLN)						Results of the test
	up to 1 000	1 001–2 000	2 001–4 000	4 000–6 000	6 001–10 000	over 10 000	
As the initiator of the project	15.0	4.1	2.6	6.5	0.0	0.0	$\chi^2 = 1403.111$; $df = 20$; $P = 0.000$
As the main project implementer	22.2	4.6	2.2	7.5	13.4	0.0	
Active participant	40.3	8.4	4.0	66.1	60.6	43.6	
Passive participant	13.0	64.3	46.3	2.3	14.8	0.0	
Don't know	9.4	18.6	45.0	17.6	11.3	56.4	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Source: The author's own research outcomes.

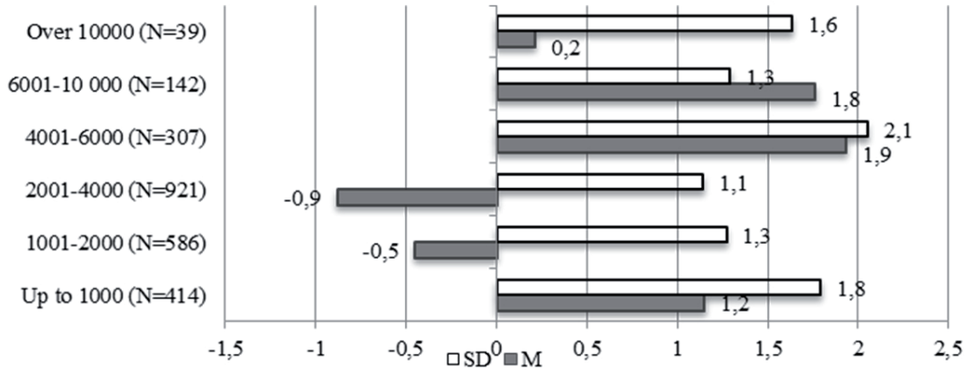

Fig. 3. Commitment among groups diversified in terms of income (basic descriptive statistics)

Source: The author's own research outcomes.

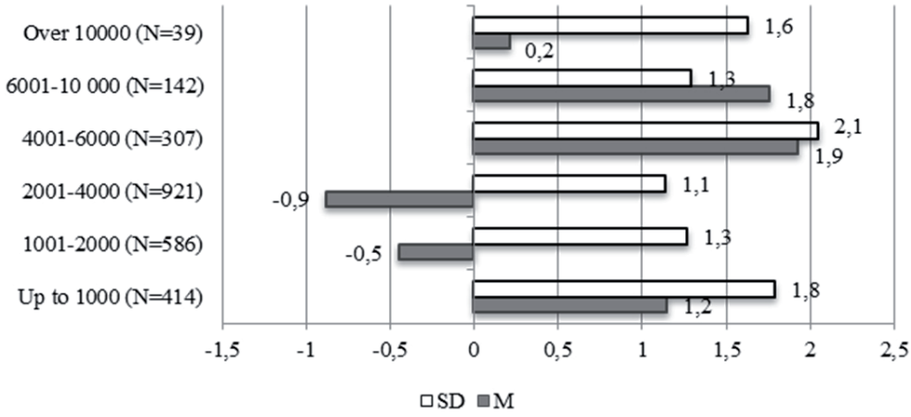

Fig. 4. Social capital among groups diversified in terms of income (basic descriptive statistics)

Source: The author's own research outcomes.

respondents earning a minimum of PLN 4,001, the level of involvement decreased with incomes, of which in the groups PLN 4,001–6,000 and PLN 6,001–10,000 it was similar and amounted to 1.9 (standard deviation 2.1) and 1.8 (standard deviation 1.3) respectively, while in the group of earners above PLN 10,000 the level of involvement was much lower and amounted to 0.2 (standard deviation 1.6).

In terms of total social capital, the lowest level was recorded by people earning PLN 1,001–2,000 and PLN 2,001–4,000, amounting to –3.8 and –7.7 respectively (Fig. 4). These groups were the only ones to reach a negative level of social capital, which indicates the fact that they were least interested in the affairs of the commune, and at the same time were the least likely to participate in elections or to engage in social initiatives. The level of social capital was slightly better among people with extreme income levels, i.e. earning up to PLN 1,000 and over PLN 10,000, where the average social capital ratio amounted to 0.1 and 0.3, respectively. The best average social capital result was achieved by respondents earning PLN 4,001–6,000 and PLN 6001–10,000, which amounted to 2.9 and 3.0, respectively. This means that income at the level of PLN 4,001–10,000 is the most conducive to involvement in matters related to the municipality (also through active participation in various initiatives or voting in elections) and trusting others.

CONCLUSIONS

Due to the fact that social capital is a category composed of elements such as trust, cooperation, civic participation, its effects are most visible at the local level, which implies the need to conduct research in a local dimension as well. The presented research results indicate the diversity of analyzed components of social capital in individual income groups. Those who earn the least participate in the elections, but their level of involvement in the affairs of the commune is relatively low. Similarly, the results of generalized trust, trust in the commune authorities and institutions are presented. That is, the lowest level of trust is characterized by people from the lowest income range. This may be due to the fact that one firstly has to satisfy their own needs, only when the level of their satisfaction is sufficient, at least in relation to basic needs, one can expand their interest to the environment and the local community. The highest level of social capital in this research was demonstrated by respondents earning income in the range from PLN 4,000 to 10,000. The level of their involvement in the affairs of the commune was the highest, although at the same time they were characterized by an average lower level of trust. Thus, we can see a positive relationship between the income achieved and the level of social capital characterizing the studied groups, though only to a certain level of wealth, beyond which the level of social capital decreases again. One can cautiously state that creating and multiplying social capital, indispensable for socio-economic development in highly developed communities, will be possible only after providing a given level of income, in rural communes of the West Pomeranian Voivodeship, corresponding to approximately the national average.

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ZRÓŻNICOWANIE POZIOMU KAPITAŁU SPOŁECZNEGO W GMINACH WIEJSKICH WOJEWÓDZTWA ZACHODNIOPOMORSKIEGO WEDŁUG KRYTERIUM DOCHODOWEGO – WYNIKI BADAŃ

STRESZCZENIE

Ewoluowanie społeczeństw sprawia, że czynniki generujące rozwój społeczno-gospodarczy również ewoluują z nimi. Klasyczne determinanty wzrostu nie wystarczą do dalszego poprawiania koniunktury gospodarczej. W pracy zwrócono uwagę na tzw. czynniki miękkie, mające coraz większe znaczenie w generowaniu postępu w krajach wysokorozwiniętych, i skoncentrowano się na jednym z nich – kapitale społecznym. Tworzy się on na bazie zaufania, współpracy, partycypacji, a te komponenty najsilniej oddziałują w najbliższym otoczeniu. Jednocześnie siła ich oddziaływania słabnie wraz ze wzrostem promienia zasięgu. Implikuje to więc dobór narzędzi pomiaru, którego optyka powinna być ograniczona lokalnie. W związku z tym celem artykułu jest zaprezentowanie zależności między kapitałem społecznym a dochodem na poziomie lokalnym, tj. w gminach wiejskich województwa zachodniopomorskiego. Jest to ważne z uwagi na poszukiwanie kategorii, które mogłyby przyczynić się do kreowania i pomnażania kapitału społecznego.

Słowa kluczowe: zaufanie, zaangażowanie, partycypacja, dochód, kapitał społeczny, czynniki miękkie

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ORIGINAL PAPER

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THE IMPORTANCE OF ORGANIC FARMING IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT OF RURAL AREAS IN POLAND

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ABSTRACT

Organic farming is one of the basic elements of constant and sustainable development of rural areas. It is the highest form of protection of the natural environment in the field of agriculture. The aim of the article is to present the development of organic farming in Poland, which became particularly important after joining the European Union. Poland strives to increase this type of production, the more so because it has considerable predispositions and favourable conditions. Organic farming in Poland shows quite large regional variations, resulting largely from natural conditions. The largest number of organic farms in 2016 occurred in the Warmińsko-Mazurskie and Podlaskie Voivodeships, and the smallest in the Opolskie and Śląskie Voivodships. The analysis uses data from the Central Statistical Office (GUS) and the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

Key words: organic farming, sustainable development, organic production

INTRODUCTION

The main principle of sustainable development is to maintain the balance between social, economic and ecological systems, which is why it is particularly important in the case of agriculture: activity that is directly related to the natural environment [Kłos 2010]. Therefore, the concept of "constant and sustainable development" was also transferred to agriculture, where it resulted in the creation of the concept of "constant and sustainable agriculture", which assumes [Juszkiewicz 2006]:

- responsibility for management – ethical and elastic attitude to nature;
- limiting the production volume by considering the capacity of ecosystems, as well as combining plant and animal production;
- work oriented entirely on agriculture, not only on the production and social benefits of agriculture and rural areas;
- economical handling of natural resources;
- limiting the use of measures increasing productivity;
- prices of agricultural products taking into account economic and ecological aspects;
- preservation of all soil functions as the basis for the functioning of agriculture.

The idea of sustainable development, both in the theoretical and practical dimension, is most fully implemented by the organic farming system. Organic farms are an integral part of constant and sustainable agriculture. Agricultural products from organic production are safe food, and at the same time this form of production is environment-friendly. Therefore, organic farming is a basic condition for sustainable development of rural areas. It satisfies the needs of farmers, nature and society at the same time. It also provides healthy food and does not cause environmental degradation. It provides fertile soil and allows us to preserve the richness of nature. Due to the close con-

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nection between the development of agriculture and rural development, one cannot speak about sustainable development of these areas without sustainable agriculture [Żmija 2014].

In the opinion of Runowski [2002], sustainable development of agriculture should be equated with sustainable development of rural areas, as agriculture is its primary function and the main holder of the natural environment. Organic farming and farmers' participation in the organic farming package is the highest form of protection of the natural environment in the field of agriculture.

In the concept of sustainable development of rural areas, Woś and Zegar [2002] and Siekierski [2003] distinguish four directions:

- protection of rural areas, including protection of the rural landscape, biodiversity and preventing erosion;
- protection of water, soil and air against agricultural pollution;
- careful developing of biotechnology and genetic engineering;
- constant and sustainable development of agriculture.

Sustainable agriculture aims to use land resources in such a way, so to not destroy natural sources and allows to meet the basic needs of next generations of producers and consumers [Urban 2003].

In the second half of the 20th century, organic farming was a dynamically developing field of agriculture, both in Europe and around the world. In 1999–2015, there was a fivefold increase in the area used by organic farming on a global scale [IRWiR PAN 2017]. Poland also strives to increase this type of production, the more so because it has considerable predispositions and favourable conditions.

MATERIAL AND METHODS

The aim of the paper is to assess the development of organic farming in Poland in the context of sustainable development of rural areas. The article discusses the situation of Polish organic farming in 2004–2016 in terms of the number of ecological farms, ecological arable land etc. The data from the Central Statistical Office (GUS) and the Main Inspectorate of Agricultural and Food Quality (GIJHARS) was used for the analysis. The data was presented in diagrams and tables.

ORGANIC FARMING AS A BASIC CONDITION FOR SUSTAINABLE DEVELOPMENT OF RURAL AREAS

The idea of sustainable agriculture resulted from the concern for production potential, expressed, among others, in reduction of agricultural intensification, the use of industrial inputs and taking into account the specificity of local rural communities. In addition to the trend of ecological agriculture (sustainable), the socio-economic and ecological trend has developed, the main idea of which is to strive for a stable and economically profitable production in a way that does not threaten the natural environment [Paszkowski 2001].

Agriculture, through strong links with the environment and based on specific entities such as family farms, plays an important role in creating sustainable development in rural areas in the European Union, especially due to the role it plays in the management of natural resources and due to its features, which do not allow treating agricultural activity as an industrial or service activity [Golinowska 2013].

Organic farming (in other words: biological or biodynamic) is defined as a management system with sustainable crop and animal production [Szarek and Nowogródzka 2015]. Organic production should combine environment-friendly farming practices, support a high degree of biodiversity, use natural processes and ensure proper animal welfare. The basic principle is the rejection of agricultural, veterinary and food chemicals in the food production process [Barłowska et al. 2017].

The dual nature of the organic farming system is very often emphasised. First of all, it is a system that positively influences the natural environment, which also contributes to achieving broadly understood agricultural and environmental benefits. On the other hand, organic farming is a response to the changing structure of market demand. Consumers lean towards organic products, want to buy them and usually pay a higher price than for products that have not been produced by such methods [Niedek and Hoffmann-Niedek 2014].

Organic farming is currently the subject of interest of many disciplines, not only natural and economic, but also technical and social ones.

The overriding objective of organic farming is striving to increase the fertility and biological activity of soil by bringing in organic fertilization, the use of crop rotation and proper cultivation of land limiting the mineralization of organic matter. The goal of organic farming is the production of high quality food beneficial for human health in accordance with the laws of nature, while using natural plant protection against diseases and pests [Żelezik 2009].

Organic farming brings diverse benefits that are part of the concept of sustainable development: economic and social, environmental, health, ethical and aesthetical. In organic farming, the permissible concentrations of harmful substances in soil, water and air are not exceeded, which is beneficial for the environment. Other benefits of this type of agriculture are described in Figure 1.

THE DEVELOPMENT OF ORGANIC FARMING IN POLAND

In Europe, organic farming has been developing since the 1970s. We observe a continuous increase in interest in organic farming in almost all EU Member States. The increase in the area of ecologically used arable lands between 2006 and 2015 in the European Union countries amounted to as much as 65% [IRWiR PAN 2017].

In 2015, in the European Union, activities in the field of organic farming were conducted by over 271.5 thousand farms. This number was the highest for Italy

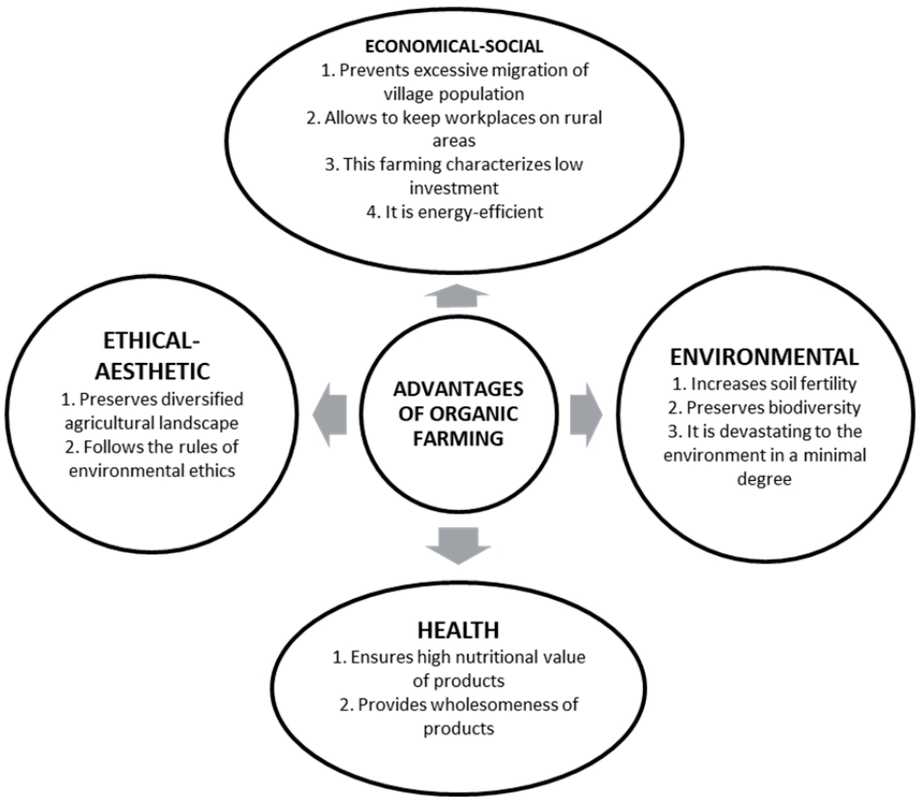

Fig. 1. Advantages of organic farming

Source: Łuczka-Bakuła [2007].

(52.6 thousand). Over 30 thousand ecological farms were registered in Spain (34.6 thousand), France (28.8 thousand), Germany (25.0 thousand), Austria (23.0 thousand) and Poland (22.2 thousand) – Figure 2.

The years 2004–2006 was the time when organic farming in Poland began to develop dynamically in line with the rules in force in the European Union. At the time, the largest number of farms were in transition to organic production. Undoubtedly, this was related to the introduction of subsidies for organic farming under agri-environmental programs in the Rural Development Programme.

Organic farming in Poland has a chance to become a significant element of the development of Polish agriculture towards its sustainable development. Poland strives to increase this type of production, the more so because it has considerable predispositions and favourable conditions. The traditional character of the Polish countryside (Polish agriculture) – predominance of family farms with small and medium size, their considerable fragmentation, appropriate soil and climate conditions, large manpower resources and low labour costs, and – above all – low level of chemical consumption – favour its expansion. It is especially

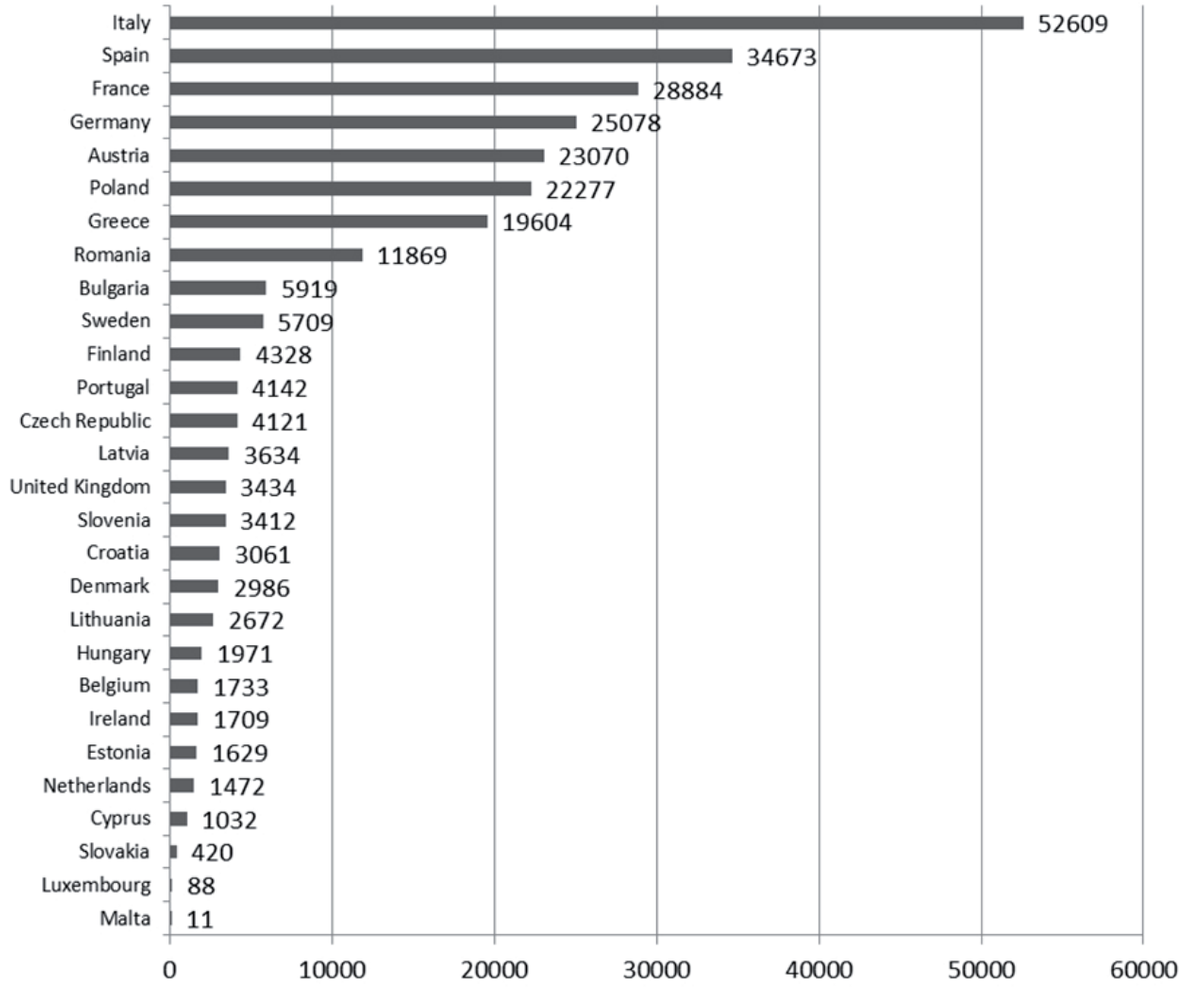

Fig. 2. Number of organic farmers in the European Union in 2015

Source: Developed based on data from the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

true for regions with proper natural conditions and a low degree of industrialization, and thus a small pollution of the natural environment. The most important factors for the development of organic farming in Poland include [Komorowska 2006]:

- growing awareness of the negative effects of intensification of agriculture on the quality of life and state of the environment;
- growing share of consumers with developed ecological preferences;
- creation of a distribution and promotion system for organic products on the markets of EU member countries;
- implementation of agri-environmental programmes;
- combining organic production with the development of agritourism.

In Poland, specific requirements in the field of organic farming are regulated by the Act of 2004 on organic farming, while the EU legal act, also applicable to Polish farmers, is Council Regulation (EEC) 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs.

The years 2004–2006 was the time when organic farming in Poland began to develop dynamically in line with the rules in force in the European Union. An indicator of the dynamic development of this sector after joining the European Union is the increase in the number of organic agricultural producers, including organic processing plants and organic agricultural holdings[1]. The increase in the number of organic producers in Poland in 2004–2016 is shown in Figure 3. The year 2014 was the first year of decline in the number of organic producers in Poland (by 6.7%). In 2016, as of 31 December, there were 22,435 organic agricultural producers operating in organic farming. This resulted mainly from

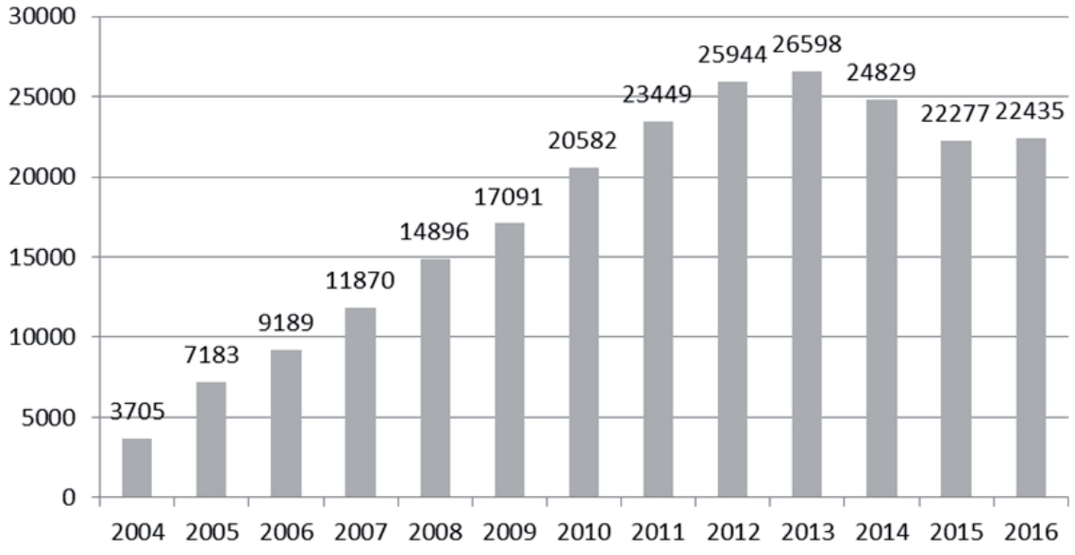

Fig. 3. Number of organic farmers in Poland in 2004–2016

Source: Developed based on data from the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

[1] According to Art. 2 (2) of the Act of 2004 on organic farming, ecological producers include: organic agricultural producers, producers involved in the preparation, importers of organic products from third countries, producers conducting activities in the field of placing organic products on the market, producers conducting aquaculture activities, producers conducting harvesting activities from the natural state, organic beekeepers and suppliers of organic seed and vegetative propagating material. This paper shows data on organic agricultural producers.

the decline in the area of ecological land in Poland (Fig. 4).

According to GUS [2017a, b] data, in 2015 the area of agricultural land where organic production was conducted accounted for approximately 4.0% of all agricultural land in Poland (0.5 point less than in 2014), and in 2016 this share was around 3.7% (0.8 points less than in 2014).

In 2015, the total area of ecological arable land in Poland was 580,730 ha. In 2016, the total area of arable land on which organic production was conducted decreased by 7.6% compared to 2015 and amounted to 536,579 ha. Starting from 2014, the area of ecological arable land has been gradually decreasing. In comparison to 2013, in which the largest area taken up by organic farming was recorded (669,969 ha), in 2016 it was 19.9% lower.

A strong decline in the area of ecological land probably resulted from two reasons. First, the end of five-year obligations of large-area farms and discontinuation of the organic production method. Secondly, the introduction of degressive payment rates along with the increase in the area, which was also the reason for the resignation of farmers running large-area farms [IRWiR PAN 2017].

Since the beginning of the development of organic farming there was a significant territorial differentiation, this is directly related to the agrarian structure of Polish agriculture [Roman and Stefańczyk 2017]. The largest number of organic farms in 2016 occurred in the Warmińsko-Mazurskie, Podlaskie, Zachodniopomorskie and Mazowieckie Voivodeships. The share of the number of ecological farms in these voivodships accounted for over 56% of the total number of producers in Poland in 2016. The smallest number of farms is observed in Opolskie and Śląskie Voivodships (Fig. 5). Large regional diversity results to a large extent from the natural conditions characterising individual voivodships of the country.

Analysing the structure of organic agricultural crops in 2009–2016, the share of meadows and pastures as well as horticultural and berry crops in the area of organic arable land decreases, from 46.1 and 16.1% in 2009 to 25.6 and 6.6% respectively in 2016. On the other hand, the share of vegetables and leguminous plants on dry seeds increases in the general structure of organic agricultural crops in Poland. The increase in consumption of organic food confirms changes in the structure of organic farming (greater interest in organic vegeta-

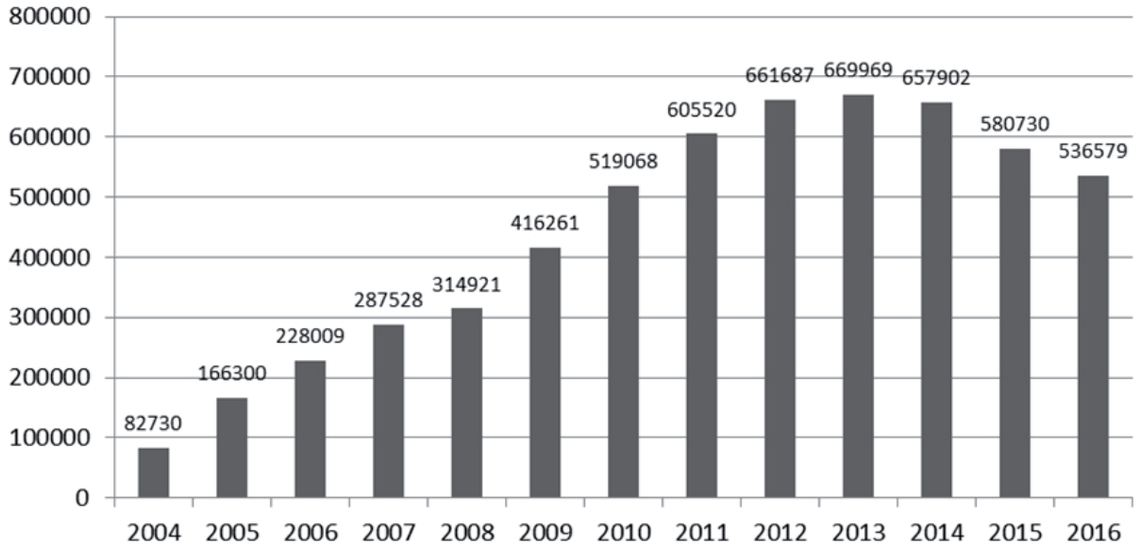

Fig. 4. Agricultural area under organic farming in Poland in 2004–2016 (ha)

Source: Developed based on data from the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

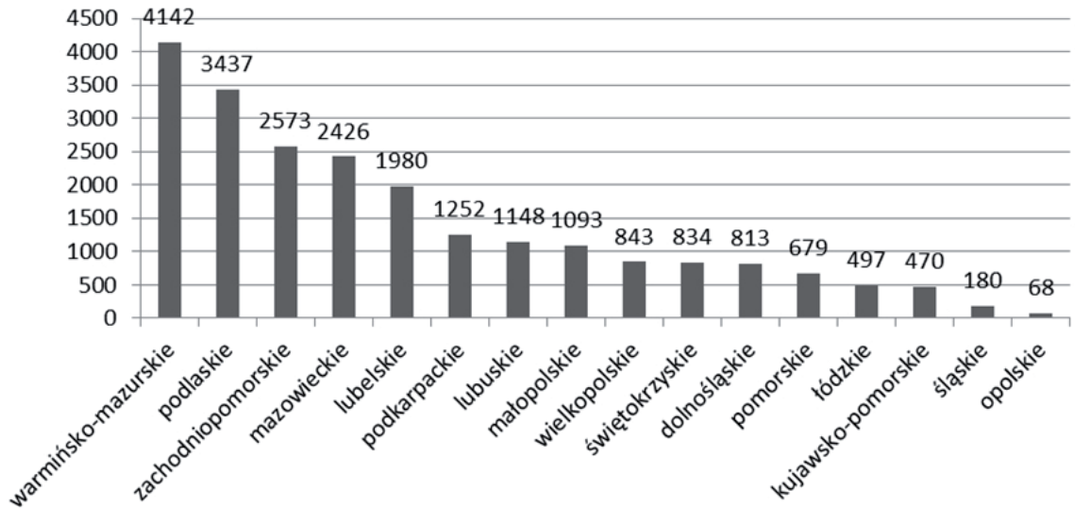

Fig. 5. The number of organic farmers in Poland by voivodeships (as of 31.12.2016)

Source: Developed based on data from the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

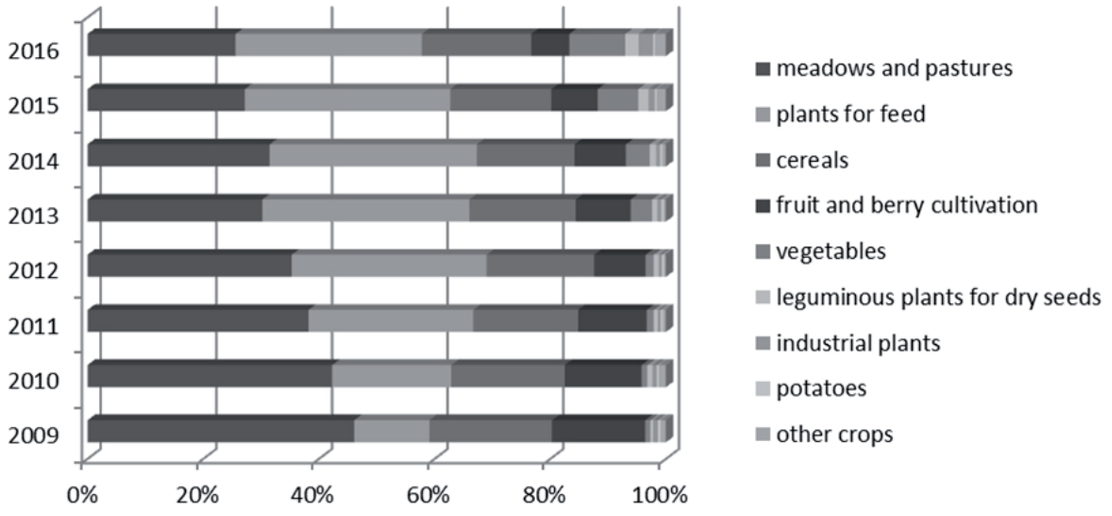

Fig. 6. The structure of the area under organic farming in 2016

Source: Developed based on data from the Main Inspectorate of Agricultural and Food Quality (GIJHARS).

bles and fruits). It gives the possibility of expansion of Polish organic agri-food products on the market.

In 2016, the largest area of ecological arable land was occupied by: plants for fodder (32.2%), meadows and pastures (25.6%), cereal crops (18.9% of ecological arable land) (Fig. 6). The share of these three cultivation categories represented 76.7% of the ecological agricultural land. The share of vegetables (9.7%), legumes for dry seeds (2.3%), industrial plants (2.5%), fruit and berry crops (6.6%) and potatoes (0.3%) was a small percentage in the total area of ecological arable lands.

CONCLUSIONS

The guiding principle of sustainable development – maintaining the balance between social, economic and natural systems – is of particular importance in agriculture, or activities directly related to nature. In the conditions of sustainable development, organic farming is the most optimal farming system and, combined with other areas of the economy, should be treated as a basis for the development of sustainable rural areas, both on the regional and national levels.

Organic farming is becoming more and more popular. This is due to new trends among consumers who perceive organic products as tastier and healthier than those from conventional agriculture, while others appreciate them because of good practices towards the natural environment or workforce employed in such farms.

A particularly dynamic growth in the number of organic farms occurred after Poland's accession to the European Union, at which time it gained the greatest importance. The ecological surface of agricultural land in Poland increased significantly in 2004–2016, over three times, along with the number of farms – from 3,705 in 2004 to 22,435 in 2016 – it is an increase of over six times. Between 2014 and 2015, there was a downward trend in the number of entities participating in this system due to the end of five-year commitments of large-area farms and the simultaneous discontinuation of the organic production method.

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ZNACZENIE ROLNICTWA EKOLOGICZNEGO W KONTEKŚCIE ZRÓWNOWAŻONEGO ROZWOJU OBSZARÓW WIEJSKICH W POLSCE

STRESZCZENIE

Rolnictwo ekologiczne jest jednym z podstawowych elementów trwałego i zrównoważonego rozwoju obszarów wiejskich. Stanowi ono najbardziej zaawansowaną formę ochrony środowiska przyrodniczego w obszarze rolnictwa. Celem artykułu jest przedstawienie rozwoju rolnictwa ekologicznego w Polsce, które nabrało szczególnego znaczenia po wstąpieniu naszego kraju do Unii Europejskiej. Polska dąży do zwiększenia tego kierunku produkcji, tym bardziej że ma ku temu znaczne predyspozycje i dogodne warunki. Rolnictwo ekologiczne w Polsce wykazuje dość duże zróżnicowanie regionalne, wynikające w znacznej mierze z uwarunkowań przyrodniczych. Największa liczba gospodarstw ekologicznych w 2016 roku występowała w województwach warmińsko-mazurskim i podlaskim, a najmniejsza w opolskim i śląskim. W analizie wykorzystano dane Głównego Urzędu Statystycznego oraz Głównego Inspektoratu Jakości Handlowej Artykułów Rolno-Spożywczych.

Słowa kluczowe: rolnictwo ekologiczne, rozwój zrównoważony, produkcja ekologiczna

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ORIGINAL PAPER

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RELEVANCE OF AGRICULTURAL LAND TAX FOR OWN REVENUE OF RURAL MUNICIPALITIES IN POLAND

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ABSTRACT

The paper focuses on agricultural land tax, which in traditional rural regions should be the major source of revenue for local municipalities. We studied and assessed the size and stability of revenue from this tax as well as the diverse role it plays in rural municipalities. Our analysis is based on an extensive empirical material – data from budget reports submitted by 2,154 rural municipalities. The paper validates a research hypothesis stating that agricultural land tax is a major source of own revenue in many rural municipalities and its size depends predominantly on the price of rye which is used to calculate the rate of this particular tax. We examined tax revenues of all rural municipalities in Poland between 2007 and 2014. The analysis confirmed theoretical expectations and thus positively validated our main hypothesis.

Key words: agricultural land tax, revenue of rural municipalities, tax policy, price of rye

INTRODUCTION

To municipalities, agricultural land tax is a source of their own revenue. Together with property tax, forestry tax, and vehicle tax agricultural land tax belongs to contributions that local authorities can impact by imposing their own tax policy. By virtue of respective acts, these taxes remain within the powers of municipal self-government. By interfering with the structure of components of local taxes (in the case of agricultural land tax by reducing the purchase price of rye used as a base to calculate the tax), local authorities may impact the amount of public resources earmarked for the implementation of own tasks in municipalities.

The role of the agricultural land tax as a source of revenue in municipalities (predominantly rural ones) is determined, on the one hand, by provisions laid down in the Act on agricultural land tax, which specify, i.a., the algorithm used to calculate the tax and, on the other hand, by a number of factors linked to local circumstances (soil valuation class, attitude of municipal authorities towards agricultural land tax) and the performance of agricultural markets (average purchase prices of rye). All of them are reasons why revenue from agricultural land tax in individual municipalities and its fiscal role may significantly differ across the country.

Using detailed data from all rural municipalities in Poland, this paper makes an attempt to examine and assess the size, stability and diversity of the role of revenue from agricultural land tax received by Polish rural municipalities as well as to identify the relevance of some factors-determinants of this revenue. The paper validates a research hypothesis stating that the agricultural land tax is a major source of own revenue in rural municipalities in Poland. To many municipalities the tax is crucial but the real number of municipalities where agricultural land tax is a major source of

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revenue depends on, often volatile, purchase price of rye and on how municipal authorities (which may intervene by reducing the binding purchase price of rye used in tax calculations) respond to such volatility.

LITERATURE REVIEW

Research into agricultural land tax usually takes place at two levels: financial (micro- and macroeconomic) and legal. The two threads are not always split hence in literature authors often times combine legal and financial aspects.

Financial microeconomic perspective presents agricultural land tax as financial levy imposed on farms. Research along these lines was conducted by, i.a., Hajduga [2014] who concluded that agriculture as a sector remains privileged compared to other business sectors in terms of taxes. We should also mention the works of Mądra [2012a, b], who investigated agricultural land tax burden depending on adopted variables.

Agricultural land tax can also be seen in the light of budget revenue (macroeconomic perspective). At this level, research effort addresses mainly two aspects. The first one most often concerns the size of budget revenue from agricultural land tax received by municipalities and its determinants. This is the perspective adopted by, i.a., Gruziel [2014], who examined own revenue of municipalities in Poland focusing especially on revenue from agricultural land tax in local government units (LGU; Polish abbr. JST) over the period 2007–2013. She concluded that revenue from agricultural land tax and its share in municipal own revenue depends on the type of municipality. The share of agricultural land tax in own revenue of urban municipalities is marginal, which may be explained with higher industrialisation rate and much smaller dependence of own resources on farming land.

Relevance of agricultural land tax as a source of own resources in Polish rural municipalities was also investigated by Kozera [2017]. She examined the amount and share of revenue from agricultural land tax in rural municipalities against other administrative levies and the amount of income lost because of using land for other purposes. Conducted studies (2004––2015) demonstrated that agricultural land tax plays a major role in budgets of rural municipalities although its fiscal role is diminishing. According to Kozera, the situation can be explained by enhanced development of residential and service functions in many rural municipalities situated at the outskirts of bigger urban centres and thus attributed to suburbanisation effect causing faster increase of municipal own revenue from personal and corporate income taxes. Another reason may be the reduction of tax rates, which reduces own revenue.

In turn, Chmielewska [2009a] analysed revenue from agricultural land tax in all municipalities and rural municipalities and compared it against specific values (e.g. total revenue of municipalities, own revenue of municipalities) for the years 2004–2007. Based on her studies, she concluded that revenue from agricultural land tax into municipal budgets depends predominantly on the area of arable land in a given voivodeship (municipalities) and on fluctuations of the price of rye per 1 q in individual accounting periods. She argues that the share of revenue from the tax in question in total municipal revenue and in total own revenue did not differ significantly across types of municipality. In all municipalities, as well as in rural municipalities treated as a single category, trends exhibited by selected indices were in general identical. Slightly higher share of revenue from agricultural land tax in selected income categories of municipal budgets was reported for rural municipalities and attributed to bigger areas of arable land.

Relevance of agricultural land tax to municipalities within some selected areas was also investigated by Czempas [2016]. He examined 96 rural municipalities in Śląskie (Silesian) Voivodeship over the period 2006–2015 looking at the share of revenue from agricultural land tax in total municipal revenue. He concluded that fiscal relevance of agricultural land tax to budgets of rural municipalities demonstrates that they continuously need to be subsidised.

In macroeconomic perspective we may also look at tax effectiveness of agricultural land tax. Studies relating to that particular issue can be found mostly in the works by Dziemianowicz [2007]. She believes that the currently binding system of agricultural taxes in Poland, with agricultural land tax as its main component, is economically and tax-wise ineffective and should be subject to a radical reform. Similar conclu-

sions were reached by Felis [2015a, b]. Agricultural land tax effectiveness was also surveyed by Gruziel. In one of her papers [2012] she studied the effectiveness of agricultural land tax in the years 2004–2009 in rural municipalities in the Małopolskie Voivodship. The study aimed to identify the cost of assessment and collection of the tax in question in rural municipalities included in the exercise. Based on the analysis of costs of agricultural land tax assessment and collection in surveyed municipalities, the author concluded that she is unable to confirm the thesis suggesting this is a low cost fiscal process. Relatively lower revenue from agricultural land tax, substantial in-kind expenditure, the application of statutory allowances and tax exemptions can be listed as factors reducing the effectiveness of the fiscal process. Also Kozera (2017) stresses that a system, which is little effective from the point of view of financial independence of municipalities and built around agricultural land tax, whose structure is hardly linked with the real agricultural output and income, results in low revenue-generating potential of rural municipalities. Low tax effectiveness of agricultural land tax is also confirmed by Hanusz [1996]. He argues that such a tax is properly structured when it collects between 6 and 8% or even 10% of average income per hectare. Statistical data show that the relationship between the revenue from this tax and farmers' income is much lower. As demonstrated by Forfa [2011], over the period 2004–2009 tax burden posed by agricultural land tax represented between 1.38 and 1.55%. Similar conclusions were drawn by Goraj et al. [2014]. They claim that although the agricultural land tax is the principal budget revenue to rural municipalities, its fiscal capacity in the current shape is very much limited, which, in turn, restricts the supply of public goods and services.

We may also see effectiveness in terms of functions that an agricultural land tax should perform (in particular fiscal and stimulating function). According to studies conducted by Chmielewska, the amount of agricultural land tax paid by farmers poses little burden especially to big and economically the fittest farms, which goes clearly against one of principal functions of a tax, i.e. the stimulating function [2009b]. Negative effects of present solutions consist in restricting the propensity to invest, discriminating farmers who either start their business or operate at a small scale and are exposed to higher business risk, as well as in not reducing tax avoidance. A properly structured taxation may be an effective instrument inducing structural transformations in agriculture [Bernal 2009, Mądra 2009].

Economically ineffective agricultural land tax and its structure, which does not comply with fundamental tax principles, including the principle of fairness [Ganc and Mądra 2011], encourage searching for other solutions that could replace agricultural land tax with, e.g. income tax. Texts along these lines usually combine legal (proposals of a new tax structure for agriculture) and financial aspects (specification of financial effects of a new tax to the budget and/or farms). The list of authors conducting studies within this area includes, i.a. Kula [2012], Goraj et al. [2014], Wasilewski et al. [2015, 2016]. In most instances, proposed solutions assume that agricultural land tax should be replaced with an income or revenue (lump-sum tax on recorded revenue) tax, which would produce higher budget revenue but also higher tax burden to farmers [Wasilewski and Ganc 2013].

MATERIAL AND METHODS

In this paper we used official data from budget reports – Reports Rb-27s on the budget performance in revenue collection of all 2,154 rural and urban-rural municipalities (hereinafter rural municipalities) in Poland. We limited ourselves to data from section 756, that is revenue from all taxes[1] paid to municipal budgets (hereinafter, own revenue). We decided that indicators correctly reflecting the fiscal role of agricultural land tax are: WSK_1 (share of revenue from agricultural land tax in own revenue) and WSK_2 (share of revenue from agricultural land tax in revenue from immovable property tax). In assessing financial role of agricul-

[1] Income from tax card, property tax, agricultural land tax, forestry tax, vehicle tax, stamp duty, inheritance tax and tax on donations, share in taxes paid to the central budget (PIT, CIT), and local levies.

tural land tax account was taken of taxpayer category (tax revenue from judicial persons and individuals). We also examined cardinality tables broken down by percentage share of revenue from agricultural land tax in bigger tax collection groups (in own revenue and in revenue from immovable property taxes, that is, property tax, agricultural land tax, and forestry tax). Our goal was to identify clear dependences between these cardinalities and factors that impact revenue from agricultural land tax (average price of rye used to calculate the tax and fiscal effects of tax competence conferred upon municipalities, which may reduce the average purchase price of rye).

RESULTS

Tax revenue of a municipal self-government depends on a number of factors operating at different levels. The share of territorial self-government units in income tax (CIT and PIT) is the most sensitive to cyclical fluctuations. Undoubtedly, this is the strategic category of own revenue to local units, fundamental for the performance of their financial system. At this point we may not forget statutory changes in the share envisaged for municipalities in income tax revenue (changes in the proportion, in which this revenue is shared between the State Treasury and LGU) and modifications of income taxes resulting from national tax policy (changes in the structure of these taxes). Property tax is the major source of revenue to municipalities among immovable property taxes or even among all of local taxes. Since in Poland property is taxed based on its area, this revenue is relatively little sensitive to business cycle fluctuations. On the other hand, changes in revenue from the agricultural land tax, which is our main focus here, result, first and foremost, from changes in average purchase price of rye over time and from decisions made by municipal bodies within their tax remit. Lack of stability of tax rates linked with the price of rye translated into often changing revenue to municipal budget[2]. In the years covered by the study, all values in current prices were systematically increasing, which resulted in the following dynamics: 160.5% of own revenue; 162.7% of revenue from immovable property taxes; and 179.4% of revenue from agricultural land tax. Good dynamics reported for revenue from agricultural land tax enhanced its relevance measured with the share in own revenue (from 6 to 6.7%) and in revenue from immovable property taxes (from 13.9 to 15.4%).

Examination of collected material revealed a diverse structure of agricultural land tax revenue depending on taxpayers' category (Table 2). Revenue from private individuals was more than six times higher than revenue from judicial persons. That was because most farms in Poland are owned by private individuals. In the period covered by the study we also noted slightly higher dynamics in municipal revenue

Table 1. Agricultural land tax revenue potential in rural municipalities compared to other revenue sources in 2007–2014

Item	2007	2008	2009	2010	2011	2012	2013	2014
	million PLN							
Own revenue	14 860.7	16 614.8	16 360.2	16 769.5	18 469.5	20 055.4	22 028.0	23 855.5
Revenue from immovable estate	6 394.3	6 990.5	7 382.9	7 549.7	8 150.5	9 278.4	10 010.7	10 400.6
Revenue from agricultural land tax	890.2	1 169.8	1 184.4	955.1	1 028.6	1 488.3	1 605.0	1 597.4
	%							
WSK_1	6.0	7.0	7.2	5.7	5.6	7.4	7.3	6.7
WSK_2	13.9	16.7	16.0	12.7	12.6	16.0	16.0	15.4

Source: Own compilation based on data from Report Rb-27s.

[2] In the period 2006–2013 average purchase price of rye (PLN) was: 35.52; 58.29; 55.80; 34.10; 37.64; 74.18; 75.86; 69.28. There is one-year shift in the rates because they are decided based on the price for the year preceding the fiscal year.

Table 2. Differences in revenue from agricultural land tax by taxpayers' category in 2007–2014

Item	2007	2008	2009	2010	2011	2012	2013	2014
				million PLN				
Total revenue	890.2	1 169.8	1 184.4	955.1	1 028.6	1 488.3	1 605.0	1 597.4
Revenue from CIT	121.8	161.3	161.7	123.7	132.0	201.6	216.7	211.3
Revenue from PIT	768.4	1 008.5	1 022.7	831.4	896.6	1 286.7	1 388.3	1 386.1
				%				
Revenue from CIT	13.7	13.8	13.7	13.0	12.8	13.5	13.5	13.2
Revenue from PIT	86.3	86.2	86.3	87.0	87.2	86.5	86.5	86.8

Source: see Table 1.

from personal income tax (180.4%) than from corporate income tax (173.5%).

As we have already mentioned, the amount of revenue from agricultural land tax to some extent depends on municipalities, which may take decisions not only to reduce the maximum tax rates but also grant allowances, exemptions and write-offs or authorise making instalment payments or defer the payment. Over the years 2007–2014 the value of aid granted through the above listed tax instruments was highly volatile. Farms benefited from the biggest tax preferences in the years 2008–2009 and 2012–2013, the lowest tax preferences were offered in 2010–2011. Reduction of the maximum tax rates was the most commonly used tool in the period covered by the study; it represented on average 90% of all cases. Importantly, municipalities were reducing maximum tax rates in periods when agricultural land tax rates in a given fiscal year were the highest (Table 3).

To deepen our research, we analysed cardinality tables for the years 2007–2014 and for subsequent percentage ranges (Table 4 for the share of agricultural land tax in own revenue; Table 5 for the share of agricultural land tax in all immovable property taxes). Data shown in the tables inform not only about the number of municipalities with specific agricultural land tax revenue potential (a big group with two-digit share) but also about clear dependence on the price of rye of cardinality for low and high percentage ranges. These relationships concur with expectations as whenever agricultural land tax rate was increasing, the number of municipalities in low ranges was decreasing compared to the years when the rate was lower. Then, there were more municipalities in higher percentage ranges. For the share in own revenue the "balance" is close to 20%, for the share in immovable property taxes it is slightly lower. It means the price of rye was not significant for the cardinality in these intervals.

Table 3. The use of tools resulting from the power to impose taxes relating to agricultural land tax in 2007–2014

Item	2007	2008	2009	2010	2011	2012	2013	2014
Revenue from agricultural land tax (million PLN)	890.2	1 169.8	1 184.4	955.1	1 028.6	1 488.3	1 605.0	1 597.4
Total tax preferences (million PLN)	155.8	522.9	452.5	61.7	92.7	706.1	662.0	477.6
Reduction of maximum tax rates (million PLN)	128.7	488.9	426.8	38.9	76.9	684.0	643.9	460.0
Allowances and others (million PLN)	27.1	34.0	25.7	22.8	15.8	22.1	18.1	17.6
Total tax preferences as percentage of revenue from agricultural land tax (%)	17.5	44.7	38.2	6.5	9.0	47.4	41.2	29.9
Reduction of maximum tax rates as percentage of revenue from agricultural land tax (%)	14.5	41.8	36.0	4.1	7.5	46.0	40.1	28.8
Allowances and others as percentage of revenue from agricultural land tax (%)	3.0	2.9	2.2	2.4	1.5	1.4	1.1	1.1

Source: see Table 1.

Table 4. Cardinality table – share of agricultural land tax revenue in own revenue in 2007–2014

Interval (%)		2007	2008	2009	2010	2011	2012	2013	2014
from	to								
0	5	712	643	629	752	769	645	652	696
5	10	509	454	433	498	528	452	467	512
10	15	341	372	372	352	326	358	369	349
15	20	237	235	235	205	209	228	226	235
20	25	139	158	161	145	139	168	157	140
25	30	100	130	121	96	89	117	125	104
30	35	65	73	95	54	46	84	68	45
35	40	29	45	57	26	26	54	46	38
40	100	22	44	51	26	22	48	44	35

Source: see Table 1.

Table 5. Cardinality table – share of agricultural land tax revenue in revenue from immovable property taxes in 2007––2014

Interval (%)		2007	2008	2009	2010	2011	2012	2013	2014
from	to								
0	5	329	240	249	381	383	276	271	296
5	10	312	290	296	328	317	293	299	302
10	15	253	237	236	246	271	248	243	250
15	20	243	217	220	226	223	215	222	232
20	25	200	188	204	214	196	186	195	196
25	30	167	198	170	158	170	188	187	187
30	35	158	147	150	143	141	150	172	160
35	40	129	111	135	111	106	123	118	128
40	45	113	141	122	92	96	116	113	105
45	50	75	112	107	82	75	99	91	85
50	55	61	88	92	54	62	79	75	65
55	60	55	66	58	48	40	58	64	51
60	100	59	119	115	71	74	123	104	97

Source: see Table 1.

These cardinalities depict the density curve, which rapidly increases to very quickly change into a decreasing exponential dependence. Figures 1 and 2 show series for consecutive years 2007–2014. In Figures 1 and 2 we can see that in the years when the price of rye was high, there were fewer municipalities with low share of revenue from agricultural land tax in bigger tax collection groups used in the study and for more municipalities the share was high. We also regularly observe the drop in the number of municipalities whenever percentage shares of revenue from agricultural land tax in own revenue and in revenue from immovable property taxes increase. Figure 1 shows that "bundles" of curves (for years when the price of rye was low and for those when it was high) cross at the point between 10 and 15%. The share of revenue from agricultural

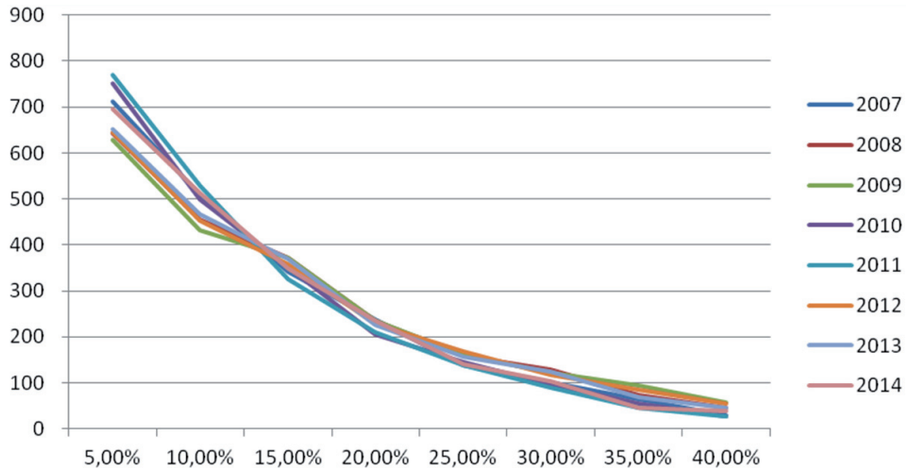

Fig. 1. Graphic representation of Table 4

Source: Own compilation based on Table 4.

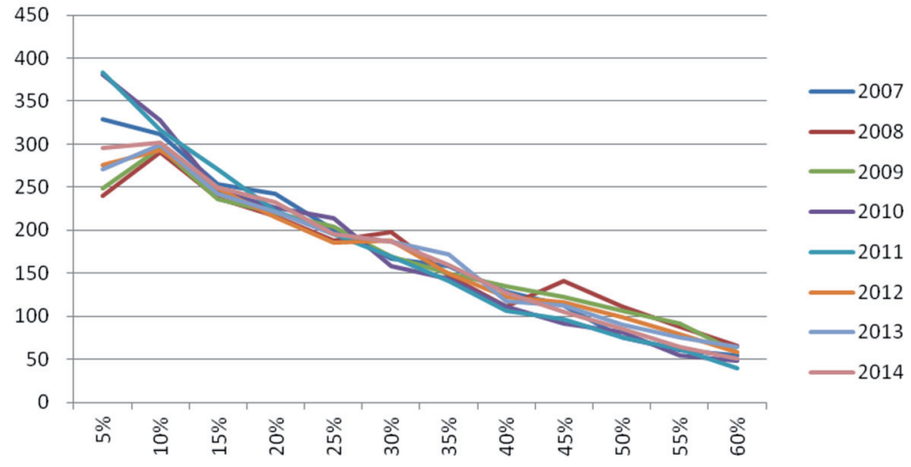

Fig. 2. Graphic representation of Table 5

Source: Own compilation based on Table 5.

land tax in own revenue is lower than in immovable property taxes, hence the ridge of density function in Figure 1 is more to the left than in Figure 2.

If Figures 1 and 2 presented percentage ranges in more detail, we would have plots showing that cardinalities decrease before they start increasing. On Figure 3 we can see left-hand side of Figure 1 and on Figure 4 left-hand side of Figure 2.

Looking at the pairs (Fig. 1 and Fig. 3; and Fig. 2 and Fig. 4) we can see that density function of percentage distribution of the share of revenue from agricultural land tax in revenue from immovable property taxes reaches its maximum at around 4% and then starts decreasing. Yet, density function of percentage distribution of the share of revenue from agricultural land tax in own revenue reaches its maximum around

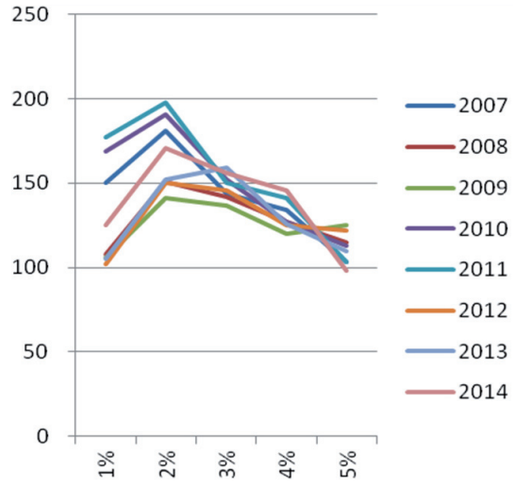

Fig. 3. Part of Figure 1, details

Fig. 4. Part of Figure 2, details

2% and then drops. Different location of the other maximum point is due to the fact that the percentage share of immovable property taxes in own revenue accounts on average for slightly less than 50%. Preliminary estimates of these densities show that in the descending stage (right of the maximum point) their distribution is approximately exponential.

CONCLUSIONS

1. In subject-matter literature we usually read that agricultural land tax does not sufficiently perform its fiscal function. That is attributed, i.a. to its outdated structure, which does not reflect present economic circumstances. Hence the currently binding taxation model in agriculture raises a lot of concern and critics.
2. However, our investigations have demonstrated that agricultural land tax should not be treated as an instrument of minor relevance to revenues in rural municipalities. Over the period 2007–2014 its share in municipal revenues ranged from 5.6 to 7.4%, and if we consider it against the background of revenue from immovable property tax the proportion is between 12.6 and 16.7%. Moreover, cardinality tables show that on average aground 46% of rural municipalities reported the share of revenue from agricultural land tax in own revenue higher than 10%; in almost 41% municipalities the share of revenue from agricultural land tax in revenue from immovable estate taxes exceeded 25%.
3. Unfortunately, in some periods fiscal effectiveness of agricultural land tax was rather volatile, which adversely affects the budget planning exercise in municipalities. Fluctuations of revenue from agricultural land tax resulted from the lack of stability of tax rates. The price of rye, not correlated with inflation, fluctuated deepening the changes in tax burden.
4. In using their power to impose taxes, rural municipalities responded differently to this volatility. When prices of rye were low, tax preferences involving the reduction of rates were applied to a very limited scope. Thus municipalities actively availed themselves of prerogatives conferred upon them in the field of taxation when purchase prices of rye were increasing, by which they reduced the revenue. Anyway, even then municipalities generated very solid revenue from significant increases in agricultural land tax.

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ZNACZENIE PODATKU ROLNEGO W DOCHODACH WŁASNYCH GMIN WIEJSKICH W POLSCE

STRESZCZENIE

W artykule uwaga została skoncentrowana na podatku rolnym, który w tradycyjnych regionach wiejskich powinien stanowić ważne źródło dochodów gmin. Zbadano i oceniono wielkość, stabilność i zróżnicowanie znaczenia dochodów z tego podatku osiąganych przez gminy wiejskie. Wykorzystano do tego obszerny materiał empiryczny – dane pochodzące ze sprawozdań budżetowych 2154 gmin wiejskich. W artykule poddano weryfikacji hipotezę badawczą, zgodnie z którą podatek rolny dla wielu gmin wiejskich stanowi ważne źródło dochodów własnych, a ich liczebność zależy przede wszystkim od decydującej wysokości stawek podatku ceny żyta. Analizie poddano dochody podatkowe wszystkich gmin wiejskich w Polsce za lata 2007–2014. Przeprowadzona analiza potwierdziła teoretyczne przypuszczenia i pozwala uznać postawioną hipotezę za prawdziwą.

Słowa kluczowe: podatek rolny, dochody gmin wiejskich, polityka podatkowa, cena żyta

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DYNAMICS OF LABOUR PRODUCTIVITY CHANGES IN AGRICULTURE AT THE REGIONAL LEVEL IN SELECTED EUROPEAN UNION COUNTRIES

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ABSTRACT

A comparison of the labour productivity disproportions in agriculture is usually carried out at the state level. Conducted research usually concerns the countries of the so-called old Union and newly admitted countries. As a result of analyses carried out in such a way such and the aggregation effect information about the actual scale of diversification at the regional level are lost. The paper proposes an analysis at the NUTS level 2 for selected European Union countries to show their internal differentiation in terms of labour productivity and changes taking place in the analysed period. It was also found that the distribution of labour productivity in agriculture in the regions should also be defined, which would require the use of more advanced statistical methods.

Key words: convergence, divergence, labour productivity

INTRODUCTION

According to the preamble of the Treaty of Rome one of the objectives in the creation of the European Community was to reduce disparity between the levels of development of regions and underdevelopment of less-favoured regions[1]. In article 174 (former article 158 of the EC Treaty) we can read that special attention in this regard is given to rural areas. To offset these differences the EU uses its structural funds policy, European Investment Bank and other financial instruments. However, despite pursuing the policy, there is still strong regional differentiation in the EU. This subject was subject of research, undertaken among others by Alexiadis [2010] and Martín-Retortillo and Pinilla [2012]. Main research on agricultural labour productivity is conducted at the national level showing the diversity between the "old" EU countries, and recently admitted, between eastern and western Europe [Gutierrez 2000, Martín-Retortillo and Pinilla 2012, Jaroszewska and Pietrzykowski 2017]. However, factors that affect the differentiation between countries also differentiate agriculture within borders of individual countries. This differentiation at the regional level is also associated with the uneven distribution of production factors, and various efficiency of their use. And that, as a result, favours spatial differentiation of the economies of individual countries, and further

[1] Official Journal of the European Union Consolidated version of the Treaty on the Functioning of the European Union. OJ C 115, 9.5.2008.

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their regional differentiation of labour productivity levels [Kuźmar 2015]. A closer understanding of the structure of this phenomenon is important from the point of view of shaping and directing the policy of regional development and the European Community's agricultural policy.

One of the factors determining the competitiveness of states in the international arena is labour productivity [Misala and Ślusarczyk 1999, Poczta 2003, Gołaś and Kozera 2008, EC 2009, Latruffe 2010, OECD 2011, Mrówczyńska-Kamińska 2013]. It is essential here to adjust the resources and expenditures of achievable agricultural production so as to achieve high efficiency of their use [Kołodziejczak 2014]. The level of the studied factor is significantly differentiated between countries due to the natural and cultural conditions, different history of political systems of these countries, different levels of economic development land-to-work ratio, fertilization level, mechanization, innovation, structural changes, as well as the institutional factor, and human capital [Baer-Nawrocka 2010, Baer-Nawrocka and Markiewicz 2010, Martín-Retortillo and Pinilla 2012]. According to the conducted research, economic results of the majority of recently admitted countries are improving, their agricultural incomes increase, and so is the value of production [Baer-Nawrocka 2013]. However, the disparity of labour productivity within these countries is still significant and persistent. In most of the "old" EU countries the process of increasing labour productivity has stopped. There is a serious premise that these results are the result of data averaging at the state level. The present research is intended to approximate the scale of this differentiation.

Hence, the main objective of this work is to assess changes in labour productivity at the regional level against the background of changes in labour productivity at the national level, and an attempt to determine the direction of these changes. In addition, the work sought to determine the dynamics of changes in labour productivity in agriculture, and whether disproportions between regions are tend to reduce, as well as their distribution patterns over studied period.

MATERIAL AND METHODS

This work uses data from the Statistical Office of the European Communities (Eurostat). Also used in the study was Economic Accounts for Agriculture at the NUTS level 2. These accounts are drawn up in accordance with a uniform methodology[2] developed by Eurostat which entitles to make comparisons of the economic situation of agriculture between the countries of the Community. Gross added value[3] in current prices[4] in millions of EUR was derived from these accounts (this value includes direct payments to production). On the other hand labour inputs originate from national statistics where as a reflection of the labour inputs involved in agriculture the value of total labour inputs employed in the agricultural holding in thousands of AWU was selected[5]. Analysed time interval was determined by regional statistics on labour inputs, which applies to years 2005, 2007, 2010 and 2013 only. Thus it was decided to limit analysis to 10 countries (i.e. 98 regions): Bulgaria (6 regions), Poland (16 regions), the Czech Republic (7 regions), Greece (13 regions), Italy (21 regions), Hungary (7 regions), Austria (9 regions), Portugal (7 regions), Slovakia (4 regions), and Sweden (8 regions). On the basis of the available data the economic work efficiency was calculated expressed as the ratio of the sum of products produced to the incurred

[2] Methodology of economic accounts for agriculture is available on the Eurostat website: http://ec.europa.eu/eurostat/cache/metadata/en/aact_esms.htm.

[3] Gross added value is the value of production in the agricultural sector less the value of intermediate consumption (mineral fertilizers, plant protection chemicals, fodder, energy, fuel, seed material, veterinary services, agricultural services, and other).

[4] Regional economic accounts for agriculture are available only in current prices (according to the methodology).

[5] The annual work unit (AWU) equals to full-time employment. It is calculated by dividing the number of hours worked per year by the annual number of hours corresponding to full-time. In Poland a unit of work equal to 2,120 working hours per year was used, i.e. 265 working days for 8 hours a day. When calculating the work inputs expressed in the AWU (in accordance with the Eurostat methodology) the condition that 1 person cannot exceed 1 AWU was followed even if in reality that person is working longer.

labour inputs (full-time employed) [Adamowski et al. 1984]. Obtained value expresses the necessary work input which changes depending on the change in the level of productive forces.

In literature we can find two main convergence concepts, i.e. sigma (σ) type convergence, and beta (β) type convergence [Sala-i-Martin 1990]. Sigma convergence is observed if the level of the studied phenomenon decreases in the examined period of time. Beta convergence determines the dependence of the average value of the observed feature and its initial level. Division of beta convergence into conditional and unconditional was proposed by Sala-i-Martin [1996]. Sigma and beta convergences are very closely related. The convergence of sigma type may suggest the occurrence of β-convergence. Sigma convergence shows how regions have come together over time, while β--convergence shows the average level of the phenomenon and its development. If we observe changes that are non-linear in nature, the beta convergence will not be a good measure. In addition to the basic measures related to the sigma and beta convergence tests other measures are determined which indicate the importance of the problem being studied.

The following coefficients are associated with the β-convergence [Łaźniewska et al. 2011]:

- convergence coefficient – β
- speed of convergence coefficient – γ

$$\ln\left(\frac{y_{it}}{y_{i0}}\right) = \alpha + \beta \ln(y_{i0}) + \varepsilon_i \tag{1}$$

$$\gamma = \frac{\ln(1+\beta)}{t} \tag{2}$$

where: y_{it} – actual level of the phenomenon being studied in time t;
y_{i0} – base level of the phenomenon being studied in time t;
α – constant regression coefficient (intercept);
β – regression coefficient (slope);
ε_i – random error $\varepsilon_i \sim N(0, \sigma^2)$
γ – speed of convergence coefficient.

Process of σ-convergence can be measured by various coefficients as follows [Łaźniewska et al. 2011]:

- coefficient of $\sigma(t)$ for sample – $S(t)$

$$S(t) = \sqrt{\frac{\sum_{i-1}^{n}(y_{it} - \bar{y}_t)^2}{n-1}} \tag{3}$$

- variation coefficient – V

$$V = \frac{S(t)}{\bar{y}} \tag{4}$$

- Williamson's coefficient – V_w

$$V_w = \frac{\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2 \frac{n_i}{N}}}{\bar{x}} \tag{5}$$

- Theil's coefficient – V_T

$$V_T = \sum_{i=1}^{n} y_i \ln\left(\frac{y_i}{P_i}\right) \tag{6}$$

- Atkinson's coefficient – V_A

$$V_A = 1 - e^{-V_T} \tag{7}$$

All the mentioned indicators do not give a clear definition of how the dynamics of the studied phenomenon is shaped over time. In this work, due to the set goals, i.e. to obtain a comparison of the dynamics of convergence/divergence changes at the regional level the indicator proposed by Williamson and Fleming [1996] was used calculated in accordance with the following formula:

$$K = \frac{V_{t0} - V_{t1}}{V_{t0}\,(t_1 - t_0)} \cdot 100 \tag{8}$$

where: K – average rate of convergence/divergence per year;
V_{t0} – coefficient of variation at the earlier year t_0;
V_{t1} – coefficient of variation at the end year t_1.

The value of the coefficient K determined in accordance with the formula (8) depending on the value obtained indicates the rate of economic processes taking place. If the value of the coefficient K is greater than zero then we observe the rate of convergence processes, whereas if we get the value that is below zero, then we talk about the divergence processes.

RESULTS

The results of the labour productivity analysis in recently admitted countries in the period 2000–2016 showed an average annual rate of change at the level of 0.06%, while the group of the "old" EU countries recorded a slight increase at 0.01% [Jaroszewska and Pietrzykowski 2017]. Despite positive changes at the level of countries recently admitted to EU in terms of labour productivity, individual regions of these countries (Bulgaria, Poland and Slovakia) show a large differentiation of labour productivity. In Bulgaria there are both weaker and stronger regions in terms of labour productivity, and they are highly differentiated (Table 1). In 2010 the difference between them was even of eight times. The Yuzhen tsentralen Region was characterized by a 25% share of labour productivity at the national level while the Severen tsentralen Region exceeded twice the average performance of Bulgaria. In the Polish regions however, there is a clear division into regions below the national average, and above the national average. South-eastern part of Poland is characterized by lower labour productivity, in particular the Małopolskie and Podkarpackie Voivodships where the efficiency stays at the level of 40 and 20% of the country's productivity respectively. This condition persists in the studied years. However, a large part of Poland is characterized by labour productivity significantly above the national average in particular the Zachodniopomorskie, Wielkopolskie, and Lubuskie Voivodships. Similarly substantial differentiation can be observed in Slovakia, where half of the country is characterized by a much lower level of labour productivity, these are the Stredné Slovensko, and Východné Slovensko regions. Labour productivity does not reach even half of the country's productivity there. The other two regions however achieve labour productivity far above the national average. A different situation takes place in the other two new EU countries, i.e. in the Czech Republic and Hungary where work productivity is less differentiated, and fluctuates around the average for the whole country throughout the analysed period. Greece on the other hand is also differentiated in terms of labour productivity, although it joined the EU in 1981 (Table 2).

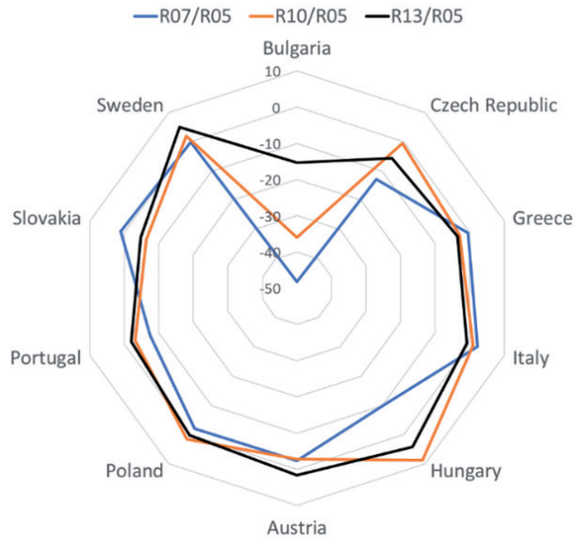
The three regions of Ipeiros, Ionia Nisia, and Voreio Aigaio are characterized by relatively low labour productivity at the level of approx. 40% of the average productivity in the country, and this state remains at the same level over studied period. Whereas two regions of Thessalia and Kentriki Makedonia clearly outperform domestic agricultural productivity in the analysed years. The remaining analysed countries, i.e. members of the "old" EU (Austria, Sweden and Portugal) do not show a clear differentiation in terms of labour productivity at the NUTS level 2. Table 2 presents a comparison showing the dynamics of changes in labour productivity in new and the "old" EU countries based on the K factor.

In order to illustrate changes in regional labour productivity for selected European Union states, its dynamics were divided into three periods (Fig. 1). Selected countries are located on the horizontal axis. The values of coefficient K on a regional basis for a given country were placed on the vertical axis. The individual bars indicate changes in studied periods. The data show that in the analysed periods most frequently occurred strong regional divergence (negative coefficient K). This was especially true for Bulgaria, Hungary and Poland. On the other hand the favourable period in which convergence within countries was the most frequent was the period of 2010–2013. The positive phenomenon affected Bulgaria, Italy, Hungary, and Sweden. Noteworthy is Bulgaria which was admitted to the EU during studied period[6]. In the period 2005–2007 (R07 / R05) the coefficient K was (–48.22) which indicates a very significant regional divergence. In the following period, i.e. 2010–2007 (R10 / R07) the coefficient K (–14.18) decreased which would suggest a reduction in divergence in the regions. In the last period of 2013–2010 (R13 / R10) we already observe a positive coefficient K (6.75) which would indicate the phenomenon of convergence in the regions. Bulgarian example show high strength of the dynamics of the studied phenomenon which turns from divergence into convergence. In the case of this country it is

[6] The accession of Bulgaria to the EU took place in 2007.

Table 1. Regional differentiation in labour productivity in selected countries admitted to the EU after 2004

Regions NUTS 2	2005	2007	2010	2013	Regions NUTS 2	2005	2007	2010	2013
Bulgaria = 1.00					Slovakia = 1.00				
Severozapaden	1.15	0.78	1.60	1.72	Bratislavský kraj	1.22	1.11	2.23	1.66
Severen tsentralen	1.24	1.09	2.00	1.47	Západné Slovensko	1.67	1.67	1.71	1.90
Severoiztochen	1.31	1.02	1.73	1.68	Stredné Slovensko	0.42	0.46	0.43	0.27
Yugoiztochen	0.96	1.99	1.32	0.47	Východné Slovensko	0.37	0.37	0.10	0.9
Yugozapaden	0.82	0.75	0.30	0.70					
Yuzhen tsentralen	0.75	0.80	0.25	0.70					
Czech Republic = 1.00					Hungary = 1.00				
Střední Cechy	1.28	1.28	1.20	1.39	Közép-Magyarország	0.58	0.45	0.87	0.76
Jihozápad	0.93	1.04	1.08	0.87	Közép-Dunántúl	0.91	0.93	1.22	0.96
Severozápad	0.88	1.22	0.96	1.28	Nyugat-Dunántúl	0.78	1.23	1.09	0.91
Severovýchod	1.17	1.05	0.90	0.83	Dél-Dunántúl	1.13	0.83	1.11	1.10
Jihovýchod	0.90	0.91	1.04	0.99	Észak-Magyarország	0.95	1.01	0.96	0.82
Střední Morava	1.01	0.87	0.86	0.97	Észak-Alföld	1.06	1.18	0.86	1.01
Moravskoslezsko	0.90	0.73	0.75	0.82	Dél-Alföld	1.21	1.07	1.00	1.17
Poland = 1.00									
Łódzkie	0.96	1.04	0.71	0.56					
Mazowieckie	1.01	0.89	1.23	1.18					
Małopolskie	0.38	0.45	0.39	0.31					
Śląskie	0.70	0.69	0.81	0.79					
Lubelskie	0.62	0.70	0.79	0.79					
Podkarpackie	0.24	0.29	0.19	0.22					
Świętokrzyskie	0.57	0.69	0.53	0.49					
Podlaskie	1.52	1.48	1.21	1.36					
Wielkopolskie	2.04	1.59	1.46	1.69					
Zachodniopomorskie	1.99	2.42	1.84	1.73					
Lubuskie	1.96	2.55	1.57	2.00					
Dolnośląskie	1.42	1.17	1.61	1.24					
Opolskie	1.53	1.93	1.99	1.53					
Kujawsko-Pomorskie	1.47	1.57	1.51	1.83					
Warmińsko-Mazurskie	2.05	1.65	1.36	1.34					
Pomorskie	1.26	1.56	1.62	1.66					



Source: Own elaboration based on Eurostat, economic accounts for agriculture by NUTS 2 regions [agr_r_accts] and labour force: number of persons and farm work (AWU) by sex of workers and NUTS 2 regions [ef_olfreg] (AWU: total, labour force directly employed by the holding).

Table 2. Regional differentiation in labour productivity in selected countries of the "old" Union

Regions NUTS 2	2005	2007	2010	2013	Regions NUTS 2	2005	2007	2010	2013
Austria = 1.00					Portugal = 1.00				
Burgenland (AT)	1.53	1.57	1.25	1.02	Norte	0.71	0.64	0.67	0.58
Niederösterreich	1.15	1.22	1.29	1.31	Algarve	1.42	1.27	1.33	1.25
Wien	1.37	1.06	0.71	0.70	Centro (PT)	0.83	0.79	0.76	0.94
Kärnten	0.63	0.66	0.69	0.67	Área Metropolitana de Lisboa	2.23	2.49	2.15	1.49
Steiermark	0.85	0.91	0.99	0.94	Alentejo	1.85	2.00	2.06	1.87
Oberösterreich	1.16	1.05	1.08	1.07	Região Autónoma dos Açores (PT)	2.10	2.26	2.55	2.69
Salzburg	0.69	0.62	0.51	0.67	Região Autónoma da Madeira (PT)	0.69	0.68	0.63	0.62
Tirol	0.71	0.62	0.48	0.59					
Vorarlberg	0.99	0.89	0.68	0.78					
Sweden = 1.00					Greece = 1.00				
Stockholm	1.54	1.66	1.70	1.11	Anatoliki Makedonia	0.88	0.84	0.83	0.73
Östra Mellansverige	0.57	0.89	0.81	0.84	Kentriki Makedonia	1.41	1.53	1.41	1.56
Småland med öarna	0.85	0.73	0.79	0.98	Dytiki Makedonia	0.98	1.19	1.07	1.17
Sydsverige	1.73	1.71	1.54	1.44	Ipeiros	0.53	0.41	0.45	0.39
Västsverige	0.87	0.85	0.84	0.86	Thessalia	1.59	1.23	1.78	1.76
Norra Mellansverige	0.66	0.65	0.70	0.71	Ionia Nisia	0.63	0.53	0.44	0.55
Mellersta Norrland	1.00	0.78	0.94	0.93	Dytiki Ellada	0.99	1.01	1.00	0.99
Övre Norrland	1.38	1.09	1.36	1.25	Sterea Ellada	1.10	0.96	1.04	0.88
					Peloponnisos	0.74	0.82	0.80	0.81
					Attiki	0.80	1.15	0.74	0.43
					Voreio Aigaio	0.41	0.26	0.40	0.40
					Notio Aigaio	0.62	0.96	0.83	1.00
					Kriti	0.90	1.03	0.87	0.73

Source: Own elaboration based on Eurostat, Economic accounts for agriculture by NUTS 2 regions [agr_r_accts] and labour force: number of persons and farm work (AWU) by sex of workers and NUTS 2 regions [ef_olfreg] (AWU: total, labour force directly employed by the holding).

possible that the effect of covering its agriculture with the CAP mechanism has been observed. For comparison purposes the value of the coefficient K for the entire period of 2005–2013 (R13 / R05) was also presented. The value of this coefficient was –15.40 which indicates divergence in the analysed period. It seems that such method of analysis by dividing into periods better describes the rate of change than in the long-term perspective. In the case of Bulgaria, the dynamics of changes was very significant and dividing the examined period into time sub-periods better defines the dynamics of changes than the calculation of this coefficient for the whole period.

Figure 2 shows the average labour productivity in agriculture in the selected country and its regions. The points connected with the dashed line determine the average value of labour productivity in agriculture for the state. In the case of Bulgaria (Fig. 2a) we can see that the average labour productivity in agriculture increased over studied period. There is also a visible

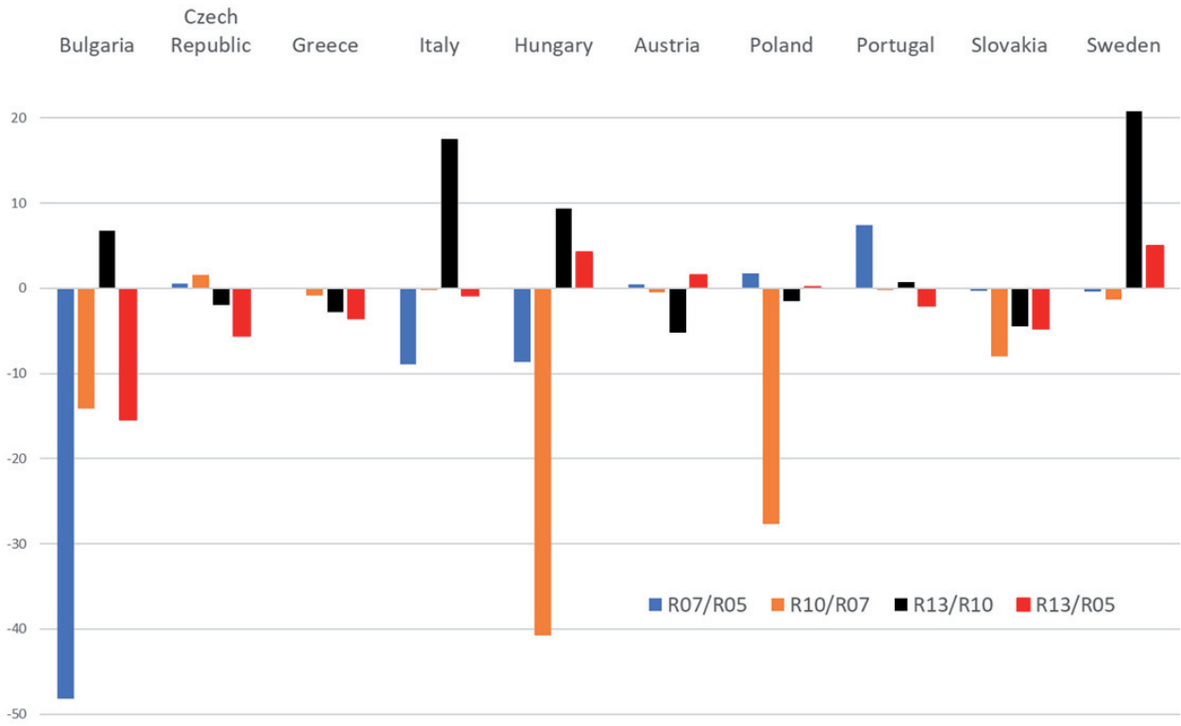


Fig. 1. Dynamics of changes in labour productivity in agriculture for selected countries on a regional basis

Source: Own elaboration based on Eurostat, economic accounts for agriculture by NUTS 2 regions [agr_r_accts] and Labour force: number of persons and farm work (AWU) by sex of workers and NUTS 2 regions [ef_olfreg] (AWU: total, labour force directly employed by the holding).

increase in the dispersion of labour productivity in individual years around the average value and a big difference between 2005 and 2013. We can therefore conclude that since 2005 the differentiation has increased in the regions in relation to 2013. Although it seems that the 2010 arrangement would suggest the existence of a convergence phenomenon in the regions. However, when comparing changes to 2005 we can observe divergence in regions (Fig. 1). Such a big change in dynamics for Bulgaria as described earlier is explained in Figure 2a.

We note that regional stratification has been increasing since 2005 through all the years. Such a big changes have not been recorded in other countries. Figure 2b shows the situation in Poland. Although there is a visible increase in labour productivity in agriculture according to the K-factor we rather observe the divergence in the regions. This is evidenced by the coefficient K that is close to zero. Figure 2c shows how the work efficiency in agriculture in the Czech Republic has changed. Note that the regional stratification (variation) increased in 2013, and in earlier years (2005, 2007 and 2010) it can be assumed that it was at a similar level. What causes that in the regions we will observe the phenomenon of divergence although at the national level it will be effectively masked.

As mentioned earlier, in Greece there no differentiation in labour productivity was observed over studied years. Note (Fig. 2d) that regional variation in Greece remains at a similar level. It is not possible to tell from that figure whether or not we are talking about the same regions, it would require more detailed analysis, and the use of more advanced statistical methods. In

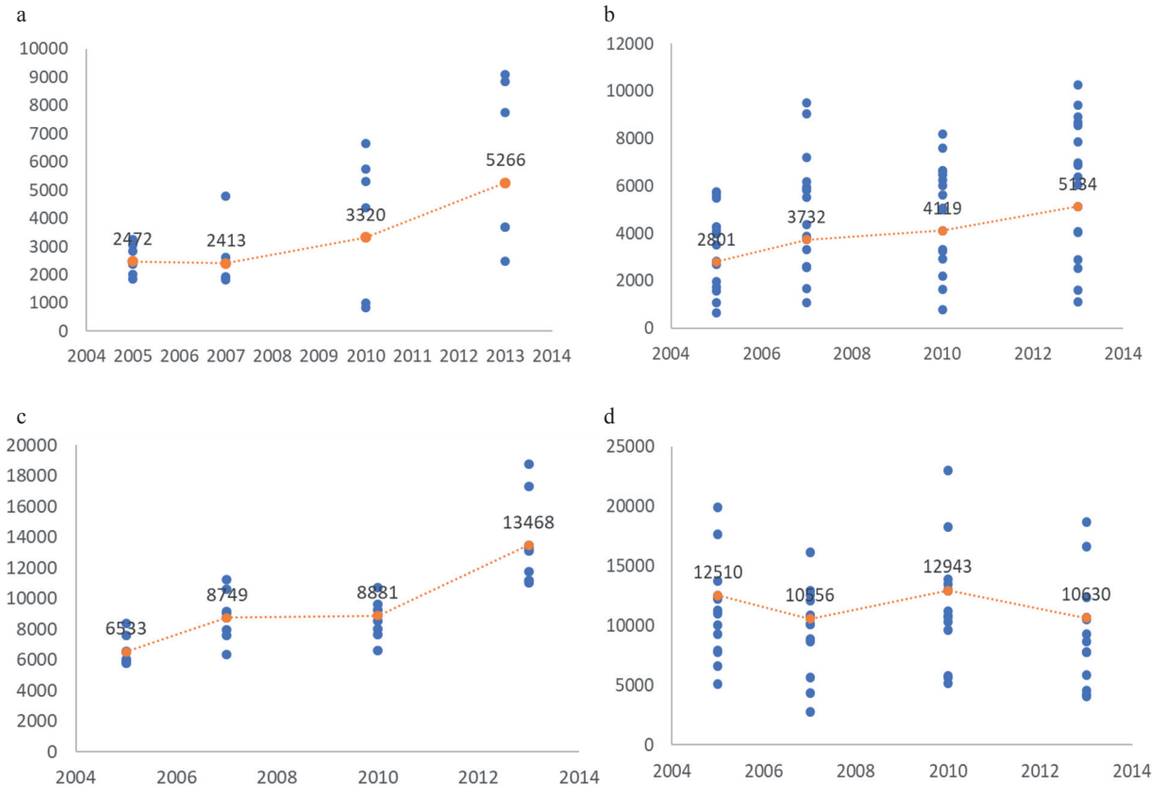


Fig. 2. Average labour productivity in agriculture at the regional level in Bulgaria (a), Poland (b), the Czech Republic (c), Greece (d)

Source: Own elaboration based on Eurostat, Economic accounts for agriculture by NUTS 2 regions [agr_r_accts] and labour force: number of persons and farm work (AWU) by sex of workers and NUTS 2 regions [ef_olfreg] (AWU: total, labour force directly employed by the holding).

case of other studied states of the "old" Union the phenomenon behaved in a similar way, hence graphs for these countries were not included.

CONCLUSIONS

The aim of the work was to assess changes in labour productivity at the regional level, and to determine the dynamics of these changes in the studied time period. A strong differentiation of labour productivity in agriculture has been determined at the regional level that is masked in the case of aggregation to the level of countries. Strong differentiation of labour productivity at the regional level has been demonstrated in Bulgaria, Poland and Slovakia. However this problem also concerns Greece which has been a member of the EU for 36 years. In the case of Greece we must note that the regional differentiation is very strong and remains the same throughout the whole studied period. The remaining countries of the "old" EU were little, internally differentiated, their efficiency fluctuated around the average for the country. Based on the dynamics of labour productivity the persistence of regional structure in agriculture has been found. However, its exact determination requires detailed

research. One of the conclusions being drawn is the necessity to change the current policy which should – to a greater extent – activate the weaker regions aiming at lower volatility at the regional level. Here comes up the case of Bulgaria which was described in the work. Conducted study shows a positive transformation taking place in this country in terms of the convergence process. This positive change should be connected with the inclusion of this country in the system of subsidies for agriculture at the time of its accession to the EU which fell during the period analysed. The direction of further research leads to determining the distribution which characterizes agricultural labour efficiency in individual regions, but it requires a more detailed analysis, and the use of more advanced statistical methods.

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DYNAMIKA ZMIAN WYDAJNOŚCI PRACY W ROLNICTWIE NA POZIOMIE REGIONALNYM W WYBRANYCH PAŃSTWACH UNII EUROPEJSKIEJ

STRESZCZENIE

Porównanie dysproporcji wydajności pracy w rolnictwie zwykle prowadzi się na poziomie krajowym. Prowadzone badania dotyczą zwykle państw tzw. starej Unii i państw nowo przyjętych. W wyniku tak przeprowadzonych analiz i efektu agregacji tracone są informacje o rzeczywistej skali zróżnicowania na poziomie regionalnym. W pracy zaproponowano analizę na poziomie NUTS 2 dla wybranych państw Unii Europejskiej celem ukazania ich wewnętrznego zróżnicowania pod względem wydajności pracy oraz zmian zachodzących w badanym okresie. Stwierdzono także, że należałoby określić rozkład, jakim charakteryzuje się wydajność pracy w rolnictwie w regionach. Wymagałoby to zastosowania bardziej zaawansowanych metod statystycznych.

Słowa kluczowe: dywergencja, konwergencja, wydajność pracy

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ORIGINAL PAPER

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INDUSTRIAL CLUSTERS AS A DEVICE OF STIMULATION OF COOPERATION AND INNOVATION OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE AREA OF BIO-ECONOMY

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ABSTRACT

The elaboration discusses the possibilities of the usage of industrial clusters to invigorate cooperation and innovative character of enterprises from the area of industry. Its purpose is to explain why clusters are appropriate structure to increase the innovative activity of cluster members, belonging to the bio-economy sector. Increasing the innovativeness of these entities is possible due to cooperation, resource synergy and the exchange of knowledge as well as technology transfer. In addition to the theoretical approach to this issue, the article contains examples of two clusters functioning in the area of the bio-economy. The elaboration has a theoretical and overview character. There were used union and national strategically and policy papers, research studies and other information deriving from observations and conversations with the chairman of an industrial cluster the Zachodniopomorski Klaster Chemiczny Zielona Chemia.

Key words: bio-economy, industrial clusters, cooperation, companies, innovativeness

INTRODUCTION

In 21st century, the world and the European Union countries have to face developmental challenges which require striving for maintenance of balanced, long--term industrial development including husbandry of biological resources. In 2010 the concept was presenting innovative approach towards solving problems of the egress of the European countries from recession after a worldwide crisis. Those funds add up as fundaments of bio-economy. These countries needed a new direction of development, based on more and more sound knowledge and innovation. There will be new products and services, new marketplaces of food and bioproducts in various branches of industry (agriculture, forestry, food industry, energy production and chemical, cosmetic, pharmaceutical, biotechnological sectors) in bio-economy. The creation of new branches of industry is anticipated [Chyłek and Rzepecka 2011, Adamowicz 2016]. On the other hand, bio-economy is considered to be an answer from science to many numerous challenges of environment, economy, and society, which determine the future of following generations. Every country in the world, as well as in Europe, have to deal with them [*The European Bioeconomy...* 2011, Adamowicz 2014]. Industries need new solutions to those problems – it requires the effects of cooperation of scientists, entrepreneurs, and society. The European Commission suggested to encompass this kind of operations in developmental strategies in macro, meso and micro scale and supporting them by national authorities and self-government.

The bandwidth of knowledge and diffusion of innovation goes well in industrial clusters; it means geographical aggregations of functional objects (companies, units of research and development sector, institu-

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tions of business environment) appearing in the same or affined industries. There are interactions and horizontal links between them, cooperation and competition (coopetition), the flow of knowledge and innovation. Industrial clusters, because of their sharp features affect functioning and development of a region.

The elaboration aims to show industrial clusters as an appropriate structure for stimulation and organization of cooperation and innovative activities of companies in the bio-economy area. The article includes the explanation of the bio-economy concept. It focuses on the possibilities of utilization of membership in an industrial cluster to a collaboration of different objects in various extent, primarily the flow of knowledge and the creation of new solutions in sectors which use renewable biological resources or industries chained with their value.

It has presupposed that industrial cluster creates a useful net of cooperation between companies and scientific units what enables the increase of the innovation and industrial entities, especially of small and medium-sized enterprises.

MATERIAL AND METHODS

The article has a theoretical and overview character. Its primary sources were strategical documents of the European Union and Poland, voivodeships, policy papers, scientific papers and other information attained from the chairman of Zachodniopomorski Klaster Chemiczny Zielona Chemia (translator's note: West Pomeranian Chemical Industrial Cluster Green Chemistry). The identification of real effects of participation in clusters' structure was enabled by the analysis of documents, results of surveys of different authors conducted on industrial clusters which function in the area of bio-economy and observations; as well as conclusions from the conversation with the representative of the management of chemical cluster.

THE IDEA OF BIO-ECONOMY IN STRATEGICAL DOCUMENTS

The realization of the Lisbon Strategy by members of the European Union did not bring the assumed effects. What is more, worldwide crisis enfaced a necessity to find a new, sound developmental urge of the European Union countries. In 2010 the European Commission acknowledged that it might be pursuing to achieve balanced growth. It was notified in the strategy Europa 2020 [2010]. A strategical direction of development (so-called smart specialization) of members of the European Union should become bio-economy, concerning the need for the sensible use of biological resources [*Innovating for*... 2012]. It is connected with the usage and remold of marine and terrestrial production processes used for the production of food, fodder, bio-products, and bio-energy, as well as processing and creating products arisen in methods of bio-waste [Chyłek 2012, Gołębiewski 2013]. With the passing of time, the definition of bio-economy and its conception has evolved theoretically. Recently scientists tend to broaden of this idea, in example, by examining it in the concept of public goods theory, external effects or from the perspective of industrialization of agriculture, social innovation, the role of farmers in the creation, social processes, and the scale of bio-economy development. As Adamowicz [2014] leads, bio-economy became one of the greatest ideas of "analytical-cognitive and dynamic sector of the European industry, being one of the biggest bidders of employment, which has great potential and real fundaments of development".

The rational use of biological resources while using knowledge from the area of biotechnology, genetics, chemistry, physics, mathematics, IT, materials science, medicine, environmental and economic science and other, enables creating innovative technologies, products, and services. They are supposed to help in solving global economic and ecological challenges of the contemporary world. They include, in example, universal nutritional safety, a well-balanced industry of natural resources, limitation of social dependency from non-renewable resources, protection of biodiversity, mitigation of changes and results of climatic changes, solving the problem of rubbish.

The European Commission precisely described the directions of exploitation of strategies in favor of using renewable biological resources in the document *Innovating for Sustainable Growth: A bio-economy for Europe* [2012]. On its basis, individual members of the European Union, including Poland, described

their strategic operations. According to the European's Commission recommendations, Polish government tried to solve of the program of bio-economy with other strategic and program assumptions: *Strategia Rozwoju Kraju do 2020 roku* [2012], Dynamiczna Polska 2020 [*Uchwała Nr 7…* 2013] (translator's note: The Strategy of Country's Development, Dynamic Poland) concerning in advance environmental, manufacturing, energetic policy, innovative policy, industrial cluster policy. In the official document *Krajowe inteligentne specjalizacje* [2016] (translator's note: National Intelligent Strategies), bio-economy includes these specializations:

- innovative technologies, processes, and products of agricultural-nutritional and timber sectors;
- food of the best quality;
- biotechnological processes and outcomes of specialistic chemistry and environmental engineering.

The choice of this "smart specialization" in this case resulted not only because of politics of the European Union and planned directions of financing prodevelopmental enterprises in years 2014–2020. It was justified mainly:

- by the potential of bioresources available in Poland and previous stock of development in the areas of bio-economy (that is to say: agriculture, foresting, fishing, aquaculture, food processing, chemical and biotechnological industry, energy sector and other);
- by abilities of knowledge and research-and-development sector which may be inspiring to habituate innovation in the area of bio-economy and to improve competitiveness for industries;
- by offering new chances of development for regions with significant potential of natural resources, i.e., Lubelskie Voivodeship and West Pomeranian Voivodeship.

Bio-economy as a way of a smart specialization entered into regional strategies of voivodeships innovation (or their amendment) which could have possibility to the usage of potential resources in this area, i.e. *Regionalna Strategia Inteligentnych Specjalizacji Województwa Zachodniopomorskiego 2020+* [2016] (translator's note: Regional Strategy of Smart Specializations of West Pomeranian Voivodeship). These kinds of documents have become fundamental for making out specific activities on the meso and micro levels. A side from above, they were used for preparing programs of reinforcement the innovative abilities of enterprises, between entities, development of the research-and-development sector functioning in the area of bio-economy, directing scientific and researching units onto practical usage of the results of their surveys. The process of bio-economy development imposes initiation and support of modern and permanent types of cooperation between entrepreneurs and units of the research-and-development sector, institutions of business surrounding and social area. They are being created by quadruple helix [Carayannis et al. 2012]. As Gralak [2015] leads, the support of institutional surrounding of the bio-economy sector is crucial, what pertains to different organizations, in example, innovation centers, technological transfer, industrial cluster initiatives and technological incubators. It gives preferential treatment to creation and development of multilateral connections of objects from the bio-economy area (members of the industrial cluster) and innovative activity [Komor 2016].

INDUSTRIAL CLUSTER AS AN ORGANISATIONAL STRUCTURE BASED ON COOPERATION

An industrial cluster is considered to be a network of organizations, relying on strategical cooperation during the realization of reciprocal aims by all members, what ensures them of the higher efficiency of husbandry [Rundo 2013]. The conception of an industrial cluster has been introduced into economic branches at the turn of the 1980s and 1990s by Porter, but the phenomena of cooperation between industrial entities from various branches concentrated in particular geographical area has been seen even in ancient times. It confirms by the structure of Sumerian cities in 4th century BC with dedicated districts specialized in a particular craft. They created a network of mutual relations. Marshall considered this problem before Porter; he formed a conception of an industrial district and benefits of agglomeration [1920], but also Perroux created the theory of the growth of centers [1964].

Many definitions of an industrial cluster appeared in the literature of economy. Along with the development of surveys in this area, there have been created

new interpretations and extended their meanings. The promotion of innovative activities as part of industrial cluster's policy has disposed the creators to develop following definitions to emphasize the role of industrial clusters while cooperating knowledge and industry, knowledge transfer and commercialization of innovation. The table presents some of the descriptions.

Modern structures of an industrial cluster perform in many developed and developing countries, and they constitute elements of local and trade innovation systems. As Weresa et al. [2017] point, individual industrial clusters divide between each other by size, level of development, a degree of innovation and technological sophistication of their members, a degree of internationality and influence on the sock and sector in which they function. However, they have interactive features such as geographical concentration, sectoral concentration and sound bounds and interactions between the members of an industrial cluster in the form of coopetition so the amalgamation of cooperation and concurrency.

Now and again, the cluster's initiative connects with an industrial cluster. However, it is not the same. A cluster's initiative means "an organized activity to intensify growth and concurrency of clusters in a region, involving industrial cluster's companies, government and/or research environment. They are less or more formalized and institutionalized forms of cooperation of groups of a local object to initiate functioning or solving substantial problems of an already existing industrial cluster" [Kowalski 2013].

Cluster's initiatives are supposed to support the growth and concurrency of previously organized industrial clusters. What is more, they are an essential elements of industrial, local and innovative policy. They attend upon initiating and promoting new branches, using the achievements of science. Despite, an industrial cluster and cluster's initiative are not the same, the second is often called as an industrial cluster in Poland. It occurs in cases of functioning cluster's initiatives in ICT (information and communications technology) sector, bio-economy, creativity sectors and in healthcare. The creation of them in recent years was because of the initiative of scientific centers, government or Polska Agencja Rozwoju

Table. Exemplary definitions of an industrial cluster

Author and source	Industrial cluster
M.E. Porter [1990]	a geographical center of mutually related industries, specialized suppliers, units providing services, companies functioning in affined sectors and institutions associated with them (i.e. universities, standardization units and industrial associations) in each branch, competing with each other but also cooperating
S.A. Rosenfeld [1997]	a geographical center of companies functioning in related sectors, cooperating or related with each other in different ways or providing services complementary to each other and making use of the same infrastructure, as well as specialized suppliers. They function on the same (local) labor market, facing similar changes and dangers
P. Den Herig, S. Malta [1999]	a manufacturing net of rigidly connected companies (including specialized suppliers), objects which create knowledge (universities, research institutes, engineering companies), bridging institutions (brokers, consultants) and clients connected with each other in production chain create the added value
M. Fromhold-Eisebith, G. Eisebith [2005]	a regional agglomeration of companies and other organizations (universities, centers of research-and-development, national agencies) connected by sectors or by the chain of added value, achieving competitory ascendancy due to colocation and cooperation
Clusters for Competitiveness [2009]	an agglomeration of companies, suppliers, contractors and various institutions in the particular branch, connected with each other and located nearby, experiencing external benefits and effects of synergy resulting from, i.e. accessibility to specialized human resources, the dispersion of knowledge and higher work efficiency concerning the increased level of competition

Source: Own elaboration based on Kowalski [2013].

Przedsiębiorczości [translator's note: Polish Agency of an Entrepreneurship Development] as part of regional innovation strategy and projects of supporting this kind of organizations.

Industrial clusters and cluster's initiatives are structures which enable cooperation in the form of a network. They form by numerous organizations, characterized by unique skills of creating value (i.e. knowledge resources, accessibility to stock, research-and-development potential, unique accomplishments of human resources), the exchange of privity and experience, simultaneously with preparedness to cooperation (even with rivals). As Weresa et al. [2017] lead, this kind of network collaboration of objects located in proximal or subsequent distance (it is possible in 21st century due to high-tech means of communication) advantages synergy and brings benefits to individual objects in an industrial cluster. As well it is used in region and sector, in which a group and the whole husbandry function. The results of surveys conducted on industrial cluster's structures in various areas show that they have a sound influence on the dispersion of knowledge, diffusion of innovation, improvement of change and concurrency [Kowalski 2013, Fundeanu and Badele 2014, Grzegorzewska et al. 2014]. The impingement of industrial cluster's structures results from the effects of dispersion. They appear when activities undertook by industrial entities create benefits for other objects located in the habitat. It contributes to achieving a so-called environmental efficiency in the economic, social, technical and ecological dimension [Kowalski 2013].

BENEFITS OF COOPERATION BETWEEN ENTITIES AS PART OF INDUSTRIAL CLUSTERS

Cooperation based on industrial cluster's structure is becoming more popular in the worldwide industry. In Polish sector in the years 2013–2015 about 19% of small-sized, 17.7% of medium-sized and 21% of large companies took part in the innovative activity as part of industrial clusters [*Działalność innowacyjna przedsiębiorstw…* 2016] [translator's note: Enterprises innovative activity]. Nowadays, these indicators are higher because of the progression. That is the result of supporting this kind of cooperation by national, regional and local authorities, because of significant innovative and concurrency potential of industrial clusters and cluster's initiatives [Haberla 2016]. However, not every of the existing structure, although called an industrial cluster, function amicably to the assumptions of this conception – some of them are only rehearsals of industrial clusters' structure.

An industrial cluster enhances the strength of a single entity in activities on the market, enables a transfer of knowledge for units from the science sector, exchange of experiences, the realization of innovative projects responsible for the demands of companies. It leads that membership in an industrial cluster forcefully determines the innovation of a company. Participation in this form of cooperation ensures more comfortable access to potential resources of information about the change, missing specialist resources crucial for the improvement of innovation (i.e. knowledge, skills, financial capital, human capital). It is easier to identify trends, undertake and habituate innovations, influence the technological improvement in the sector, create intersectoral change, achieve greater dynamics of development due to an industrial cluster. According to Anderson et al. [2004] – the faster growth of companies results from easier access to seed and venture capital, advanced tools of risk management, higher strength of the whole industrial cluster. On the other hand, it results from the lower significance of interest groups (which may be a barrier while making decisions), inspected access to the network of sources of financing and complementary skills, improvement of effectiveness (as a result of specialization and rivalry) and access to specialized resources. Benefits of presence in an industrial cluster mentioned earlier are significantly crucial for small and medium-sized enterprises which come across numerous barriers to innovation and are not always able to overcome them independently.

Functioning in an industrial cluster resists on cooperation, sometimes even on concurrency, and it enables the entities to achieve following benefits confirmed by results of empirical surveys [Kowalski 2013, Grzegorzewska et al. 2014].

- improvement of agencies' productivity;
- achieving benefits of scale and specialization;
- reduction of transaction, transport, technical infrastructure and market activities costs;

- achieving greater specialization within a range of acquiring human resources, conducted research-and-development works, sources, and mechanisms of financing;
- easier access to information about conditions and changes in technology, stock, and determinants of running a business; in the result – easier adjustment and reaction to changes in the habitat;
- ability to impact the technological progress in branch and sector; gaining a technological pioneer's pension;
- acquiring access to the qualified labor force;
- exploitation of sharing knowledge, the synergy of sources to obtain skills of learning, cooperation while solving problems and creating innovations.

Surveys conducted by varied authors on the exploitation of an industrial cluster's conception in different industrial and service sectors in Poland affirm that it is possible to achieve mentioned benefits by companies or other members of an industrial cluster. Cooperation based on synergy and trust improves their innovativeness and concurrency. It also supports the development of a region [Nasalski 2008, Łącka 2013, Kacprzak 2014].

INDUSTRIAL CLUSTERS IN BIO-ECONOMY – A SHIFT OF THE THEORY TO PRACTICE IN POLAND

National concept papers emphasize that bio-economy is a smart specialization. Its development requires organizing a net of cooperation (i.e. as an industrial cluster) of various objects within a sector and intersectoral cooperating to solve problems associated with the wise husbandry of biological resources. The collaboration of members of an industrial cluster enables reducing difficulties while financing undertakings in the area of bio-economy (i.a. using public support) and looking for new markets for hitherto or new proposals of companies. It facilitates promoting the flow of existing or innovative solutions in or between sectors. Scientists support entrepreneurs while diagnosing needs of purchasers and exploiting this knowledge to prepare new solutions. They initiate the research-and-development works and create innovations which will conform prospective needs of acquirers. As Komar [2016] leads, the most significant meaning for the development of industry has a creation of an effectual, proficient "system of gaining, keeping and sharing knowledge, and commercialization of the results of scientific surveys". Industrial clusters offer these opportunities. Two, undermentioned examples describe, how it realizes practicably. Prime, agricultural and food industrial cluster connects with producing ecological food, and it is called Dolina Ekologicznej Żywności [translator's note: Valley of Ecological Food]; further, called Zachodniopomorski Klaster Chemiczny Zielona Chemia [translator's note: West Pomeranian Chemical Industrial Cluster Green Chemistry] with a widely comprehend bio-economy. Initially, it was directed towards chemical sector (chemical and rubbery industry), but with the passing of time it spread its range of activity into other areas of bio-economy such as waste farming and the power industry.

Klaster Dolina Ekologicznej Żywności

An industrial cluster functioning as an association lies in Lubelskie Voivodeship, but its influence embraces Podkarpackie Voivodeship, Świętokrzyskie Voivodeship, Podlaskie Voivodeship and Warmińsko-Mazurskie Voivodeship. It has existed since 2010 and was created within the project "Rozwój klastra Dolina Ekologicznej Żywności [translator's note: The development of an industrial cluster Valley of Ecological Food] accomplished in years 2010–2013. A concept of this net structure was prepared to needs of Program Operacyjny Rozwój Polski Wschodniej 2007–2013 [translator's note: Operative Program of Development of Southern Poland]. Axis 1: Modern industry, functioning. 1.4 Promotion and cooperation. It states as a cluster's initiative organized within the regional development policy and supports innovation in the area of a region with significant potential of biological resources, and specialization of productivity factors. PLN 2.5 million was set for this, and 90% of funds (PLN 2.25 million) derived from the European Fund of Regional Development. The Instytut Uprawy, Nawożenia i Gleboznawstwa w Puławach research center [translator's note: The Institute of Cultivation, Fertilizing and Soil Science in Puławy] has become a coordinator of this project. The cluster's initiative,

primarily having six participants (recently – more than 20) was supposed to lead to [Kacprzak 2014]:

- the creation of a supra-regional platform of cooperation in the area of development and promotion of the ecological food in the region of southern Poland;
- the improvement of competitiveness and innovativeness of members;
- the augmentation of production scale of environmental food and the number of workplaces in the sector of green products (within netted cooperation and mutual promotion offer of products and clusters' services);
- the improvement of accessibility to complex information and knowledge about production; processing, marketing of ecological outcomes for members of an industrial cluster;
- the increase in demand for eco-friendly products among consumers and gaining new markets.

The structure of this industrial cluster relies on the integration of individual elements of production and distribution of biological and agricultural products. The circle begins with creators, within organizations and institutions supporting and controlling economic, agrarian activities (consultants, certifying units, producer associations), processing companies, research-and-surveying institutes, agricultural school system, and organizations focused on promotion and development of the stock of ecological food.

After seven years of functioning of this net of cooperation, it can be easily alleged that it has brought anticipated results. To needs of this activity of the cluster's structure and its members, surveys and analysis concerning production, processing, and marketing of ecological products have been created. There appeared 13 new environmental products and used 26 innovative methods of manufacturing and selling bio food. Essential effects of the existence of the industrial cluster are the formation of sound cooperative connections between its members and the attraction of subsequent members. Another result is the creation of permanent relations between the members of this cluster in the regulative surrounding on the local, regional and national standards. Dolina Ekologicznej Żywności has promoted a distinguishable brand and entrepreneurs acquired the increase of production scale. Activities connected with sharing knowledge and teaching the members of this cluster were also successful (i.e. training courses, conferences, promotional and informative materials).

Zachodniopomorski Klaster Chemiczny Zielona Chemia

The association Zachodniopomorski Klaster Zielona Chemia was created in June 2007 and registered in KRS [translator's note: National Court Register] on 18 September 2007. It is one of the most extended existing structure in Poland. Before this time, there were informal cooperative bounds between entrepreneurs of chemical sector and between Szczecin universities in Poland. Works over the Regional Strategy of Innovation in 2006, noted a need to create formalized cluster structure which will have higher chances of acquiring support for activities. These connect with forming a platform of knowledge exchange, the technology transfer as a result of the cooperation of science and industry, and innovative operation of companies. The prime movers of this net structure were scientists of Politechnika Szczecińska [translator's note: Szczecin Polytechnic Institute], Akademia Rolnicza w Szczecinie [translator's note: Szczecin Agriculture University] which in 2009 created Zachodniopomorski Uniwersytet Technologiczny w Szczecinie [translator's note: West Pomeranian University of Technology, Szczecin], and self-government. The entrepreneurs of the chemistry sector have attended works over creating the industrial cluster from scratch. Primarily, the structure kept a count of about 20 members, including companies from the chemistry sector (chemical and rubber industry), universities and objects of the business surrounding. After the reform of higher education in Poland in 2010, the industrial cluster started to overgrow. In 2017 it focalizes 120 members, including 20 large companies, 55 small and medium-sized, numerous business support organizations, scientific units, and institutions of local government. The range of the industrial cluster has transgressed over a region of West Pomerania - recently, its members localize in 10 voivodeships. It cooperates with units abroad – in Germany, the Netherlands, Belgium, Sweden, Denmark, Finland, Spain, Italy, Greece and the United States of America. Recently, objects from Ukraine and Belarus have joined.

The activity of the industrial cluster consists of organizing platforms of cooperation of business environment with representatives of the research-and-development sector and latest achievements of science. There are three such platforms: bio-economy, packaging and the power Industry and the recovery of materials. Polish and foreign counterparties demonstrate great interest in the results of commercialization of the cluster's innovation what causes a consistent development of research-and-development background and joining the net of cooperation by following members. Since autumn in 2015, the Zachodniopomorski Klaster Zielona Chemia states as Krajowy Klaster Kluczowy [translator's note: National Fundamental Industrial Cluster]. It was entered by Ministerstwo Gospodarki [translator's note: The Ministry of Industry] what attests an acknowledgment of its achievements and the strength of a structure, and executed strategy.

Following facts prove the strength and efficiency of the industrial cluster in years 2010–2017: the organization of 230 meetings, including eight editions of Międzynarodowe Forum Naukowo-Gospodarcze Chemika EXPO [translator's note: International Scientific and Economic Meeting of Chemika EXPO]. It organizes courses and other events for companies of the industrial cluster (i.e. mutual industrial assignments, studio appointments, attendance at fairs, cooperative market). The communication between the members and promotion of the cluster's activities facilitates since 2014 by a fortnightly dispensation of a Newsletter in the electronic version. What is more, the industrial cluster implemented 12 national and international projects (including initiatives CORNET, 7 FP, H2020). Projects such as SUBWEX (2013–2014), SmartFlowerPack (2013–2014), FreshCoat (2013–2015), ExtruMibi (2013–2015), ProgRess (2014–2015), ActiPoly (2015––2017) appeared among them. Due to those projects, the industrial cluster claimed PLN 7.5 million on Zachodniopomorski Uniwersytet Technologiczny w Szczecinie account. However, companies which cooperate in this cluster claimed a support of PLN 23.5 million. Concerning limited framework of this article, it is impossible to describe each and individual projects in details, however, each fit in the range of bio-economy. The Klaster Zielona Chemia took part in the Natureef project (European Cluster Partnership). The aims of this project were the creation and implementation of a similar strategy which promotes cooperation between various branches of industry. It also simplifies an internationalization of small and medium-sized enterprises by mentoring and popularization of their innovative technologies (in the area of natural resources). The project was financed by a programme Horizon 2020 of the COSME initiative [translator's note: Programme for the competitiveness of enterprises and small and medium-sized enterprises]. Thanks to this initiative, the Klaster Zielona Chemia supports its three members from South Africa, China, and the Philippines.

Apart from that, the industrial cluster supported the development and preparatory works of new products from members of the cluster, in example, innovative, organo-mineral fertilizer Or Cal (covered by the patent) as well as hobby and professional fertilizers for agriculture SUPROFOS and SUPROFOSKA. What is more, the industrial cluster supports surveys within PhD thesis directed on bio-economy and uses the results of these studies to needs of members of the industrial cluster.

CONCLUSIONS

Modern, innovative processes demand interaction and cooperation between the units of science and industry. Experts lead that the most beneficial expanse of creating and implementing the innovation is a region in which a connection of knowledge, skills, and functioning of companies is possible. Environments especially favorable for cooperation and innovative processes are industrial clusters. They efficiently impact the creation of connections and organization of collaboration of universities, research institutes, companies, institutions of the business surrounding, social groups, representatives of consumers, and units of the labor government. Cooperation inside of an industrial cluster contributes to the exchange of knowledge and information, transfer of technology, their flow from the science sector and the developments of qualified workforce in companies. Thanks to above-mentioned, clusters acquire new chances of development – they intensify the research-and-development activity, involve innovative technological solutions into production processes. It favorably impacts the growth of in-

novations and concurrency of companies and a region in which a cluster locates. Experts lead that essential factors of an industrial cluster's success are: sound scientific substructure in the form of fundamental and applied surveys, good scientific hinterland, the high culture of industry in the academic environment, accessibility to business support services, and the presence of large industrial objects in affined industrials. They singled out sectoral specialization in a region, the intensive cooperation of members of an industrial cluster in a local, interregional and international environment, as well as positive effect of this collaboration – the mutual trust of objects.

Abovementioned annotations also pertain industrial clusters in the range of bio-economy. Portrayed examples of two Polish industrial clusters functioning in this sector denote that such structure approves the flow of knowledge and know-how, acquiring new skills, and implementing mutual research-and-development works. It facilitates communication and creation of an atmosphere of trust, even among rivals. It reassures more straightforward access to expert services and interactive marketing activities. The presence of companies from the bio-economy sector in an industrial cluster supports their innovativeness, commercialization of surveys results, and the diffusion of knowledge and innovation. It enables the growth of the number of workplaces and improves the quality of work power among cluster's members, what improves developmental conditions of a region. Outnumbered benefits lead that industrial clusters in Poland should be used to a greater extent while enhancing innovativeness of companies from the bio-economy sector.

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KLASTRY JAKO NARZĘDZIE STYMULOWANIA WSPÓŁPRACY I INNOWACYJNOŚCI MAŁYCH I ŚREDNICH PRZEDSIĘBIORSTW W SFERZE BIOGOSPODARKI

STRESZCZENIE

W opracowaniu omówiono możliwości wykorzystania klastrów do pobudzenia współpracy i innowacyjności przedsiębiorstw z obszaru biogospodarki. Celem artykułu jest wyjaśnienie, dlaczego klastry są właściwą strukturą do zwiększenia aktywności innowacyjnej członków klastra należących do sektora biogospodarki. Zwiększenie innowacyjności tych podmiotów jest możliwe dzięki współpracy, synergii zasobów i wymianie wiedzy oraz transferowi technologii. Poza teoretycznym ujęciem tego zagadnienia artykuł prezentuje charakterystykę dwóch klastrów funkcjonujących w obszarze biogospodarki. Opracowanie ma charakter teoretyczno-przeglądowy. Do jego przygotowania wykorzystano unijne i krajowe dokumenty strategiczne oraz programowe, opracowania naukowe, a także informacje pochodzące z obserwacji i rozmów z prezesem Zachodniopomorskiego Klastra Chemicznego Zielona Chemia.

Słowa kluczowe: biogospodarka, klastry, współpraca, przedsiębiorstwa, innowacyjność

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DIRECT AND INDIRECT IMPACT OF NAUTICAL TOURISM ON THE DEVELOPMENT OF LOCAL ECONOMY IN WEST POMERANIA ON THE EXAMPLE OF DARŁOWO MUNICIPALITY

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ABSTRACT

The aim of the article is to determine the direct and indirect benefits from the development of nautical tourism in the West Pomerania. The study was founded on the economic base theory, which attributes local development to exogenous factors. In accordance with its premises, the direct benefits include the initial sailing spendings. The lack of a comparative base made it impossible to determine their exact significance for the economy. The calculated tax revenues – as one of the categories of indirect benefits – comprised a small part of the local budget, but with the income of the port operator they allowed to cover the investment outlays for the development of sailing infrastructure. Qualitative analysis confirmed that the majority of indirect benefits accumulates in the local economy. Sailing tourism may become an important aspect in the development of the West Pomerania's local economy. This, however, will require further development of sailing infrastructure and broadening the scope of available services.

Key words: sailing infrastructure, yacht marina, local development

INTRODUCTION

In Western Europe, sailing tourism is becoming more and more popular [Jugović et al. 2011] owing to changes in the contemporary tourism trends such as an increased interest in forms of active leisure, moving away from mass tourism towards individual tourism, and an increased demand for various forms of qualified and specialized tourism [Fache 2002, Meyer 2005, Balińska 2013]. In recent years, in Poland one can observe an increased interest in sailing, the main reasons for this situation being – apart from general tourism trends – the liberalization of laws concerning sailing and international traffic, the increasing wealth of the Polish society, and the intense development of the infrastructure [Heflich 2011, Łapko 2015].

Sailing tourism is a key element of local development [Luković 2012, Durydiwka 2013], especially important for port municipalities. It allows to fill in an economic gap resulting from the regress of the Baltic fishing industry [Kaup 2010, Zieziula and Nowaczyk 2011].

The aim of the following article is to identify the direct and indirect benefits from the development of sailing tourism in West Pomerania. With this aim in mind, the answers to the following questions were attempted:

1. What benefits for the local economy are generated by sailing tourism and with the use of which research methods can they be identified?
2. What conditions are conducive to the development of sailing tourism and at the same time stimulate the development of local economy?

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Due to the amount of research material available and the limitations in access to statistical data, the study was narrowed to the yacht marina in Darłowo, which was constructed as part of the project called The West Pomeranian Sailing Trail – a network of tourist ports of West Pomerania. However, in most seaside municipalities the conditions for the development of sailing are similar. Therefore, the conclusions from this study can very likely be applied to all of them.

It should be noted that in both national and foreign literature on the subject the economic aspects of the development of nautical tourism have not been comprehensively researched yet [Mańkowski 2008, Łapko 2015]. The following article is an attempt at bridging the resulting gap at least to some extent.

In the article, both primary and secondary sources of information were used. For this purpose, literature on the subject and numerous publications and scholarly studies have been consulted. Research was conducted in the form of in-depth interviews with the representatives of small seaports. Information provided by the manager of the Maritime Port Authority in Darłowo was especially valuable.

IMPACT OF TOURISM ON THE DEVELOPMENT OF LOCAL ECONOMY IN THE LIGHT OF THEORIES

Places rich in tourist attractions often attribute their development to the servicing of tourist traffic, i.e. the export of a tourist product [Butowski 2010]. It is especially visible in smaller settlement units with less diversified economy and limited development possibilities, which are visited by tourists from larger centers – the key areas of consumption of tourist services [Blair 1991]. Therefore, many authors believe that the development of tourism and tourist centers is mostly conditioned by exogenous functions [Dziewoński 1971, Maik 2000, Gołembski 2009].

The theoretical concept emphasizing the importance of external factors in the development of spatial economy is the economic base theory. It is believed to have been created by Sombart [1907], and adjusted to the conditions of contemporary economy by Hoyt [1954]. Although is it among the oldest theories, it remains to be one of the most popular concepts explaining local development [Grosse 2002].

In accordance with the economic base theory, the main factor stimulating the economic processes is the export of goods and services. The subject of export is the so-called economic base, i.e. goods and services in the productions and provision of which a territorial unit specializes. Thanks to export revenue – through multiplier effects – almost all sectors of local economy benefit from it.

The economic base theory can be successfully applied to tourism – a sector of economy rarely used in local development – due to its complex and multifaceted character. Panasiuk [2007] points to the penetration of tourism into most areas of economic and social life. In a similar tone, Meyer [2008] states that tourist economy manifests itself in all spheres of management. Gaworecki [2004] emphasizes tourism's power of influence over other sectors of economy, such as production, division, exchange, and consumption of goods and services. For Gołembski [2009], tourism is a true rarity, as its effects are comparable to the effects of investments. Tourists enter additional money into the economic cycle (independent of the previous financial flows) which circulates fast in the economic system. The nature of tourist spendings also plays a large role, since they tend to be above average, often unplanned and decided on impulse. Additionally, the areas of tourist reception – especially those less developed – are often very popular with foreign tourists, whose spendings are higher than those of local tourists, which further influences the development of local economy [Łapko 2015].

In terms of income, the power of impact tourism has on the development of a tourist area is determined by a multiplier. It is used to measure the total effects of the initial tourist expenses within a given area, as a result of its penetration into the economy [Medlik 1995]. The multiplier model includes direct, indirect, and induced effects [Hall and Page 2002, Milewski 2007]. The direct (or primary) effect is connected with tourist expenses whose addressees are business entities directly involved in the tourist traffic service. The indirect effect – which, along with the induced effect constitutes a secondary income impulse – includes companies which supply the entities directly involved

in the tourist traffic service. The last, induced effect, consists in an overall increase in expenses of people hired in the direct and indirect tourist traffic services. An important element of tourism's secondary impact on local economy are the taxes paid to local budgets by the business entities servicing the sailing traffic.

The importance of tourism for the local economy may vary [Milewski 2007, Kosmaczewska 2014]. It depends mostly on the scale of tourism traffic, that is on the number of tourists, the time of their stay, and the transactions made. Nonetheless, the amount of tourist expenses does not always translate into the development of local economy, which is reflected in the value of the tourist multiplier. So far not much research has been done on the strength of penetration of tourist expenses into the local economy. On the basis of available data [Clement in: Łazarek 1999, WTO in: Mika 2012], it can be concluded that the multiplier value in economically developed regions, where own resources are enough to develop an economic base, can be in the range of 2–3, which means that each monetary unit introduced into the economic cycle (direct effect) additionally generates from one to two monetary units in further economic cycle (indirect and induced effect). On the other hand, in less developed regions the multiplier value is usually lower, even below 1. Such areas do not generally have their own, endogenous resources to satisfy the demand of the tourists. Then, the development of tourist assets by external capital could potentially lead to the "leakage" of profits outside the area of tourist reception. An extreme example of this is creating tourist enclaves, oriented at servicing exclusive forms of tourism. As a result, connections with local economy are even fewer, because services for elite tourists require appropriate personnel and means of supply of adequate quality, the source of which is usually the country of the capital's origin [Oppermann 1993]. In the case of limited development opportunities of tourist areas, the concept of economic base assumes the possibility of initiating their development as a result of external intervention, e.g. through improving transport accessibility or creating tourist infrastructure. The participation of local businesses in the realization of the aforementioned investments could additionally strengthen the development of local economy [Malizia and Feser 1999].

In literature on the subject, a number of factors are mentioned which determine the development of tourist localities [Brohman 1996, Meyer 2008, Gołembski 2009]. Among the most important ones are: the number of transactions made in the servicing of tourist traffic, the marginal propensity to consume on the part of the local community, and the investment demand of the local economic sector.

It is assumed that a bigger number of transactions has a more positive effect on the development of the local economy. Therefore, the tourist offer needs to be diversified and based on small and medium-sized businesses, which have a greater impact on the formation of network of mutual connections. The marginal propensity to consume depends primarily on the income level. As a rule, the lower the income level, the bigger propensity to consume – and the lower to save money. Therefore, tourist spendings among the less wealthy section of society should usually result in stronger development impulses. On the other hand, the investment demand depends mostly on the prognoses as to the formation of demand for tourist services of businesses. Consequently, the anticipated increase in tourist traffic should result in a higher tendency to expand the tourist base.

Summing up, it should be concluded that the development of tourist space is determined by numerous factors. Both the income level and the multiplier value are dependent not only on tourist expenses. In order for the currency to stimulate the local economy, the servicing of tourist traffic should be handled by local businesses, integrated through a network of connections with the local socio-economic environment. The tourist offer has to comprehensively satisfy tourist needs, and the income obtained from tourism should find an outlet in consumption and investments expenditures, injecting money into the local economy.

IDENTIFYING THE BENEFITS FROM THE DEVELOPMENT OF SALING TOURISM ON THE EXAMPLE OF DARŁOWO MUNICIPALITY

In accordance with the definition of tourist multiplier, the direct effect measures the initial, primary expenses of tourists. Estimating their amount requires access to

data on the scale of sailing traffic. The port in Darłowo registers only calls at the port, and from the available data it can be concluded that in the years 2011–2016 the frequency of the calls rose (Table 1). An especially intense increase in sailing traffic was observed after a new yacht marina was put into use in 2013 [Nowaczyk 2015]. The investment was largely funded from EU funds, which confirms the importance of external intervention in the local development.

In the year 2016, 562 yachts called at the marina. On the basis of conducted research it was determined that the average time of stay of a vessel in port was four days. There were three sailors per vessel. In total, the yacht marina in Darłowo could have ben visited by 1,686 sailors, with each one staying in the port for four days (Table 2).

Having determined the number of sailors, their expenses were estimated. The estimates were solely based on the available statistical data. They include tourist expenses in general (not only of sailors), mainly on: transport, accommodation, food and drinks in cafés and restaurants [MSiT 2007a, b]. A question should be asked about how representative those estimates are for the sailors using the port in Darłowo. Certainly sailors spend less on transport and accommodation, since – usually – they arrive at the port in their own yachts and often sleep on them. However, taking into consideration the significant amount of time that the yachts stay in the port (four days), the sailors must purchase food in local stores. Sailors – like other tourists – take advantage of the local seaside attractions, which entails expenses. On the other hand, the available statistical data do not include tourist expenses specific to the sailors from the Darłowo marina: renovations of vessels, winterizing, yacht charters[1]. According to the author of this article – an opinion confirmed by experts – the expenses of sailors in the Darłowo port are certainly not smaller than the expenses of an average tourist. Therefore, they can be considered representative.

Due to the difference in size between the expenses of local and foreign tourists, calculations were performed separately for both aforementioned groups. Additionally, the estimates were increased by the amount of the port fee charged by ZPM Darłowo. It is another element not included in the statistics. As a result, in 2016 the expenses of sailors in the Darłowo municipality could amount to PLN 1,517. The lack of comparative base (e.g. in the form of information on total tourist expenses or the value of product manu-

Table 1. Number of yachts calling at the Darłowo seaport in the years 2011–2016

Number of calls	2011	2012	2013	2014	2015	2016
	200–250		445	533	672	562

Source: Own study on the basis of data from ZPM [2017].

Table 2. Estimating the amount of expenses of sailors using the yacht marina in Darłowo in the year 2016

Number of calls	Number of calls divided into		Time of stay in the port (days)	Number of sailors per vessel	Expenses (thous. PLN)		Proceeds from port fees collected from sailors (thous. PLN)	Expenses in total (thous. PLN)
	local	foreign			local	foreign		
562	213	349	4	3	250	1 081	186	1 517

local, foreign – average expenses of tourists per one day of stay in Poland in 2016 were: for Polish tourists: PLN 98, for foreign tourists: PLN 285.

Source: Own study on the basis on data from MSiT [2017a, b], ZPM [2017].

[1] In 2016, tourists had four yachts at their disposal. The cost of charter per day was PLN 100. It was higher than the statistical expense of a local tourist assumed for the purposes of estimation.

factured in the Darłowo municipality) makes it impossible to determine the importance of the estimated value for the local economy. It can only be noted that in 2016, sailor expenses could provide employment for at least 31 persons [GUS 2017]. At that time, 1,793 persons were employed in the Darłowo municipality [US 2017]. Those working in nautical tourism services constituted 1.7% of all the employed. There were 800 persons registered as unemployed in the municipality, which makes the unemployment rate 9.3%. Employees in sailing tourism – in case of unemployment – could increase the unemployment by almost 4% or increase the unemployment rate by nearly 0.4%. If perceived through the prism of local employment, sailing tourism was not an essential element of the local economy. However, with limited opportunities for employment or an increase of unemployment as a result of a progressive regression of fishery, sailing tourism provided valuable workplaces.

After calculating the direct effects, the indirect and induced effects had to be estimated, ie. the secondary impact of sailing on the local economy. Due to statistical and scientific limitations, the calculations were narrowed to estimating tax revenues, and a qualitative analysis was conducted in relation to the key element without which the development of sailing tourism would not be possible – the yacht marina.

Estimating the amount of tax revenues was not an easy task. The difficulties resulted from the fact that the revenues from sailing activity were not treated separately in the city budget. On the other hand, the activity of numerous business entities was not limited to services for sailing tourism. Due to the aforementioned factors, the tax revenues were estimated indirectly. On the basis of available research results [Pluciński 2001, Matczak 2016] an assumption was made that the participation of tax revenues of the port sector in the budgets of port cities averaged at about 4%. In the next step, the importance of sailing activity in the operations of the Darłowo port had to be determined. For this purpose, the share of port fees charged in the port in the income of ZPM Darłowo was calculated. In 2016, this share was 15%. This means that the taxes paid by the business entities connected with sailing activity constituted approximately 0.6% (15 out of 4%) of the city budget. In 2016, the tax revenues in the Darłowo municipality were PLN 62,894,000, which means that the income from sailing activity could have been PLN 377,000 (Table 3). The estimated value is significantly smaller than sailors' expenses, but it should be taken into account that tax revenues constitute only one of the elements of secondary impact of sailing tourism on the local economy. Moreover, municipalities only partly participate in some of the taxes collected from business entities. An exception to the rule is the property tax, 100% of which goes to the local budget [Matczak 2016].

While estimating the tax revenues from sailing activity, it should be questioned whether a yacht marina is a profitable venture for the municipality in the first place. The investment outlays of Darłowo on the construction of the marina were PLN 500,000. Considering the benefits for the municipality exclusively in the form of tax revenues obtained in 2016 and in the previous years of the operation of the facility, i.e. 2013–2015, it can be safely assumed that the investment proved profitable [ZPM 2017].

While initiating the qualitative analysis of the secondary impact of the yacht marina on the local economy, it should be noted that the port did generate profit for ZPM Darłowo. In the years 2013–2016, cumulative net income was over PLN 250,000 [ZPM 2017],

Table 3. Estimating income from sailing tourism in the budget of Darłowo in 2016

The share of tax revenues of the port sector in the budgets of port municipalities (%)	The share of tax revenues from sailing activity in the budget of the Darłowo municipality (%)	Income of the Darłowo municipality (thous. PLN)	Income from sailing tourism in the local budget (thous. PLN)
4	0.6	62 894	377

Source: Own study on the basis of data from Pluciński [2001], ZPM [2007], Matczak [2016].

which additionally confirmed the economic rightness of the decision to expand the sailing infrastructure.

Part of the port fee charged on the sailors is spent on salaries for the employees who reside in the municipality. It should be expected, therefore, that their expenses will boost the local economic circulation (the induced effect). The open question remains: what part of salaries will be consumed (marginal propensity to consume) and to which business entities will the money go? Statistical offices do not collect data on the average disposable income per resident in the Darłowo municipality. They do have data on the income in a group of towns comparable in size [GUS 2017]. It is close to the national average. However, the Darłowo municipality is among tourist towns where the income of residents is on average higher [Durydiwka 2013]. Having taken into account the above factors and after the analysis of available statistical data, we can risk an assumption that the propensity to consume of the Darłowo residents could have been about 70%. The major part of the extra money has therefore been consumed.

Will the funds go into the local economic circulation? Certainly not all of them. The most important item in the structure of household budgets are the food and non-alcoholic beverages expenses. In the Darłowo municipality, apart from small retail outlets, there are discount stores characterized by a higher turnover of goods. They must be the main beneficiaries of consumer spendings. There remains the question of the allocation of (potential) profits[2] and the discount stores' sources of supply in food products [Sawicka 2010][3]. A similar situation applies to other – more important – household expenditure items related to, e.g. use of premises, energy carriers, and transport; only a part of these expenses shall enter the local economic circulation.

It should be noted that the development of nautical tourism can contribute to an increase in the investment activity of Darłowo residents, a phenomenon which has been observed. The source of financing of the objects dedicated for sailors could be the unconsumed part of the extra income from the initial tourist expenses. For the local authorities and the port operator (who do notice the increasing interest of the society in active forms of leisure), sailing tourism constitutes a development priority, and it is the estimates as to creating demand for tourist services which mainly determine the investment expenditure of enterprises.

There are also other expenses incurred by ZPM related to the operations of a yacht marina, such as periodic review of the infrastructure, regular repairs, removal of waste from the yachts. The equipment on the yacht marina is continually expanded with elements such as a recreational pavilion for sailors and a hall for yachts to winterize (2015). Local business owners offering yacht charters operate on the premises of the port. The M&W Darłowo shipyard handles repairs and maintenance of sailing equipment, while local businesses run gastronomic activities. The majority of the services mentioned are offered by local subjects [Hernik and Ściana 2014], which means that the income they generate feed the local economy.

Having considered all of the above and based on research on the value of the multiplier, we might risk a statement that the secondary impact of sailing tourism could be at least comparable with the primary impact, that is the value of expenses at the level of PLN 1,517,000. This supposition was based on the analysis of the local economy characterized by: the local residents' high propensity to consume, the advantage of local entities in handling the sailing traffic services, and the investment activity of the local entrepreneurs.

POSSIBILITIES OF FURTHER DEVELOPMENT OF NAUTICAL TOURISM IN WEST POMERANIA

From the conducted analysis it can be concluded that sailing tourism has a positive impact on local economy, so it is worth to invest in its development. All the more so, as the interest in local sailing tourism is increasing, which is a result of the increasing wealth of the society. The Baltic Sea basin has an enormous sailing potential. Taking advantage of the opportunity

[2] Are the profits transfered abroad or reinvested in the local economy.
[3] Do the retail stores purchase food products from local or external producers.

presented by nautical tourism will require adjusting the service offer to the expectations of sailors [Meyer 2010].

The value of the tourist multiplier depends on the size of tourist expenses and the possibility of them being absorbed by the local economy. Utilizing the growth of interest in sailing will require increasing the number of berths for yachts and expanding the range of provided services. Due to the regression of Baltic fishery in the small ports of West Pomerania, there are reserves of port areas which can be utilized for the purposes of sailing tourism. In terms of the range of provided services, in the first place the typically sailing infrastructure should be supplemented with a stable – preferably all year long – accommodation, catering, and recreational base. In some ports there are no berth equipped with power and water intake, which is a major impediment for sailors traveling in their own means of transportation, but not owning a yacht. Therefore, sailing services should be complementary: along with the availability of berths, yacht charter possibility should be provided.

The fact that the population aging process is deepening, increases the percentage of older people participating in sailing, which can currently be observed in the countries of Western Europe [Wassertourismus 2012]. More and more often, they travel on motor yachts. Therefore, fuel distributors should be available in ports. It is often entire families who sail on yachts, so attractions for children, such as playgrounds, should also be included. An extremely important factor for the sailing community which increases the attractiveness of yacht ports are sailing events [Cooper et al. 2008]. For instance, in 2016 three sailing regattas were held in Darłowo, which should be assessed positively. However, it seems that the sailing potential of Darłowo has not been fully utilized in this regard.

The main issue for the ports of West Pomerania is the seasonality of sailing traffic, limited to the period from May to September. Offering the option of winterizing and yacht repairs does not solve the problem. It seems that providing additional tourist attractions not related strictly to sailing tourism or even tourism in general, which is practiced in bigger yacht marinas in Europe [Luković 2012] could limit the seasonality of sailing traffic. Sailing tourism, with its dense network of mutual connections, is predisposed to concentrate economic activity. A feature which would attract sailors could be the presence of the following on the port premises: restaurants, spas, massage salons, conference facilities, shopping malls, small shipyards, and apartments or houses on water, which are becoming more and more popular in Western Europe [Łapko 2015, BPŻ 2017].

The biggest share in the financing of the investment process should belong to non-returnable external funds, as much as it is possible. Local business entities should be involved in the development of sailing potential. That way, new money will enter into the local economic circulation and positively influence the multiplier effects.

CONCLUSIONS

Tourism can have a significant impact on the development of the local economy. Tourists constitute an exogenous factor in the development of the reception area. Owing to them, additional money is introduced into economic circulation and, through multiplier effects, impacts almost the entire economy. The power of this impact depends to a large extent on the local economy's capacity to utilize the tourist traffic. The more local businesses offer tourist services, and the more connections there are between them, the greater the economic benefits for the area of reception.

In the recent years, the sailing traffic in the port of Darłowo strongly developed, as a result of the expansion of the sailing infrastructure. Sailing tourism generated numerous benefits for the local economy. Direct benefits in the year 2016 were estimated at PLN 1,517,000. It is difficult to determine the relative importance of the aforementioned value, due to the lack of a comparative base. However, the expenses of sailors possibilitated the development of local entrepreneurship and created workplaces.

The tax revenues – one of the categories of secondary effects – constituted only a small part of the local budget, but together with the income of the port operator allowed to cover the investment outlays for the construction of the yacht marina. A significant part of the benefits from the development of nautical tourism is accumulated in the local economy. This is

confirmed by the high propensity to consume in the residents of the municipality, the dominance of local businesses offering sailing services, and their investment activity.

The perspectives for the development of sailing tourism in West Pomerania are promising. However, its further development will require the adjustment of the service offer to the expectations of sailors. It is postulated to broaden the scope of services provided with a gastronomic, hotel, and entertainment base. Also, it will be necessary to account for the demographic processes in the service offer. Limiting the seasonality of the sailing traffic will require, based on the experiences of Western European countries, offering tourist related services.

Maximizing the benefits from the development of tourism will require involving local businesses in the service activities. In the investment process, external and preferably non-returnable sources of financing such as EU funds should be obtained.

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BEZPOŚREDNIE ORAZ POŚREDNIE ODDZIAŁYWANIE TURYSTYKI ŻEGLARSKIEJ NA ROZWÓJ LOKALNEJ GOSPODARKI NA POMORZU ZACHODNIM NA PRZYKŁADZIE GMINY DARŁOWO

STRESZCZENIE

Celem artykułu jest określenie bezpośrednich oraz pośrednich korzyści płynących z rozwoju turystyki żeglarskiej na Pomorzu Zachodnim. Podstawą metodyczną opracowania jest teoria bazy ekonomicznej upatrująca przyczyn rozwoju lokalnego w czynnikach egzogenicznych. Zgodnie z jej założeniami korzyści bezpośrednie obejmują początkowe wydatki żeglarskie. Brak bazy porównawczej uniemożliwił ustalenie ich dokładnego znaczenia dla lokalnej gospodarki. Wyliczone wpływy podatkowe – jako jedna z kategorii korzyści pośrednich – stanowiły niewielką część budżetu lokalnego, ale razem z dochodami operatora portowego

pozwoliły pokryć nakłady inwestycje na rozwój infrastruktury żeglarskiej. Analiza jakościowa potwierdziła, że większość efektów pośrednich jest kumulowana w lokalnej gospodarce. Turystyka żeglarska może stać się ważnym aspektem rozwoju lokalnej gospodarki Pomorza Zachodniego. Będzie to jednak wymagało dalszej rozbudowy infratsruktury żeglarskiej oraz poszerzenia zakresu oferowanych usług.

Słowa kluczowe: infrastruktura żeglarska, przystań jachtowa, rozwój lokalny

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PATENT ACTIVITY OF THE AGRARIAN SECTOR IN THE CONTEXT OF ITS DEVELOPMENT IN GLOBAL ECONOMY

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ABSTRACT

This paper address the question, whether states' level of participation and share in patents granted and patent activity development trend in different world's regions is consistent with the sustainable development paradigm? Presently, this problem is very important and topical, not only due to the states' and regions' struggle for their economic position in the world, but also in the social and cultural dimension. The paper analyzes patent activity in the agrarian sector globally, in the context of the level and its trends by state group characterized by different level of development. This two-part analysis was performed at the macro level. The first part highlights the diminishing level of europe and north america in generating patents with a high rate of growth in asia. The second part of the paper documents low patent activity in the agrarian sector. Consequently, an attempt has been made to interpret the causes and effects of this phenomenon in the context of the drive to improve food security in the world, as an important element of sustainable development. To achieve the objective we used scientific literature and data collected by the world intellectual property organization (WIPO) and the world trade organization (WTO). The paper covers the years 2005 to 2016.

Key words: patents, intellectual property, agrarian sector, innovation

INTRODUCTION

It is currently recognized, that the main factor of economic growth, as well as social and economic development, is the intellectual capital, which, being intangible, in response to the needs of economic entities leads to innovations which later are transformed into intellectual goods. Access to such goods is limited by intellectual property rights which cover copyright and industrial property right [Biga 2014]. The latter comprises, among others, patent right that protects inventions, access to which is available only after the purchase of a license. The boom in natural and technical sciences in the 18th and 19th centuries enabled rapid development of the second technological wave, called the industrial revolution, and characterized by an increase in the number of inventions. It lead to changes in all aspects of daily life and influenced social development, including the demographic development of societies. However, it was only in the

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20th century that the theory of economics started to appreciate, describe, and analyze the role of innovations [Schumpeter 1950]. It should be noted that the dissemination of information and know-how exchange through information technology in the late 20th century formed conditions for rapid improvement of processes, products, organizations, and marketing management methods in countries rich in intellectual and technology capital. Intellectual capital is the sum total of all the knowledge in a company and its environment, as well as the capabilities of using such knowledge to achieve competitive advantage [Nahapiet and Ghoshal 1998]. Technology capital, on the other hand, is "unique know-how from investing into research and development, brands, and organization capital" [McGrattan and Prescott 2009]. At the same time there was a large imbalance in the access to new technologies and innovations available for different countries and regions.

As already mentioned, intellectual and technology capital is closely connected with intellectual property rights which can be subject to purchase and sale on both domestic and international markets. This applies to patents, design rights, commercial brands, trade secrets, commercial designs, which constitute elements of private knowledge [Gomułka 1989], which is legally protected. Countries and companies which are leaders in patent activity, i.e. in effective protection of their achievements in the area of innovations by patents, enjoy the highest economic benefits. World technological leaders achieve the highest advantage not so much in the area of R&D outlays, but in financial benefits connected with legal protection of intellectual property.

The research problem raised by this paper is comprised in the question whether the patent level and structure of entities holding patents in the world in the agrarian sector drive world food security, in conformity with the sustainable development paradigm, in the process of growing competitiveness using innovations as an advantage. The purpose of the paper is to analyze patent activity in the agrarian sector globally, in the context of its level and trends in different groups of states with different development levels in the years 2005–2016. In order to complete the task set forth herein we applied desk research, description, comparative analysis, induction, and visualization.

COUNTRY PATENT ACTIVITY

A country's patent activity is the result of companies' activities leading to the obtaining of a patent for a specific period of time and territory, and is legal, financial, technical, and organizational in nature. In 2016, the number of patents obtained by highly developed countries was significantly higher than in 2005, however, its global share declined in the same period from 80.3 to 62.7%. During the same time, countries with a level of development higher than middle increased the number of granted patents nearly five times and doubled their global share. However, the share of low developed countries in the patents granted worldwide, although up from ca. 4,000 to ca. 8,000, is still marginal and under 1%. Their distribution by the country's level of development is given in table 1.

The granting of a patent is the final stage of the journey that starts with the awareness of a need, fol-

Table 1. Patent grants by income group in years 2005, 2015 and 2016

Item	Number of grants (thous.)			Share in the world (%)			Average growth 2005–2016 (%)
	2005	2015	2016	2005	2015	2016	
High	509	785	848	80.3	63.3	62,7	3.3
Upper-middle	104	171	474	16.5	34.6	35.1	16.1
Lower-middle	16	19	22	2.5	1.5	1.6	1.5
Low	4	8	8	0.7	0.6	0.6	4.8
World	634	1 296	1 296	100.0	100.0	100.0	6.0

Source: WIPO [2016a, b; 2017].

lowed by finding ways to fulfill it, its conversion by trial and error into an innovative solution, through a number of technological trials and tests at laboratory, semi-technical, and technical levels, up to the filing of an application with the relevant institution of the patent system. "The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling them to appropriate the returns from their innovative activity. The examination process usually consists of determining whether the claimed innovation is novel, non-obvious and industrially applicable" [WIPO 2017].

It must be noted, that among the fields with a high share in the number of patents both applied for and granted are fields important for agriculture, husbandry, fish and seafood farming, as well as the storage, preservation, processing, and transport of food (Table 2).

It has been known for a long time, that presently, given the need of high spending on R&D, even large global company groups and companies are unable to pursue all directions of basic and developmental research, which are both interesting and important for them. Additionally, with the development of IT technology it is increasingly difficult to maintain secrecy of the progress and results of such scientific work. Increasing patent activity of own innovations is also a significant cost driver due to fees for patent offices, especially if the protection is to cover many countries in the world. Furthermore, patents are also created to mislead competitors (so-called patent trolls). Consequently, the old paradigm of closed innovations is being superseded by, so-called open innovations [Chesbrough 2003]. This means, that ideas for solutions, and process and product innovations from one field of manufacture or service are often transplanted into another one, finding completely unexpected applications [Zalewski 2013, WIPO 2017].

PATENT ACTIVITY IN THE AGRARIAN SECTOR IN THE WORLD

The data presented above shows a picture of a world divided in the area of the creation and circulation of intellectual goods. Medium and highly developed countries assign significant outlays on R&D (on average USD 17.6 per capita). Other countries, on the other hand, on average spend only USD 1.51 per capita [Pardey et al. 2016]. The share of outlays on R&D in the agrarian sector compared to total spending on R&D is also diversified by region (16% in Africa, 11% in South America and the Caribbean, 4% in Europe, 6% in Asia). This significant polarization is caused by

Table 2. World patent applications by selected field of technology, potentially connected with the agrarian sector, in years 2005, 2010 and 2015

Item	Applications in a year (thous.)			Share in 2015 (%)	Average growth 2005–2015 (%)
	2005	2010	2015		
Total number of applications, of which:	1 617	1 763	2 517	100.0	4.6
computer technology	108	129	187	7.4	6.9
IT methods for management	18	23	42	1.7	8.8
measurement instruments	62	78	124	4.9	7.3
analysis of biological materials	13	12	15	0.6	2.0
control	27	29	50	2.0	6.4
biotechnology	39	39	55	2.2	3.8
pharmaceuticals	73	71	103	4.1	3.4
food chemistry	23	28	63	2.5	10.9
environmental technology	21	26	43	1.7	7.5
transport	66	68	105	4.2	4.8

Source: WIPO [2016, 2017].

current needs and capabilities to satisfy them according to Unesco's Institute for Statistics.

This creates in the world a number of barriers and division criteria, among others, in access to food. Latest estimates indicate that "ca. 800 million people remain undernourished globally, down 167 million over the last decade, and 216 million lower than in 1990–1992. This decline is more visible in developing regions, despite an increase in their populations (…) in particular in Africa and Southern Asia" [FAO 2016]. What is required to overcome this barrier is common access to resources, new technologies, an improvement of the global system of food distribution, changes of consumer habits, and changes of intellectual property laws. Patent law in the world favors highly developed countries by the mere fact of protecting an invention. It is argued, that given the current demographic forecasts, which anticipate a further growth of the population to 9.7 billion in 2050 [DESA UN 2015], mankind will not be able to fully feed itself. The problem is so serious that it requires the cooperation of governments, various industries, many international and domestic organizations, as well as research and development by both the public and private sectors [Ryan 2017]. After the crisis of 2007–2011, one can see that there is a trend of reducing R&D expenditure in the agrarian sector by the public sector. According to Pardey et al. "Rich countries accounted for 56% of global public-sector spending on R&D in agriculture in 1960, but only 47% in 2011. By this point, government spending in middle-income countries – 50% of global R&D public-sector spending – had overtaken that in high-income countries (…) Meanwhile, middle-income countries (including China, Brazil and India) were responsible for 43% (their share was 29% in 1980)" [Pardey et al. 2016].

It can be noticed that technological challenges facing the agrarian sector are more complicated now than in the past. In the past, growth factors comprised of chemical fertilizers, improved methods of care and protection of plants and animals, mechanization, genetic engineering, which all ensured quantitative and qualitative yields. Presently, these are innovations, and, as Kałuża and Ginter [2014] say "these are new production techniques ensuring better use of farm resources and lower consumption of inputs, use of solutions safe for the environment (…) these are also activities connected with the dissemination of biological progress among farms (…) implementation of breeding progress in the form of new animal breeds ensuring higher yields (…) new organizational solutions are also used".

Agriculture, animal breeding, food production and processing have a significant deteriorating impact on the environment, due to its contamination with waste, use of large amounts of water, application of intensive plant protection products, electricity consumption etc. A growing demand for food means that it must be satisfied, among other things, by:

- increasing cereal production and yield;
- reducing food losses within the supply chain, in sales and consumption;
- better adaptation to climate changes and extreme weather conditions;
- using new cultivation hnologies adapted to the specificity of a location, type of soil; and climate characteristics, e.g. by sensors monitoring the quality of crop;
- applying drones to create 3D soil maps to optimize irrigation and the dozing of nitrogen fertilizers [Jarman et al. 2016, Mazur 2016];
- developing CRISPR (clustered regularly interspaced short palindromic repeats) technology, which enables the creation of specific genes in plant and animal organisms as a counterbalance for GMO [Montenegro 2016];
- using robots to automate field crop and breeding operations [Lenain et al. 2006, Gebbers and Adamchuk 2010].

The above are just examples pointing to three key directions in developing innovations in agribusiness. The first is higher yield, the second is an improvement in productivity of resources at hand, and the third – sustainable growth. Over the last dozen-or-so years, innovations and related patents in the agrarian sector have resulted mainly from the successes of biotechnology, knowledge of plant cultivation, animal breeding, digitization, and robotics.

On the other hand, the share of patents resulting from R&D in the agri-food sector conducted by some EU and OECD countries in the total number is presented in Table 3.

Table 3. Share of patents in the agri-food sector and total number of patent applications submitted to the European Patent Office by selected country in 2014

Item	Netherlands	Belgium	France	Germany	EU-15 average	OECD
Share (%)[a]	1.0	0.5	1.3	2.7	0.6	17.8
Number[b]	3 498	1 551	8 527	21 874	–	–

Source: a – Figiel [2016]; b – OECD Patent Database.

Let us note, that the data above indirectly confirm the information presented earlier. Specifically, the small number of patents in the agrarian sector is due, among other things, to the fact that it uses patents granted in other areas of activity, e.g. biotechnology. Every year, operators in the sector file several thousand patents worldwide (Table 4), which are of particular use to the sector itself and to the pharmaceutical sector.

Moreover, the number of patents granted for new plant varieties is also growing, as illustrated by data published by the U.S. Patent Office. Table 5 summarizes them by year for the period 1991–2015 and by country which received more than 500 in total.

Meanwhile, according to latest data [WIPO 2017] in the period between 2006 and 2016 highly developed countries reduced their share in the structure of patent applications for plant varieties from 74% down to 57%, in favor of countries with more than a middle level of development, which currently hold a share of 32%. These changes are taking place despite a growing trend in the number of applications, from ca. 12,000 to ca. 16,500 in the same period. Out of 13,280 patents in 2016 for new plant varieties, 2,980 patents were granted by the Community Plant Variety Office and by patent offices in China (2,132), USA (1,703), Japan (941), and South Korea (824) [WIPO 2017].

Plant variety patent activity is rated both positively and negatively [cf. Sekar and Kandavel 2009, Nambisan 2016]. According to Barton and Berger [2001] "an intense drive to patent agricultural biotechnologies may hurt those who would benefit most: people in developing countries".

Desk research leads to the conclusion that particularly controversial are patents for:

- whole plant families, e.g. transgenic cotton or soya, which allows the patent holder to control all varieties of these plants;
- specific technical procedures used in agriculture and genetic engineering;
- tools for gene exchange in plants;
- creation of transgenic varieties of basic cereals (rice, soya) requiring specific herbicides and purchase of seeds every year.

The growing phenomenon of patenting is visible in biotechnology used in agriculture. Around half of the patent market in this area is controlled by five transnational corporations (Aventis, Dow Chemical, DuPont, Monsanto, and Syngenta), who despite conducting

Table 4. Number of patent applications in the biotechnology sector in the period 1999–2013 by selected countries of the world

Item	1999	2002	2004	2006	2008	2010	2012	2013
Denmark	154	180	229	151	189	151	151	144
France	428	402	401	451	503	476	460	450
Germany	898	1 162	932	889	871	798	714	637
Netherlands	200	226	248	320	273	192	172	184
UE-28	2 987	3 139	2 862	2 968	2 928	2 675	2 528	2 433
USA	4 324	4 000	3 641	3 356	2 978	2 681	2 711	2 976
World	9 100	9 413	8 628	8 312	7 823	7 235	7 026	7 274

Source: OECD Patent Database.

Table 5. Number of patents for plant varieties[a] granted by the U.S. Patent and Trade Mark Office in the years 1991–2015 for countries with the highest share

Item	Year						Total in years 1991–2015
	1991–2001	2002	2006	2010	2014	2015	
Total	4 871	1 133	1 149	981	1 072	1,074	18 832
of which:							
USA	2 615	518	430	297	401	400	7 883
foreign	2 256	615	719	684	671	674	10 949
The Netherlands	594	218	212	188	228	200	3 257
Germany	473	145	98	160	82	141	2 244
Japan	129	30	84	50	86	52	963
Denmark	169	79	71	25	59	39	803
UK	189	35	68	47	42	32	756
Australia	104	27	45	45	47	41	591
France	183	26	23	48	12	34	536

[a]New plant varietes show higher yield, better quality, and higher resistance to pests and diseases, which increases productivity minimizing negative environmental effect. They are created using genetic engineering.

Source: U.S. Patent and Trademark [2016].

their own research and development work also take over many small biotech companies to obtain access to new technologies. This is also possible by using "open innovations" [Chesbrough 2003] and cooperation with pharmaceutical and chemical corporations to strengthen their own intellectual capital. In the future this may bring about a standstill in agriculture R&D by the public sector, and market commercialization [Barton and Berger 2001]. Among other dangers is making agriculture dependent on commercial attitudes of transnational corporations in the whole food chain, especially in developing countries.

The main applicants for these patents are companies from the US and EU. However, data provided above shows that the share of China and other Asian countries is rising. On the other hand, the involvement of African countries and Oceania is at present at ca. 3% for each of these regions (OECD Patent Database – data of 2014) [U.S. Patent and Trademark office 2016].

Furthermore, it can be concluded (assuming proportionality of shares) that the number of patents granted in the agricultural sector worldwide is also low. This most probably should be attributed to incomplete use of available resources (both human and intellectual) and is closely related to the quality of formal institutions, instruments, and systemic solutions.

CONCLUSIONS

The 21st century offers to entities in the world broader opportunities for the development of innovations and patent activity. To a large extent this is the result of growing spending on R&D, development of intellectual capital, but also intensification of companies' both internal and external communication. This includes social-related communication. The phenomenon of open innovations and network innovations is on the rise, the latter being the outcome of cooperation between different industries. The analysis above found that more than 1.3 million patents were granted in global economy in 2016 (more than twice as many as in 2006), most in Asia, followed by North America and Europe (in total over 95.5% patents worldwide). An analysis of patent applications requires "both formal and substantial examination. The substantive examination process usually consists of determining whether the claimed innovation is novel, non-obvious and industrially applicable. The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, thus enabling them to appropriate the returns from their innovative activity" [WIPO 2017]. At present, the patent granting procedure takes three to five years.

There can also be other drivers leading to increased patent activity and its differentiation in different country groups. Firstly, currently we have an economy that is unsustainable, among other things, in terms of products and technologies. What is used in economic competition nowadays is a shortened life cycle of products, the phenomenon, i.e. a conscious shortening of the life cycle of many market products (e.g. household appliances, consumer electronics) and the need for new design solutions in this area [Guiltinian 2009, Bartels 2012]. Secondly, developing countries, in their attempts to reduce the technological gap towards the developed countries of Europe and North America increased their patent activity.

This activity in the agrarian sector in global economy is not well identified. Moreover, there is little information on this subject on a country-by-country basis and their groups categorized according to geographic or economic criteria. Studies indicate, that the agrarian sector in the world contributes little to the creation of patent protected intellectual property, however, it uses IP from other industries. Consequently, the interdisciplinary nature of many patents is conducive to a faster growth of the agrarian sector than would result from its internal patent activity.

Despite all the procedures and with a fast-rising number of patent applications, opinions are voiced that the current patent system is inefficient, absurd, and hindering progress and innovations [Jaffe and Lerner 2004, The Economist 2012 and 2014]. It is also speculated, that most patented innovations do not meet the criterion of significance, i.e. are not radical, but merely basic, or incremental.

In the postindustrial economy currently taking shape, there will be a growth in interdisciplinary, networking, and multifunctional innovations. Consequently, the role of the human capital in the agrarian sector is to develop application capabilities. All the more, as companies own patent activity is costly. Meanwhile, entities in lower income countries and sectors have reduced access to the intellectual property market. Research shows that there is a high increase in patent activity in countries with incompletely satisfied food needs. This phenomenon deserves praise, as "innovations are the only way to improve the balance of the situation" [Braga de Andrade and Domingos 2017]. One must agree with the opinion that "no transnational corporation, government, or other institution will solve this problem independently" [Ryan 2017]. In order to achieve world food security, there is a need for better use of available intellectual and technological capital within the framework of greater international cooperation.

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AKTYWNOŚĆ PATENTOWA SEKTORA AGRARNEGO W KONTEKŚCIE JEJ ROZWOJU W ŚWIATOWEJ GOSPODARCE

STRESZCZENIE

Problem badawczy zawiera się w pytaniu, czy stan i struktura udziału państw w przyznanych patentach na świecie oraz tendencja rozwoju aktywności patentowej w poszczególnych regionach są zgodne z paradygmatem zrównoważonego rozwoju? Problem ten jest obecnie bardzo ważny i aktualny w świetle walki nie tylko o pozycję ekonomiczną państw i regionów na świecie, ale również w wymiarze społeczno-kulturowym. Celem pracy jest analiza stanu aktywności patentowej w sektorze agrarnym w kontekście poziomu i tendencji tej aktywności na świecie, w grupach państw o różnym stopniu rozwoju. Analizę dwuczęściową wykonano na poziomie makro. W pierwszej części wskazano na malejący udział Europy i Ameryki Północnej w generowaniu patentów przy dużej dynamice wzrostu tego zjawiska w Azji. W drugiej części udokumentowano małą aktywność patentową sektora agrarnego. Podjęto próbę interpretacji przyczyn i skutków tego zjawiska w kontekście dążenia do wzrostu bezpieczeństwa żywnościowego na świecie jako istotnego elementu równoważenia rozwoju. W realizacji celu wykorzystano dane zgromadzone przez World Intellectual Property Organization (WIPO) i World Trade Organization (WTO). Zakres czasowy analizy obejmuje lata 2005–016.

Słowa kluczowe: patenty, własność intelektualna, sektor agrarny, innowacje

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CONVERSION OF AGRICULTURAL LAND TO NON-AGRICULTURAL PURPOSES IN SELECTED POLISH METROPOLITAN AREAS

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ABSTRACT

The aim of the paper is to determine the scale of agricultural land conversion in gmina (*municipalities*) located in selected metropolitan areas of Poland. Analyses were conducted taking into account the location of agricultural land in relation to the core of metropolitan area and its suitability for agricultural production. The research has shown that in the metropolitan areas selected for analysis, agricultural land conversion in the period 1996–2014 was over twice as fast as the average for Poland, with the most land converted in the core of a metropolitan area, little less in the first zone of gmina around the core, and the least in gmina located on the outskirts of a metropolitan area. The hypothesis saying that the distance of a gmina from the core of the metropolitan area is a significant factor in the differences in conversion processes, and high quality of environmental conditions of agricultural production does not limit (in a significant way) the process of farmland abandonment has been positively verified.

Key words: farmland conversion, metropolitan area, Poland

INTRODUCTION

Land, due to its unique qualities (i.e. it is multifunctional, limited, not expandable and immobile), is an area of interest for numerous economic entities [Szymańska 2015, Wilkin 2015]. This interest is particularly high in areas with large increase in urbanisation processes, where the competition for land and similarly the dynamics of changes are the biggest. Literature emphasises that particularly huge changes on the land market, including its conversion to non-agricultural purposes, occur in metropolitan areas of countries showing dynamic economic growth, as well as countries which are undergoing or have undergone transformation of the land management model (for example China and Vietnam and European post-socialist countries) [Baumann et al. 2011, Piorr et al. 2011, Su et al. 2011, Phuc et al. 2014, Deng et al. 2015, Huang et al. 2014].

There are at least two reasons why Polish metropolitan areas seem to be an interesting case for analysing the scale and mechanisms of agricultural land (AL) conversion. First, after 1990 the land ownership structure started to be shaped anew in Poland, with dynamic changes taking place in land uses [Poławski 2009]. The limitations on the number of owned flats were lifted, the wealth of residents was growing, and all that led to the development of the residential market. At the same time, there was a growing demand for land allocated to increasing individual entrepreneurship and technical infrastructure [Chmielewska 2015]. Second, in the early 1990s it was believed in Poland that the fact that agricultural land was being taken over by other sectors of the economy should be regarded as a natural consequence of socio-economic development, and the market mechanism would ensure optimal use of land and sustainable development [Szymańska 2015]. Some scholars think that also today the market mechanism in

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Poland is only slightly corrected by various legal instruments [Piorr et al. 2011, Krzyk et al. 2013, Kudłacz 2016], and the processes of agricultural land conversion take place too fast, resulting in the loss of land that is highly suitable for agricultural production.

A lot of analyses concerning land conversion mechanisms and their cause and effect can be found in literature, however, they are usually about chosen cities and peri-urban areas [Wasilewski and Prokopowicz 2004, Sawicka and Fogel 2016, Mastalska-Cetera and Akińcza 2017]. Moreover, researches conducted in Poland very rarely put an emphasis on the significance of economic rents in explaining diversification of the scale of land conversion. It should be noted that many scholars [Gellrich and Zimmermann 2007, Mazzocchi et al. 2013, Xie at al. 2014] stress the importance of economic rents in agricultural land conversion.

The main aim of the paper is to determine the scale of agricultural land conversion in gmina located in six selected metropolitan areas of Poland. Analyses were conducted taking into account the location of land in relation to the core of metropolitan area and its suitability for agricultural production. The hypothesis saying that the location of agricultural land in a metropolitan area is a significant factor in the differences in the scale of its conversion, and high quality of environmental conditions of agricultural production does not limit the processes of agricultural land conversion has been formulated.

DYNAMICS OF FARMLAND CONVERSION – CONCEPTUAL FRAMEWORK

Land conversion is widely defined as a process characterized by the transference of land from one type of use and user to another. However, in literature farmland/agricultural land conversion is measured and analysed in different ways. Most scholars, as this paper does, study this process in its broad sense, claiming that farmland conversion is a situation of permanent decrease in the area of agricultural land, i.e. transfer of agricultural land to other uses [Gaube et al. 2009, Huang et al. 2014, Liu et al. 2017]. Some scholars, especially when the analysis covers areas undergoing urbanisation, analyse the process of farmland conversion in terms of agricultural land transfer for urban uses only [Phuc et al. 2014, Qiu et al. 2015] while others narrow down their analysis to conversion of farmland for built-up land [Skog and Steinnes 2016]. However, irrespective of the context of studies and how farmland conversion is measured, it is stressed that this process is increasing, and cities and their functional areas are particularly at risk of a dramatic loss of farmland [Piorr et al. 2011].

While discussing the subject of agricultural land conversion, it is necessary to address the issues of various legal regulations underpinning the land market. Many countries have implemented laws and planning instruments to preserve agricultural land [Perrin et al. 2018]. Also in Poland, there are a range of instruments in place to protect farmland. As they have been thoroughly covered in literature [Bielecka and Calka 2012, Sawicka and Fogel 2016], this paper will not describe them in detail. Huang et al. [2014] stress that prime farmland protection policy could be effective in saving agricultural land from development for non-agricultural uses. However, when the legal protection of farmland is not very effective, the dynamics and direction of transformations are increasingly determined by the market mechanism – landowner is the central decision-maker [Kristensen et al. 2016]. In microeconomic theory land use changes have been usually explained in terms of the maximisation of utility by a landowner [Lambin et al. 2000]. Therefore, there is a widespread view today that the key concept explaining the allocation of land among competing uses is land rent, i.e. the reward paid for the use of land to its owner [Diogo et al. 2015]. Alonso's bid rent theory explained the relationship between land prices and land use as follows: in a competitive land market, landusers/landowner seek to maximise their utility, land being purchased/rented by the bidder offering the highest bid, i.e. the potential land-user able to derive the highest rent from land. Therefore, land is expected to be used for the purpose which brings the greatest utility, taking into account the relative benefits of alternative land uses [Diogo et al. 2015].

Alonso's model [1964] inspired numerous researchers, and currently at least a dozen or so different models are used to present the problem of competition for urban land. However, Wegener [2004] stresses that overwhelming majority of these models rely on the assumption that the basis for decision-making is

maximisation of utility of the landowner. Based on these assumptions, many studies pointed out [Gellrich and Zimmermann 2007, Mazzocchi et al. 2013, Xie at al. 2014] that farmland conversion is especially intensive in areas where there is high demand for land from non-agricultural sector, i.e. close to urban centres (von Thunian ideas), and in areas which are not very suitable for agricultural production (low quality of soil, climate etc.), where income from agriculture is relatively low (Ricardian ideas).

Since this analysis focuses on the concept of economic rents and the assumption that the farmland owner seeks to maximise utility, verification of the significance of the rent resulting from location and the rent resulting from higher land productivity in the processes of agricultural land conversion have been put forward.

STUDY AREA, DATA AND RESEARCH METHODS

The analyses address the issues of agricultural land conversion to non-agricultural purposes, and the research was conducted in six monocentric metropolitan areas of Poland – large one Warsaw metropolitan area; medium-sized ones: Kraków, Wrocław, Poznań and Trójmiasto metropolitan areas; and small one Lublin metropolitan area (the figure). They were selected in such a way to reflect large diversity of environmental and economic conditions in different parts of Poland. This refers both to conditions of agriculture development, because they represent economic-environmental conditions of four Polish macro-regions outlined for FADN goals [Skarżyńska et al. 2005], but they are also characterised by varied structure and size of regional economy [Smętkowski et al. 2009].

Delimitation of these areas was based on development documents and strategies adopted by regional authorities (the figure). The chosen metropolitan areas consist of 279 gmina, including six urban gmina constituting the cores of metropolises: Gdańsk, Gdynia and Sopot are treated as one city – Trójmiasto (ang. Tricity) and 273 gmina surrounding the cores.

The main data sources included, data from the Polish Central Statistical Office (GUS), the Head Office of Geodesy and Cartography (GUGiK) and findings of the author's own research conducted using a survey, as well as the relevant literature. In the first case (data from GUS and GUGiK), processes of agri-

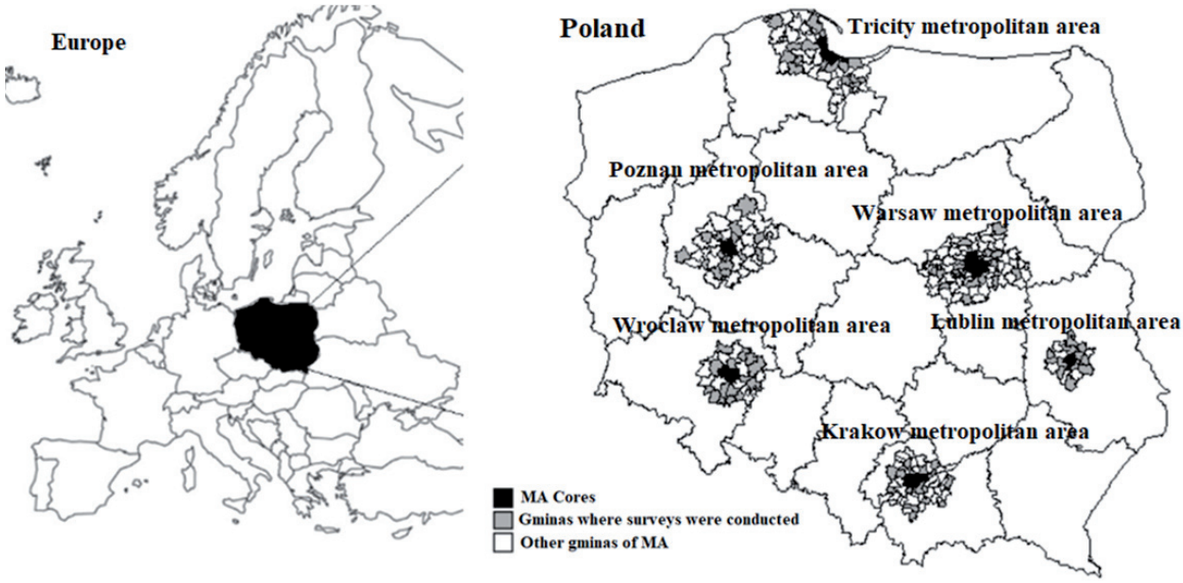

Fig. Metropolitan areas which qualified for the study

Source: Own elaboration.

cultural land conversion for all the outlined metropolitan areas (279 gmina) were analysed, and the surveys were conducted in the appropriately selected 94 gmina (98 surveys in total), which represented gmina located in a varied distance from the core of the metropolitan area and were characterised by a diverse environmental conditions of agricultural production. The respondents were experts familiar with the local conditions of the agricultural development, i.e. employees of poviat offices of Agricultural Advisory Centres (ODR), representatives of chambers of agriculture, and academics living in the gmina selected for analysis. Surveys were conducted in the second half of 2017.

Since the time range of research is limited by the availability of materials, the first stage of analyses was based on the data from GUS (years 1995–2005) concerning surface of agricultural land used by farms (in the administrative borders of gmina). The second stage encompasses the years 2010–2014 and is about geodetic surface of agricultural land (the data from GUGiK). In surveys, experts assessed changes in land market in the span of resent 20 years. Since various methodology concerning data collection was used, the presented results are not fully comparable with different periods. Nevertheless, the aim of the author was not a dynamic analysis, but rather an evaluation of the significance of land location in terms of the core of metropolitan area (MA) and the quality of agricultural surface production in conversion processes of agricultural land.

In accordance with the presented theoretical assumptions, research units (gmina) were selected based on their location in the metropolitan area and the agricultural production space valuation ratio (APSVR[1]) reflecting the environmental conditions for agricultural production. In order to verify the significance of a gmina's location in relation to the core of metropolis and the significance of the quality of environmental conditions in agricultural land conversion processes, the analysed gmina were divided into disjoint groups. In the first case, four groups of gmina were distinguished: cores of the metropolitan areas (MA core); towns located within the boundaries of the metropolitan area (towns in MA); gmina directly bordering the core[2] (I zone of MA gmina); and the other gmina of the metropolitan area (II zone of MA gmina). In order to divide gmina based on the quality of the environmental conditions of agricultural production, the standard deviation method was used, resulting in distinguishing gmina with very good environmental conditions (APSVR > 88 points), good conditions (70 points < < APSVR < 88 points), average conditions (52 points < < APSVR < 70 points) and poor conditions (APSVR < < 52 points).

The paper uses general methods (deductive, inductive, comparisons and analogies), descriptive method, as well as quantitative methods, i.e. dynamics and structure analysis and one-way ANOVA. ANOVA and Tukey's HSD (honest significant difference) test were used for determining the significance of the differences in the scales of farmland conversion in the different groups of gmina.

Statistical analysis of received research results was conducted using the program Statistica 13.0.

RESEARCH FINDINGS

As early as in the years following the war, Poland started to record a systematic decrease in the surface area of agricultural land (AL), with particularly high intensity in the 1960. At that time, out of almost 20.4 million ha, as much as 830 thousand ha was converted to non-agricultural purposes [Dzun 2012]. In the decades that followed, the process of agricultural land conversion slowed down a little, but by 1990 around 1.6 million ha of agricultural land was converted [Szymańska 2015]. In the period of system transformation, agricultural land was still being taken

[1] Agricultural production space valuation ratio is a synthetic measure that takes into account the quality of: soil, climate, topography and water conditions. Its maximum value is 125 points. The average value for Poland calculated in this way was 66.6 points.

[2] In the case of Warsaw metropolitan area, due to the very large impact of the centre, the I zone of MA was extended to include gmina that do not border the core. It covered all the gmina belonging to the Warsaw functional area.

over by other sectors of the economy, and it wasn't until 2002 that this process slowed down for a few years, mainly due to Poland's accession to the European Union and expected direct payments for agricultural land [Dzun 2012, Szymańska 2015]. In the subsequent years (2005–2015), according to data from the Head Office of Geodesy and Cartography (GUGiK), around 2 thousand ha of agricultural land was converted on an annual average, with the highest intensity of this process recorded in areas undergoing urbanisation.

During assessment of the scale of agricultural land conversion in selected metropolitan areas, the first stage was analysis of data from the Polish Central Statistical Office (GUS) covering the period 1996–2005 (Table 1). Information about agricultural land refers to farmland and other land, including allotments, common land and gmina land in individual use, located within administrative boundaries of gmina. Due to (slight) changes over time in the surface area of the gmina analysed, the area of agricultural land was also presented in relation to the total surface area. By taking such approach, it is also possible to carry out a broader assessment of the significance of agricultural land in the space of the analysed gmina, and to point out that metropolitan areas, often thought to be areas where agriculture and agricultural land are less important, in fact have an above-average share of agricultural land. This phenomenon has roots in history and results from the function that peri-urban areas fulfilled with respect to fast growing cities, which needed food, wood and communication routes, among other things, in order to develop [Hofmann 2001]. As for the impact of the distance from the core of MA on the percentage of agricultural land, it should be noted that in 1996 agricultural land made up 67.2% of land in total in both the zones (I and II) surrounding a city. Thus, it turns out that at the beginning of the system transformations in Poland even the biggest central cities (MA cores) had little impact not only on gmina located on the outskirts of their metropolitan areas, but also those bordering them. The reasons for that lie mainly in migration processes. Until 2001, migrations from the countryside to the city still prevailed in Poland [Zborowski and Raźniak 2013], so the demand for land in gmina

Table 1. Changes in the share of agricultural land in gmina of selected metropolitan areas in Poland in 1996–2005

Specification	Number of respondents	Share of AL in the overall surface area of gmina (%)		Change in the share of AL 1996–2005 (p.p.)[a]	Annual average change in the AL surface area 1996–2005 (%)[a]
		1996	2005		
By location within a metropolitan area					
MA core	6	36.2	30.4	–5.8[b]	–1.55[b]
Towns in MA	37	29.1	26.8	–2.3	–0.73
I zone of MA gmina	69	67.2	64.5	–2.8[b]	–0.42[b]
II zone of MA gmina	167	67.2	65.9	–1.3[b]	–0.20[b]
MA in total	279	64.1	62.1	–2.0	–0.31
By agricultural production space valuation ratio (APSVR)					
Gmina > 88 points	57	76.5	74.2	–2.3	0.28
Gmina 70– 88 points	77	69.5	66.6	–3.0[b]	0.46[b]
Gmina 52–70 points	92	58.9	57.8	–1.1[b]	0.17[b]
Gmina < 52 points	53	52.0	49.9	–2.1	0.27
Poland	2479	58.4	58.2	–0.1	0.03

[a] For the variable, ANOVA was conducted.

[b] Based on ANOVA and Tukey's HSD (honest significant difference) test it was found out that the average for the group being analysed differs significantly from at least one of the groups ($P < 0.05$).

Source: Own elaboration based on GUS data.

surrounding MA cores was relatively low. It is only later that we saw stronger urbanization and faster decrease in the agricultural land in gmina located in the I zone surrounding MA cores (in the span of 10 years decrease in the agricultural land area at 4.2%), and a slightly slower one in the remaining gmina. For comparison, in period 1996–2005 the surface of agricultural land in Poland decreased by only 0.3%. Until 2005, the largest decrease in agricultural land was observed in dynamically developing cities and towns, where in the span of 10 years the area of agricultural land decreased by as much as 15.5% in the cores and 7.3% in other towns respectively. Thus, based on ANOVA analysis, the formulated hypothesis about the significance of land location in relation to MA core in the processes of agricultural land conversion to non-agricultural purposes should be verified positively.

An important aspect in studies of agricultural land conversion is the quality of land, or more broadly – quality of agricultural production space. The research has shown that in gmina with very good conditions for agricultural production, the share of agricultural land oscillates in both the periods analysed around 75%, whereas in gmina with the worst conditions it is only around 50%. This means that these conditions, developed over hundreds of years, excellently reflect the bid rent theory. In areas with good conditions for agricultural production, agriculture was at first the winner in the competition for land. As the country developed and agriculture became less important in generation of income, the tendencies were reversed. Although it is widely held that land of very god quality should not be converted to non-agricultural purposes [Krzyk et al. 2013], in Polish metropolitan areas it is gmina with good environmental conditions for agricultural production (APSVR 70–88 points) that recorded the biggest loss of agricultural land. Thus, it turns out that neither legal instruments for protecting the best farmland nor a relatively high differential rent resulting from land fertility is able to stop farmland conversion. Economic rents generated by non-agricultural activities (e.g. house-building, commercial infrastructure etc.) are so high that they not only exceed land (differential) rent, but can pay the costs connected with agricultural land conversion to non-agricultural purposes (fees for agricultural land designated for non-agricultural purposes), which in the case of I quality land may amount to around EUR 100 per 1 ha [Krzyk et al. 2013]. Also in this case, one-way analysis of variance has shown that the scale of agricultural land conversion significantly differs depending on the quality of the environmental conditions of agricultural production, but there is no substantive explanation why it happened that way. It should be thus concluded that the scale of conversion is determined by other factors than the quality of environmental conditions. Having said that, the second part of the research hypothesis should be verified positively.

Due to the lack of relatively up-to-date data on the surface area of agricultural land that is effectively used for agricultural purposes, further analysis will be conducted using geodetic data. Unlike the previously presented information from the Polish Central Statistical Office (GUS), which covers covering land that is used for agricultural purposes, the database of the Head Office of Geodesy and Cartography (GUGiK) is based on the official land register, which includes also agricultural built-up land and land that is no longer used for agricultural purposes [Górska and Michna 2010]. As a result of the changes in data compilation methodology implemented in 2002, the surface area of agricultural land in geodetic terms is larger by even a dozen or so percent compared to GUS's studies [Dzun 2012]. What is more, as the obligation to enter changes to land in an official register is not always fulfilled [Górska and Michna 2010], the presented scale of conversion processes will be lower than the actual one. Setting aside methodological issues, it should be noted that in the period 2010–2014 (Table 2) the patterns in agricultural land conversion are similar to those in the period 1996–2005. The largest decrease in agricultural land was recorded in MA core, a slightly smaller – in the I zone of gmina, and the smallest – in the II zone. However, comparing the results with the period 1996–2005, we can see an increase in the rate of agricultural land conversion, with the annual average decrease being higher in each case irrespective of the land location. Having said that, there was also a much faster growth in the dynamics of agricultural land converting in zones located further away from the core. In the period

1996–2005, in the II zone of MA, the annual average agricultural land conversion was 0.2%, whereas in the period 2010–2014, it was only 0.55%. This may result, among other things, from the reversal of migration trends, as in the period 2010–2014 gmina of the I zone saw 8.7% increase in population, whereas in MA cores the increase was only 0.1%.

During verification of the hypothesis concerning the impact of the quality of agricultural production space on the scale of agricultural land conversion, is has been found out that it is not significant also in the case of data covering the period 2010–2014. Although gmina with very goods and good environmental conditions of agricultural production (APSVR > 70 points) showed lower farmland conversion compared to gmina with average conditions (APSVR 52–70 points), gmina with very poor conditions of agricultural production also had relatively small areas of agricultural land converted. Thus, it should be regarded as coincidence and explained by other factors than the quality of environmental conditions.

In order to determine the scale of agricultural land conversion, local experts were also consulted to assess this phenomenon based on their own observations. The results of the survey research are consistent with the data from the Polish Central Statistical Office (GUS) and the Head Office of Geodesy and Cartography (GUGiK). The experts noted that the highest scale of agricultural land conversion was observed in the cores of metropolitan areas, and as the distance from the cores grew, the conversion scale decreased slightly. It was estimated that over the last 20 years, the area of agricultural land in the MA cores has decreased by one-fourth (Table 3). An overwhelming majority (41%) of the agricultural land was converted to land for multi-family houses, followed by 33% of agricultural land converted to land for single-family houses, whereas the least land, i.e. 12%, was allocated to other uses, including technical infrastructure and wasteland. In the I zone of gmina, the average decrease in the area of agricultural land in the period 1996–2017 was estimated at 18.3%, with the

Table 2. Changes in the share of agricultural land in gmina of selected metropolitan areas in Poland in 2010–2014 (geodetic data)

Specification	Number of respondents	Average share of AL in the overall surface area of gmina (%)			Change in the share of AL 2014–2010 (p.p.)[a]	Annual average change in the AL surface area of agricultural land in 2010–2011 (%)[a]
		2010	2012	2014		
By location within a metropolitan area						
MA core	6	34.8	33.5	32.4	–2.4[b]	1.70[b]
Towns in MA	37	27.5	26.7	26.2	–1.3	1.23
I zone of MA gmina	69	68.4	67.2	66.3	–2.1[b]	0.75[b]
II zone of MA gmina	167	69.2	68.7	68.3	–0.9	0.55
MA in total	279	65.3	64.7	64.1	–1.2	0.59
By agricultural production space valuation ratio (APSVR)						
Gmina > 88 points	57	78.0	77.6	77.3	–0.7[b]	0.25[b]
Gmina 70–88 points	77	71.5	70.9	70.4	–1.1	0.40
Gmina 52–70 points	92	60.3	59.2	58.2	–2.1[b]	0.85[b]
Gmina < 52 points	53	52.0	51.5	51.2	–0.8	0.38
Poland	2479	60.5	60.2	59.9	–0.6	0.28

[a] For the variable, ANOVA was conducted.

[b] Based on ANOVA and Tukey's HSD (honest significant difference) test, it has been found out that the averages for the group being analysed differ significantly from at least one of the groups ($P < 0.05$).

Source: Own elaboration based on GUS data.

land being mostly converted to plots for single family houses. A relatively large area was also allocated to the development of economic activity. The experts noted that this phenomenon was a result of migration processes, as entrepreneurs comprise a relatively large group among migrants. In the II zone of gmina, according to the respondents, dynamic changes in the use of agricultural land started relatively recently, i.e. after Poland's joining the European structures, and are mainly connected with better access to MA cores. It has been noted that the further away from the city, the lesser its impact on the use of land. Over the last 20 years, around 10% of agricultural land has been converted in the II zone, with the overwhelming majority of the land converted to land for single family houses. A relatively large area of agricultural land was used for the development of technical infrastructure, including roads. The relatively large decrease in agricultural land due to conversion to such purposes results mainly from more negligence in this respect compared to the urban zone and typically peri-urban zone (I zone of gmina).

Assessing the significance of agricultural land quality in processes of its conversion, the respondents claimed that as a rule higher quality agricultural land is less often converted to non-agricultural purposes, but they also stressed that if it is in a very good location, then the quality of land is unable to limit conversion. As in earlier analyses, statistically significant differences in the scale of agricultural land conversion were found, but from a substantive point of view the hypothesis saying that agricultural land highly suitable for agricultural production is less often converted cannot be confirmed. Similarly, analysis of the structure of agricultural land conversion in terms of the purpose for which it was converted gives no substantive grounds for claiming that this process is determined by the quality of environmental conditions.

Table 3. Changes in the area of agricultural land according to local experts in 1996–2017

Specification	Number of respondents	Average decrease in AL 1996–2017 (%)[a]	Agricultural land was converted to (%)[c]			
			land for single family houses	land for multi-family houses	land for the development of economic activity	Other, including technical and social infrastructure and wasteland
By location within the metropolitan area						
MA core	10	25.0[b]	33.0	41.0	14.0	12.0
I zone of MA gmina	32	18.3[b]	55.1	10.0	19.5	15.5
II zone of MA gmina	56	10.3[b]	63.9	2.3	15.3	18.5
By agricultural production space valuation ratio (APSVR)						
Gmina > 88 points	33	12.9[b]	61.2	7.5	14.7	16.6
Gmina 70–88 points	24	14.2[b]	52.9	9.7	20.9	16.5
Gmina 52–70 points	21	24.7[b]	52.8	8.6	20.6	17.9
Gmina < 52 points	20	13.3[b]	63.3	7.5	12.1	17.1
In total	98	14.5	58.1	8.2	16.8	16.9

[a] For the variable, ANOVA was conducted.

[b] Based on ANOVA and Tukey's HSD (honest significant difference) test, it has been found out that the averages for the group being analysed differ significantly from at least one of the groups ($P < 0.05$).

[c] Ten respondents did not give answers.

Source: Own elaboration.

CONCLUSIONS

With unique properties of land as a production factor, i.e. it is immobile and not expandable, agricultural land conversion is now regarded as a natural phenomenon accompanying urbanisation worldwide. Literature often emphasises that agricultural land decreases at the fastest rate in countries and areas with fast economic growth. They undoubtedly include Poland and Polish metropolitan areas, which for historical reasons constitute a very interesting unit for analyses. After 1990, the application of the principle of primacy of "private ownership" over social good, combined with insufficient legal protection of farmland, resulted in market principles being applied also to agricultural land market. Land, especially in areas undergoing urbanisation, was becoming an increasingly scarce resource, and its use was increasingly determined by economic rent.

The analyses have shown that in the metropolitan areas analysed, the process of agricultural land conversion was over twice as fast as the average for Poland, and the distance of a gmina from the core of the metropolitan area was a significant factor in the differences in the conversion scale. The closer to the core, the faster the process of conversion. Although at the beginning of the economic transformation (until 1996), agricultural land conversion took place mainly in urban areas, after the migration trends were reversed and the process of peri-urbanization increased, it became more intensive also in gmina located further away from economic centres (MA cores). The second important element of the analyses was assessment of the scale of agricultural land conversion depending on the quality of agricultural production space. In accordance with the bid rent theory, productive land, due to generating higher rent (I differential rent), is less likely to be transferred to other uses. Although in Poland the I differential rent is additionally supported by legal instruments in the form of high fees associated with taking plots of agricultural land out of agricultural production, it has been found out that the conversion scale of high quality agricultural land is not significantly lower compared to poor quality farmland. Thus it can be concluded that economic rents generated by the non-agricultural sector are significantly higher, and in "good locations" even the best agricultural land is converted to non-agricultural purposes.

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KONWERSJA GRUNTÓW ROLNYCH NA CELE POZAROLNICZE W WYBRANYCH POLSKICH OBSZARACH METROPOLITALNYCH

STRESZCZENIE

Celem artykułu jest określenie skali konwersji użytków rolnych położonych w wybranych obszarach metropolitalnych Polski. Analizy prowadzono z uwzględnieniem położenia gruntów w stosunku do rdzenia obszaru metropolitalnego oraz ich przydatności do produkcji rolniczej. Badania wykazały, że w latach 1996–2014 w wybranych do analizy obszarach metropolitalnych użytki rolne były przekształcane na cele nierolne ponad dwukrotnie szybciej od średniej krajowej, przy czym ten proces przebiegał najbardziej intensywnie w rdzeniu obszaru metropolitalnego, nieco słabiej w pierwszej strefie gmin otaczających rdzeń, a najsłabiej w gminach leżących na obrzeżach obszaru metropolitalnego. Pozytywnie zweryfikowano hipotezę, że odległość gminy od rdzenia obszaru metropolitalnego istotnie różnicuje przebieg procesów konwersji, a wysoka jakość warunków przyrodniczych produkcji rolnej (w istotny sposób) nie ogranicza procesu wyłączania ich z produkcji.

Słowa kluczowe: konwersja użytków rolnych, obszary metropolitalne, Polska

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DEVELOPMENT DYNAMICS OF THE TRANSPORT NETWORK IN MAŁOPOLSKIE VOIVODESHIP IN THE PERIOD 2002–2014

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ABSTRACT

Transport infrastructure is necessary for the proper functioning of the economy and performs a key role in its development. In this paper particular attention was paid to the development of a linear road transport infrastructure. The research is based on the analysis of statistical data from the databases of the Eurostat and the Polish Central Statistical Office (GUS). The values of road density ratios, which are expressed in kilometers of roads per 100 km^2 of the surface area, point to the dominance of Małopolskie Voivodeship over the national average. In respect of annual increases in the length of motorways and expressways, Małopolskie ranks high among western voivodeships, and exceeds the average annual domestic increase by 0.3 km of motorway/ /expressway section. The density of railroads is high – in this aspect only south-western voivodeships rank higher than Małopolskie Voivodship. Water transport in this region was limited to the operation of one waterway. Air transport in the voivodeship is based on the operation of one regional airport in Kraków-Balice.

Key words: transport infrastructure, road network, Małopolskie Voivodeship

INTRODUCTION

A transport network, the main task of which (along with other infrastructure elements) is to satisfy the transport needs of a region, must be developed in proportion to current and future demand. Maladjustment of a transport network and infrastructure to needs brings negative effects in almost all sections of the regional economy and lowers the standard of living of inhabitants. According to Rozkwitalska [2002], the degree of development and quality of a transport infrastructure and the efficient functioning of transport are determinants for access to domestic and foreign markets, as well as the attractiveness of particular regions for domestic and foreign capital. In conclusion, the development of a network as an element of transport infrastructure in the region should be strictly connected with the current and forecast condition of the local, national and world economies. Changes in the world economy, technological progress and the development of logistics force accelerated development of infrastructure. An analysis of the infrastructure condition is the basis for actions ensuring a sustainable transport system [Banet and Rogala 2016].

Infrastructure development may support the process of alleviation of socio-economic problems, e.g. unemployment, by means of, among other factors, creating demand for a workforce during the implementation of investment projects. Often this demand is not short term, taking into account the long period of construction of infrastructural facilities. The implementation of investments in a transport infrastructure may also stimulate the economic development of the region by creating favorable conditions for investors

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or by bringing growth in demand on local markets, through stimulation of, for example, the development of the local building materials industry. In addition, it often generates demand for investment projects accompanying infrastructural projects, e.g. the growing attractiveness of less-developed or even underdeveloped regions through the stimulation of the development of a tourist infrastructure. This situation favorably affects the employment of the local population in the non-agricultural sector. Domańska [2006] indicates the complicated and multidimensional nature of connections between transport infrastructure and regional development and mentions the possibility of the so-called corridor effect in regions where construction of expressways weakens the competitive position of a region.

Closing unprofitable railway lines weakens the competitiveness of rail freight transport for goods, even more, causing the development of substitute branches of transport [Rozkwitalska 2010]. Meanwhile, "the intensification of rail freight carriage as an ecological form of transport is a necessity resulting from environmental protection" [Zielaskiewicz 2009].

Another significant role of infrastructure is its positive impact on international cooperation. An effective transport network system is a factor that stimulates the development of this cooperation. A properly planned and built infrastructure has a positive impact on cooperation between cross-border regions. A good example is the Euroregions: a key element of international economic cooperation and the elimination of differences in levels of socio-economic development.

MATERIAL AND METHODS

The purpose of this paper was to identify changes taking place in the transport infrastructure of Małopolskie Voivodeship in the period from 2002 to 2014. The research covered the linear part of the infrastructure, which is defined as transport routes with engineering equipment existing in the country. In this paper it includes the road network, railway lines, waterways and air corridors. By analyzing the development of the infrastructure, the development of passenger and transport traffic at airport in Kraków-Balice was described.

Presented in this article indicators refers to the quantity of the infrastructure parts. It should be emphasized that the quality of a transport network is an equally important element that should be taken into account during a complex analysis of its condition.

The basic sources of the data covered in the information were the databases of the Eurostat and the Polish Central Statistical Office (GUS).

The measures used in the paper are basic tools in researching the dynamics of economic phenomena. Absolute increases and relative increases with permanent and variable bases were used. For the selected phenomena, one-based and chain indexes were used and expressed in percentage values [Kukuła 2003].

The research also involved analytical and descriptive methods.

TRANSPORT INFRASTRUCTURE OF MAŁOPOLSKIE VOIVODESHIP

When analyzing the development of the transport infrastructure of a region, it is worth to become familiar with its socio-economic situation, because this determines the requirements set for infrastructure, and thereby indicates the level of its modernization. Currently, gross domestic product (GDP) per capita is considered as one of the basic determinants of the level of economic development. In the case of Małopolskie Voivodeship, in the examined period it was growing at a pace similar to the average for Poland.

Development of road network in Małopolska Region

The main ratio that should open the analysis of road infrastructure development is road density, which is often used as the diagnostic variable in analysis of the social and economic development of some regions [Jaworska and Luty 2009, Rymuza and Bombik 2014, Majka 2015].

By presenting, in Table 1, data for kilometers of roads per 100 km^2 of the surface area, the overwhelming dominance of Małopolskie Voivodeship over the national average can be seen.

In 2002, the network of this voivodeship was denser by 79.9% than the average for the whole country, while at the end of the examined period this

Table 1. Road density ratios in the period 2002–2014

Specification	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	kilometers of roads per 100 km^2 of the surface area												
Małopolskie Voivodeship	143.9	141.7	143.3	144.3	145.4	147.3	149.0	147.8	155.8	157.8	159.2	158.9	160.3
Poland	80.0	79.6	80.6	81.2	81.7	82.8	83.5	85.8	87.6	89.7	89.8	91.2	92.0
	kilometers of roads per 10,000 inhabitants												
Małopolskie Voivodeship	67.1	66.2	66.8	67.1	67.5	68.2	68.6	67.9	70.9	71.6	72.1	71.8	72.3
Poland	65.5	65.1	66.0	66.5	67.0	67.9	68.5	70.3	71.1	72.8	72.9	74.1	74.8

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

dominance fell to 77.3%. In Małopolska Region, the density increased over this period from 143.9 km of roads per 100 km^2 of surface area in 2002 to 160.3 km of roads per 100 km^2 of surface area in 2014, which means an increase of 11.4%. All Polish voivodeships were developing faster, reaching an increase of 15%. The relationships between these values should not be treated as a premise for a slowdown of development because with the high density of the network there is no need for its development at a high pace. Actions should be focused (as necessary) on maintenance and an increase in the quality of already existing routes – in the case of Małopolskie Voivodeship this will be visible after an analysis of the next ratio discussed.

In the analysis of road network density, it may turn out to be important to compare its length with the number of potential users. Compared with other voivodeships, the density of infrastructure in relation to the whole population in Małopolskie Voivodeship was growing more slowly than in the case of the national average. An increase from 67.1 km of roads per 10,000 people in 2002 to 72.3 km of roads per 10,000 people in 2014 gives an increase of 7.7%, whereas for the whole of Poland this change was as much as 14.2%. However, at this point the data concerning population growth should be borne in mind, since dynamic population growth in this voivodeship exceeded the density of infrastructure.

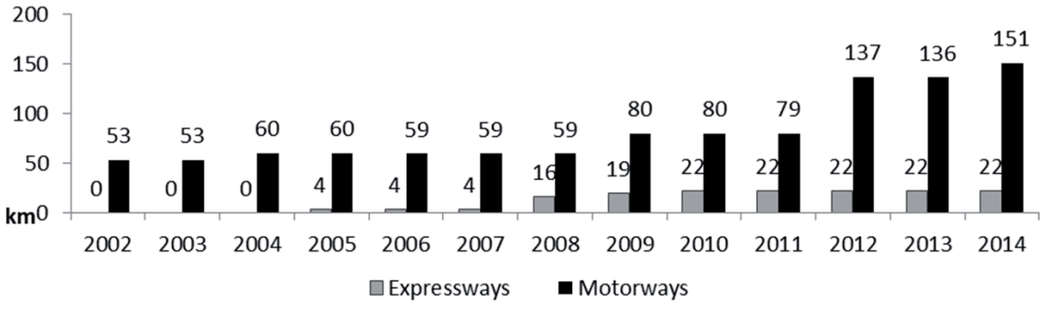

Fig. 1. Length of expressways and motorways in Małopolskie Voivodeship

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

Table 2. The density of the network of expressways (km per 1000 km^2) in voivodeships in 2002 and 2014

Specification	Expressways	Motorways	Total	Expressways	Motorways	Total	Increase in cumulative value 2002–2014
	2002			2014			
Łódzkie	0.00	0.97	0.97	11.95	10.30	22.25	21.29
Śląskie	5.08	2.45	7.53	9.39	14.30	23.69	16.16
Lubuskie	1.25	0.00	1.25	10.19	6.38	16.56	15.31
Wielkopolskie	0.27	1.61	1.88	4.94	7.06	11.99	10.12
Kujawsko-Pomorskie	1.28	0.00	1.28	1.95	9.18	11.13	9.85
Małopolskie	0.00	3.49	3.49	1.44	9.95	11.38	7.89
Poland	0.72	1.30	2.02	4.63	4.98	9.61	7.59
Podkarpackie	0.00	0.00	0.00	0.62	6.29	6.91	6.91
Dolnośląskie	0.00	7.51	7.51	3.22	11.12	14.35	6.83
Mazowieckie	0.60	0.00	0.60	4.91	1.78	6.69	6.09
Warmińsko-Mazurskie	0.11	0.00	0.11	5.81	0.00	5.81	5.70
Pomorskie	2.12	0.00	2.12	3.95	3.60	7.55	5.43
Zachodniopomorskie	1.23	0.94	2.17	5.90	1.11	7.01	4.83
Lubelskie	0.00	0.00	0.00	3.16	0.00	3.16	3.16
Świętokrzyskie	2.03	0.00	2.03	4.88	0.00	4.88	2.85
Podlaskie	0.00	0.00	0.00	1.64	0.00	1.64	1.64
Opolskie	0.00	9.04	9.04	0.00	9.36	9.36	0.32

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

In this research it is significant to analyze statistics concerning roads of high capacity. In the examined period, the length of the network of motorways and expressways in Małopolskie Voivodeship (Fig. 1) increased multiple times.

Progress made in Poland with regard to the share of public roads in the period 2002–2014 is presented in Table 2. In terms of the density of expressways and motorways, Małopolskie Voivodeship does not stand out significantly from well-developed central Polish voivodeships in relation to this aspect. It is worth noting the stagnation in eastern voivodeships (one of the neighbours – Świętokrzyskie as also Podlaskie and Lubelskie Voivodeships).

An important issue is annual increases in the length of expressways. In this respect, Małopolskie Voivodeship is well placed among western voivodeships, and exceeds the average annual national increase in the examined period by 0.3 km of motorway/expressway section.

Development of the network of railroads

Statistically, the rail transport infrastructure of Małopolskie Voivodeship performs well in comparison with the rest of the country. The density of railroads is high – in this respect this voivodeship ranks lower only than south-western voivodeships: neighbouring Śląskie, as well as Dolnośląskie and Opolskie Voivodeships (Fig. 2), that owe their high density of rail infrastructure to their industrial character and, in the case of Opolskie and Śląskie Voivodeships, also to their small surface area.

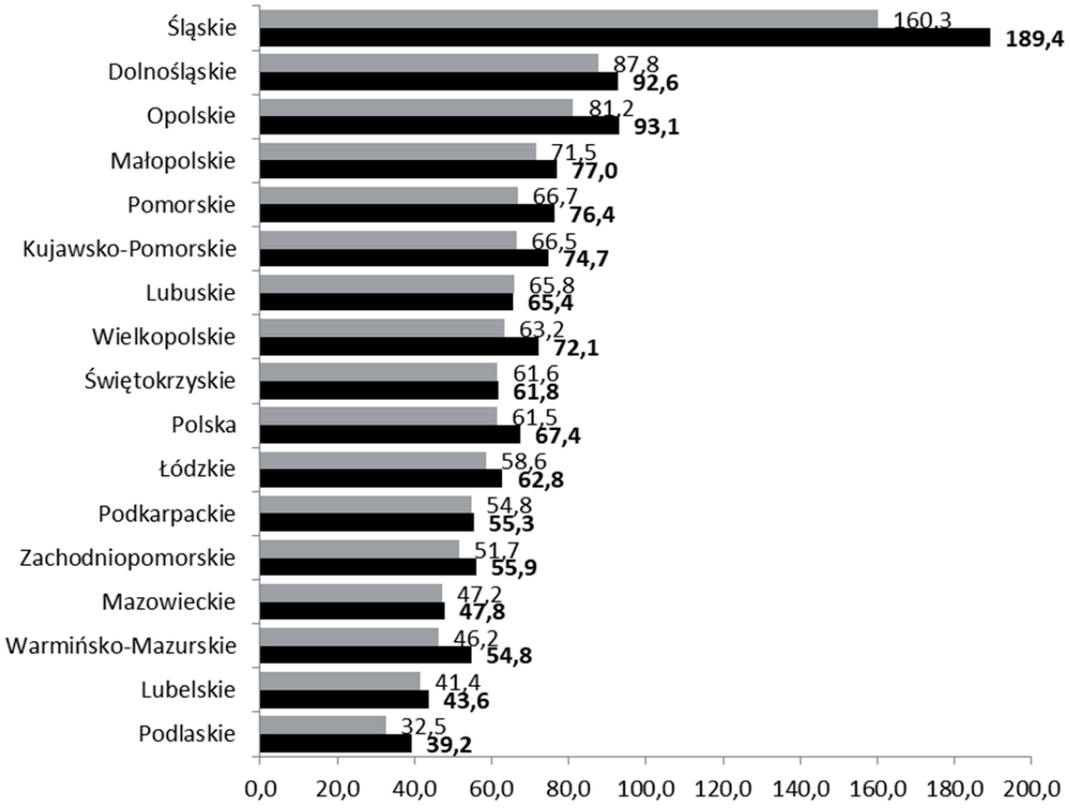

Fig. 2. Density of the network of railway lines (km per 1,000 km^2) by voivodeship between 2002 and 2014

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

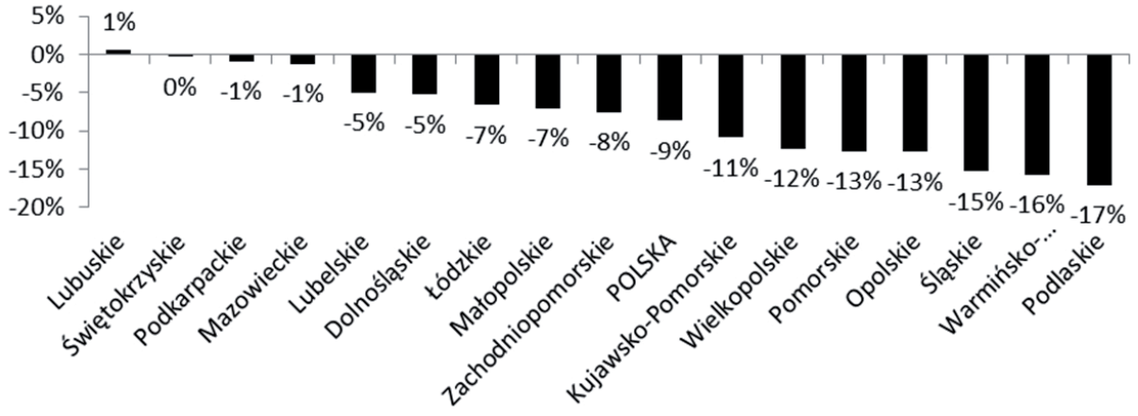

Fig. 3. Dynamics of the density of rail network (km per 1,000 km^2) between 2012 and 2014

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

In Figure 3 it can be seen that Małopolskie Voivodeship was reducing the number of operating rail lines more slowly, by about 2% less than the national average. During the examined two-year period their density fell by 7%.

Maintenance of railway lines is a tendency that has brought about benefits, not only in the examined period but it may also be favorable in the future.

Development of water transport network

Owing to restrictions resulting from the land form of Małopolskie Voivodeship, the water transport network in this region was limited in the examined period to the operation of one waterway, known as the upper Vistula river waterway. This waterway has quite a limited capacity – its route through the voivodeship consists of sections classified into as many as four different classes of waterway. Unfortunately, it is a classic example of constraints resulting from the land form. The introduction of new inland waterways in the case of upland land form would require huge expenditure, disproportionate to the benefits.

The limited possibilities for making use of the advantages of water transport are a serious impediment for Małopolskie Voivodeship. Inland water transport, due to its strongly limited adverse environmental impact and high efficiency of expenditure, is a good alternative to other, more expensive and less environmentally friendly forms of transport of cargo.

Development of air transport infrastructure

Air transport infrastructure in Małopolskie Voivodeship is based mainly on the operation of the only large airport in the region – John Paul II International Airport Kraków-Balice. The airport is situated favorably in relation to the network of airways. There are six permanent airways around the airport. The airport has only one runway. This stays invariable from many years. Transport of passengers and cargo is presented for illustrating changes in the air transport. Dynamic growth of the airport in the period 2002–2014 shows statistics in Table 3.

After a period of stagnation lasting until 2003, when about 500 thousand passengers were handled annually, Poland's accession to the European Union caused an explosive growth in the number of passengers handled (Fig. 4). In 2005, the number of passengers, when compared with the previous year, increased by as much as 88.6%.

The years of the beginning of the world economic crisis (2008–2009) were a period of stagnation in the development of the airport in Kraków-Babice [Rydzykowski 2010]. The number of passengers handled decreased, although the share of the airport in Kraków-

Table 3. Transport of passengers and cargo at the airport in Kraków-Balice in the period 2002–2014

Specification	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Passengers (thousands of people)													
Arrivals	241	283	405	775	1 160	1 505	1 444	1 323	1 414	1 489	1 698	1 806	1 897
Departures	245	283	408	793	1 194	1 542	1 465	1 341	1 429	1 512	1 722	1 836	1 917
Transit	15	27	28	17	13	21	15	16	20	12	19	6	4
Total	501	593	841	1 586	2 367	3 068	2 924	2 680	2 864	3 014	3 439	3 648	3 818
Cargo (t)													
Loading operations	676	880	698	615	851	1 043	844	1 021	1 392	1 408	240	187	713
Unloading operations	911	1 192	1 108	1043	1 163	1 494	1 582	1 363	1 414	1151	342	279	716
Total	1 586	2 071	1 806	1 658	2 014	2 537	2 427	2 384	2 806	2 559	582	466	1 429

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

-Balice in terms of carriage of passengers in Poland was not falling significantly, and since 2008 it accounted for around 14% of carriage of passengers throughout Poland (Fig. 4). Certainly, this results from the fact that other airports were struggling with similar problems. In 2014, the airport handled the highest number of passengers so far: approximately 3.8 million.

Transport of cargo has never been a priority in the operation of the airport in Kraków-Balice. While in the years 2002–2011 an unstable and slow, but visible, development of the volume of handled tonnage could be noted (Table 3), in 2012 this volume plummeted by as much as 77% (Fig. 4).

per surface area and population was high. The development did not achieve the highest values in Poland according to these conversion factors, which can be explained by the concentration of actions on modernization of roads, instead of on further densification.

In terms of the density of expressways, throughout the whole examined period, Małopolskie Voivodeship was maintaining a level similar to very highly-developed western voivodeships.

The general European tendency to eliminate less frequently-operated railway lines was reflected in changes in the condition of this infrastructure in most Polish voivodeships (in total approximately 9% of these

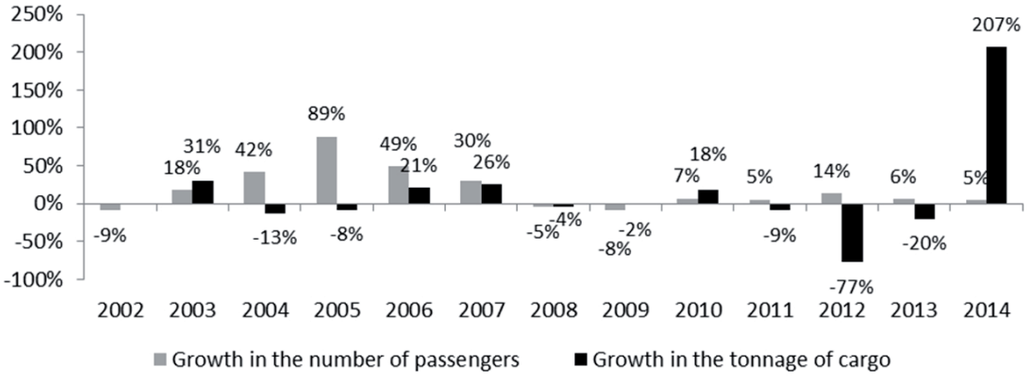

Fig. 4. Development of air traffic in Małopolskie Voivodeship in the period 2002–2014 (percentage changes in the number of passengers and cargo tonnage as compared to the previous year)

Source: Prepared by the authors on the basis of data from the Local Data Bank of the Polish Central Statistical Office (GUS).

CONCLUSIONS

The geographical location of Małopolskie Voivodeship between strongly-developed, industrial western regions and slightly underdeveloped eastern regions would suggest a degree of development at the level of its neighbors. This statement is true, although this voivodeship is closer to better-developed regions.

In terms of the development of the carriage service in which road transport is dominant, the road network satisfies the reported demand. Right from the beginning of the examined period, the density of roads, both

were liquidated in the years 2002–2014). In contrast, in Małopolskie Voivodeship the rail network decreased in the examined period by 7%, which is a moderate decrease on the national scale. In consequence, this provides greater scope for actions in the future, if rail transport – an environmentally friendly transport system – becomes competitive again. This could take place as a result of the development of mechanisms making it possible to use its advantages more effectively.

The network of waterways in Małopolskie Voivodeship is very poorly-developed, and in the examined period covered only one waterway, with very limited

capacity. However, it should be taken into account that this branch of transport has encountered substantial constraints rooted in the landform of the Małopolskie Voivodeship, which, along with small funds, is a strong barrier to its development.

By analyzing the condition of the air transport network in the examined period, an unambiguous conclusion can be drawn: in the period 2004–2006, this mode of transport was developing at a very high pace. Growth in demand for international carriage, as a result of Poland's accession to the European Union, was an impulse for gradual expansion of the only large airport in the region: aiport in Kraków-Balice. Consequently, since 2008, Małopolskie Voivodeship has handled as much as approximately 14% of passenger carriage in Poland, which makes it possible to conclude that not only has the infrastructure satisfied local demand, but also part of the demand of the neighboring voivodeships.

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DYNAMIKA ROZWOJU SIECI TRANSPORTOWEJ WOJEWÓDZTWA MAŁOPOLSKIEGO W LATACH 2002–2014

STRESZCZENIE

Infrastruktura transportowa jest niezbędna do prawidłowego funkcjonowania gospodarki i pełni kluczową funkcję w jej rozwoju. W pracy szczególną uwagę zwrócono na rozwój liniowej infrastruktury samochodowej. Wartości współczynnika zagęszczenia sieci dróg, wyrażony w kilometrach dróg w przeliczeniu na 100 km^2 powierzchni województwa, wskazują na zdecydowaną przewagę Małopolski nad średnią krajową. Pod względem rocznych przyrostów długości autostrad i dróg ekspresowych Małopolska zajmuje wysoką pozycję wśród zachodnich województw, przewyższając średni krajowy przyrost roczny o 0,3 km odcinka autostrady/drogi ekspresowej. Zagęszczenie dróg kolejowych jest bardzo duże – Małopolskę pod tym względem wyprzedzają jedynie południowo-zachodnie województwa. Transport wodny w tym regionie ograniczał się do funkcjonowania jednej drogi wodnej. Infrastruktura transportu powietrznego w województwie opiera się na funkcjonowaniu jedynego dużego portu lotniczego w regionie – w Krakowie-Balicach.

Słowa kluczowe: infrastruktura transportu, sieć dróg, województwo małopolskie

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TRENDS IN THE CHANGES OF CONSUMER NUTRITIONAL NEEDS IN POLAND IN THE YEARS 2003–2015

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ABSTRACT

The article presents main trends in the changes of nutritional needs in Poland over the past dozen years. Main goal of the article is to determine the direction and scope of the changes in consumption patterns of Poles in progress in the first and second decade of the 21st century. Starting point of the analysis consists in presenting the methods for studying the pace of development of food consumption and the changes of its structure. Next, the prioritization of nutritional needs was presented basing on the analysis and assessment of average income elasticity factors for consumption for the years 2003–2015. The conducted analysis of the shaping of nutritional needs of Polish households reflects the growing level of satisfaction of the needs as well as quality changes, together with substitution processes within the analysed food groups.

Key words: nutritional needs, hierarchy of nutritional needs, income elasticity factors for consumption

INTRODUCTION

Within the first and the second decade of the 21st century, the level of satisfaction of nutritional needs in Poland is growing. At the same time, within the analysed period important diversification of household consumption patterns is still visible. The stratification of food consumption patterns in the presented households is not as important as in the 1990s, but the process of consumption models approaching one another within the analysed household range is very slow. Changes in the level and structure of consumption are connected with numerous causative factors, both of economic as well as social origin.

Main goal of the presented article is to determine the direction and scope of the changes in consumption patterns of the Poles in the first and second decade of the 21st century.

RESEARCH METHODOLOGY AND SOURCES OF INFORMATION

As far as the tools for measuring the pace of development of food consumption and the changes of its structure are concerned, econometric analysis methods prevail. They are of quantitative character and they make it possible to conduct analyses on a wide spectrum basing on assessment indicators. The indicators consist of parameters estimated basing on different demand models as well as income elasticity factors determining the force of reaction of demand to the change in consumers' income level. The econometric model the most frequently used for estimating the parameters of food consumption function is the log-hyperbolic model in which the estimated A parameter sets the asymptote, constituting in economic interpretation the level of consumption saturation provided that the income is grow-

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ing without any limits. The works by Zielińska [1978] have pioneering significance in this regard, where basing on empirical analysis of the workers' budgets saturation level was determined for 10 nutrition groups as well as comparative analysis was performed for the dynamics of changes in the years 1966–1976. The presented methodology constituted the basis for further studies created basing on the data from household budgets [Szwacka-Salmonowicz and Zielińska 1996, Szwacka-Salmonowicz 2003, Kwasek 2008, 2012]. The evaluated elasticity factors constituted factual basis for performing quality and quantity assessment of consumption structure expressed in a qualitative and quantitative way as well as for the assessment of the pace of the consumption of different nutrient groups approaching the saturation level. What is more, they were used for determining the hierarchy of nutritional needs in different household types in Poland.

In the present study the level of satisfaction of nutritional needs have been determined basing on the results of food consumption income elasticity in the household perspective. The source of information for conducting this research was the data from household budgets by Central Statistical Office (GUS). The analysis included the years 2003–2015, which made it possible to capture the dynamics of changes in the structure of nutritional needs of Polish households. Comparative analysis of nutritional needs in the year 2015 was performed basing on the modifications shaped in the year 2003.

As far as the method of presenting research results is concerned, it follows the pattern ensuring the comparability of data. All materials were arranged according to the criterion of the value of income elasticity factors for food consumption. Presented factors constitute average values, obtained in the profile of quintile groups in the studied households. At present, Central Statistical Office (GUS) makes available the information on the diversity of income, expenses and consumption according to quintile groups exclusively for the total of households in Poland, employees and pensioners, while for the remaining social groups, i.e. farmers, the self-employed or people living on unearned income, this data is not provided. For this reason, presented research results, starting from the year 2003, are of narrowed character due to limited accessibility of data. What is more, when it comes to the subject-related scope of the analysis, the present study concentrates on product categories without taking into account subsequent items included in them. Nutritional products, exclusive of stimulants, were the only categories taken into account, which constituted the subject of analyses in the previous years. Data concerning the income, expenses and consumption is presented according to its division into five quintile groups with demographical and social characteristics of the people forming a given household as well as the level of monthly income and expenses taken into account. Such division makes it possible to compare the distribution of income in the profile of the wealth level (starting from the poorest 20% – first quintile group, and finishing with 20% of the wealthiest households) taking into account two already mentioned household types, i.e. employees and pensioners.

Prioritization of nutritional needs was performed basing on the analysis and assessment of average income elasticity factors for consumption in the profile of the following groups: general household wealth, employees as well as pensioners. Starting point consisted in dividing the expenses for nutritional products into three groups according to the assessment criterion of income elasticity factors adopted in previous studies. The first group of expenses, including the values of elasticity factors 1.0 and above 1.0 corresponds to satisfying the needs for luxury goods. The next product group includes products with average level of income elasticity factors for expenses below 1.0 to 0.5. They were called basic products. The third group, including products satisfying lower-order needs, included the products characterized by relatively lowest level of income elasticity factors for consumption, i.e. below 0.5.

According to the performed analysis, among the estimated income elasticity factors for consumption, high and very high ones, i.e. those at the level of 1 and above, are absent. It probably results from accepting for analysis a more restricted product portfolio and in majority in the perspective of a category and not subsequent products, as it was the case in the years 1996–2001. What is more, within the years 2000s, the trend consisting in the reduction of average expense elasticity factors has been observed, which opts for the growing level of satisfying nutritional needs.

STUDY RESULTS

In the present study for estimating the parameters of food consumption the log-hyperbolic function model has been applied. The level of satisfaction of nutritional needs have been determined basing on the results of food consumption income elasticity in the general household wealth, employees and pensioners. Prioritization of nutritional needs was performed basing on the analysis and assessment of average income elasticity factors for consumption in the types of households mentioned above. The performed analysis concerning the shaping of nutritional needs of Polish households makes it possible to select three basic change directions. This concerns the level of satisfying the needs, quality changes as well as substitution processes within the analysed groups of nutritional products.

By assessing the level of satisfaction for nutritional needs in the year 2015 in comparison with the year 2003, visible decrease in income elasticity factors for food consumption should be noticed, while the essence of prioritization remained unchanged – Tables 1, 2, 3. In the years 2003–2015, the prioritization concerned only basic and absolutely basic products as the transition to the second group took place for those products which up to that point represented the luxury group and still in the 1990s were characterized by high, i.e. exceeding 1.0, level of income elasticity factors for expenses and consumption [cf. Szwacka-Salmonowicz 2003].

It has been important from the point of view of the conducted deliberations to refer to empirical verification of Engel's law. Basing on Engel's factors, constituting the relation of expenses on food to the total of expenses, the society's standard of living is assessed. The relatively lower the mentioned factor, the higher the standard of living of the studied social group. High share of expenses on food in the total of expenses, in turn, points out to unfavourable economic situation of a given social group. Studies verifying Engel's law constitute the subject of interest of numerous scientists and they have been reflected in many different Polish and foreign studies [Zielińska 1978, Deaton 1998, Szwacka-Salmono-

Table 1. Prioritization of food consumption according to high elasticity factors in the year 2003

Specification	Values of factors	
	from	to
Group II – elasticity factors from 0.5 to 1.0		
Juices total	0.84	0.97
Yoghurts and milk drinks	0.55	0.67
Pastries	0.44	0.64
Fish	0.39	0.56
Sweets	0.43	0.51
Fruit total	0.38	0.54
Cheese total	0.40	0.44
Group III – elasticity factors below 0.5		
Animal fats	0.23	0.34
Meat total	0.15	0.26
Oils and other plant fats	0,05	0.22
Vegetables total	0.04	0.19
Milk	–0.01	0.14
Bread and cereal products	–0.02	0.09

Source: Own study.

wicz 2003, Janoś-Kresło and Mróz 2006, Kwasek 2015, Szwacka-Mokrzycka 2016, 2017].

While performing the assessment concerning the level of satisfaction of nutritional needs in the first and second decade of the 21st century it should be stated that the decrease in consumption elasticity factors took place in each of the analysed groups, while the scope of this decrease is diversified. Relatively most important decrease of factors in the analysed period took place in the expense group corresponding to satisfying lower-order needs [Szwacka-Mokrzycka 2018]. The same change direction could be noticed for income elasticity factors for food consumption for product groups. The noticed regularity, expressed in relative decrease in the level of income elasticity factors for nutritional products, constitutes the expression of changes that nutritional needs have undergone over the last dozen years. What is more, it proves the growing level of satisfaction of nutritional needs starting from the 1990s. What should also be pointed out it is the lasting diversification of household behaviours. These differences include on one hand the households of employees and on the other, of pensioners. In the first household group, relatively low elasticity factors were observed in the years 2003–2015, while in the second group, relatively high income elasticity factors for expenses and consumption were noticed. The diversification of food consumption patterns in presented household is no longer as important as in the 1990s, but it would be difficult to support the thesis on consumption patterns of the households of employees and pensioners getting gradually closer to one another.

The second trend in the analysed period points out to quality changes in food consumption. They have been estimated basing on the elasticity of quality defining the differences between income elasticity factors for expenses and consumption in subsequent product groups. The largest discrepancies were observed in relation to absolutely basic products. For some products in the third group, high differences between income elasticity factors for expenses and consumption were observed [Szwacka-Mokrzycka 2018]. These differences decrease over the years, but quality elasticity for some products still remains at a relatively high level.

Table 2. Prioritization of food consumption according to high elasticity factors in the year 2009

Specification	Values of factors	
	from	to
Group II – elasticity factors from 0.5 to 1.0		
Juices total	0.56	0.84
Yoghurts and milk drinks	0.50	0.63
Pastries	0.43	0.57
Fruit total	0.38	0.59
Fish total	0.39	0.57
Sweets	0.40	0.52
Cheese total	0.40	0.47
Group III – elasticity factors below 0.5		
Animal fats	0.31	0.41
Meat total	0.15	0.26
Oils and other plant fats	0.06	0.21
Vegetables total	0.05	0.21
Milk	–0.01	0.07
Bread and cereal products	0.00	0.07

Source: Own study.

By saying this I refer to such categories as: oils and other plant fats, cereal products, milk, meat, sweets. For these categories, the increase in quality elasticity factors was observed in the second decade of the 21st century. This proves the dynamization of quality changes over the last years in this product group, where substantial changes concerning the increasing of quality parameters are observed. When it comes to products forming group II, as it results from the performed analysis, quality has a fixed position, and for this reason the scale of changes is much lower than in the group of products satisfying lower-order needs. The analysis of quality changes according to the profile of households shows that different meaning is attributed to the quality of nutritional products consumed in the households of employees than of pensioners. In the first group visible quality changes in food consumption have appeared, which is reflected in high discrepancies between income elasticity for expenses and the consumption of nutritional products. In the households of pensioners, in turn, the quality of nutritional products purchased is of much lower importance.

It is confirmed by significantly lower quality elasticity factors. Quality changes result in particular from the transformations in consumers' consciousness. They are expressed in the change of eating habits, and as a result in the transformation of the preference scheme. The changes in consumption model are also promoted by consumer education stimulating the shaping of models based on the rationalization of food consumption. The results obtained for the years 2003––2015 repeat the trend emerged in the 1990s.

Moreover, the analysis of the changes in nutritional needs demonstrates that quality changes result to a large extent from the intensification of substitution processes between nutritional products groups – Tables 1, 2 and 3. It is reflected in relative decrease in income elasticity factors for expenses and consumption. Relative decrease of income elasticity factors for food results on one hand from the ongoing substitution processes between food and other consumer goods and on the other – from those within nutritional products groups. This distribution manifests itself in the shift of many nutritional products from group II (basic products) to group

Table 3. Prioritization of food consumption according to high elasticity factors in the year 2015

Specification	Values of factors	
	from	to
Group II – elasticity factors from 0.5 to 1.0		
Juices total	0.53	0.84
Fruit total	0.38	0.68
Pastries	0.43	0.57
Fish total	0.39	0.61
Yoghurts and milk drinks	0.23	0.59
Cheese total	0.43	0.47
Sweets	0.30	0.45
Group III – elasticity factors below 0.5		
Animal fats	0.38	0.56
Meat total	0.13	0.24
Vegetables total	0.12	0.24
Oils and other vegetable fats	0.07	0.20
Milk	0.01	0.14
Bread and cereal products	0.04	0.10

Source: Own study.

III (lower-order needs). What is more, the regrouping of some categories took place within the groups. It refers in particular to such products as animal and plant fats, milk, bread and cereal products, for which over the years 2000s, the substitution effect became clearly marked. The conducted analysis of changes in nutritional needs in Polish households shows the continuation of the trend which emerged within the period of transformation of Polish economy.

SUMMARY

Econometric studies conducted in the years 2003–2015 clearly show that the level of satisfaction of nutritional needs has been increasing starting from the years 1990s. Persistent diversification of household behaviours should also be emphasized. These differences concern on one hand employees' households and on the other, the households of pensioners. Stratification of food consumption models in the presented households is not as important as in the 1990s, but it would be difficult to support the thesis on consumption models in employees' and pensioners' households gradually approaching one another. Quality changes in consumption result in particular from transitions in consumer's consciousness. They are expressed in the changes of consumption habits, and as a result in the transformation of the preference scheme [Dąbrowska et al. 2015].

Changes in the consumption model are also promoted by consumer education stimulating the shaping of models based on food consumption rationalization. What is more, the analysis of changes in nutritional needs demonstrates that quality changes result to a large extent from the intensification of substitution processes between nutritional products groups. The conducted analysis of changes in nutritional needs of Polish households in the years 2003–2015 demonstrates the continuation of the trend emerged during the period of transformation of Polish economy.

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TRENDY W ZMIANACH POTRZEB ŻYWNOŚCIOWYCH KONSUMENTÓW W POLSCE W LATACH 2003–2015

STRESZCZENIE

W artykule przedstawiono główne tendencje zmian w potrzebach żywnościowych konsumentów w Polsce na przestrzeni ostatnich kilkunastu lat. Celem przewodnim artykułu jest ustalenie kierunku i skali dokonujących się zmian we wzorcach konsumpcyjnych Polaków w pierwszej i drugiej dekadzie XXI wieku. Punktem wyjścia rozważań jest przedstawienie metod badań tempa rozwoju konsumpcji żywności i przemian w jej strukturze. Następnie zaprezentowano hierarchizację potrzeb żywnościowych na podstawie analizy i oceny średnich współczynników elastyczności dochodowej spożycia dla lat 2003–2015. Przeprowadzona analiza kształtowania się potrzeb żywnościowych polskich gospodarstw domowych wskazuje na wzrost poziomu zaspokojenia potrzeb, przemiany jakościowe oraz procesy substytucyjne w obrębie analizowanych grup żywności.

Słowa kluczowe: potrzeby żywnościowe, hierarchia potrzeb żywnościowych, współczynniki elastyczności dochodowej spożycia

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POLITICAL BUDGET CYCLES IN THE EUROPEAN UNION – POST-COMMUNIST HERITAGE

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ABSTRACT

We test the hypothesis that post-communist history affect election cycles in the European Union countries. We show that pre-election fiscal manipulation increase total public spending per capita by 1.9% and three specific spending categories, i.e. general public services, public order and safety, and economic affairs in Central and Eastern Europe democracies with post-communist roots. At the same time we observe no significant spending deviations in remaining EU Member States, except expenditure linked to environmental protection. Our results indicate cross-country heterogeneity of political budget cycles (PBCs) in the EU, conditional on political system history.

Key words: political budget cycle (PBC), election cycle, general government expenditure, fiscal manipulation, European Union, EU post-communist countries

INTRODUCTION

The public finance sector remains the responsibility of politicians, not economists. Thus, economic and political scientists have been intrigued by the coincidence of economic policies and election timing [Rogoff 1990]. Elections play a crucial role in functioning of any democracy. Elections create incentives for the incumbent to put to use policy instruments to be reelected [De Haan 2014]. The state of an economy affects voting [Nannestad and Paldman 1994]. Political budget cycle can be described as a cyclical fluctuation in fiscal policy, induced by electoral cyclicality [Shi and Svensson 2003].

There are numerous theoretical and empirical studies on political budget cycles. They date back to Nordhaus' [1975] opportunistic political business cycle which indicates that incumbents have strong incentives to use fiscal policy for re-election purposes. Fiscal policy opportunistic manipulation for electoral gains has been criticized by numerous evidence suggesting that voters are fiscal conservatives and punish politicians who increase pre-election expenditure [Peltzman 1992, Brender 2003, Brender and Drazen 2008, Arvate et al. 2009, Drazen and Eslava 2010, Garmann 2017]. However, Akhmedov and Zhuravskaya [2004], Sakurai and Menezes-Filho [2008], Aidt et al. [2011], and Klomp and De Haan [2013a] find voters as fiscal liberal who appreciate and reward pre-election extra public spending.

Pure PBC models predict increase in aggregate spending but pre-election incumbent's manipulation may occur as a form of targeting expenditure. Rogoff [1990] shows that PBCs arise due to information asymmetries about government' competence, thus during pre-election period incumbent prefers shifting expenditure towards easily observed consumption expenditures, and away from others. Using multi-country panel data, Vergne [2009] and Block [2002] observe an

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increase in more visible current expenditure and a decline in capital spending in election period. In contrast, capital expenditures [Schuknecht 2000] and infrastructural spending [Aidt et al. 2011] have been shown to increase around elections. Larger expenditure composition changes in election years are related to established democratic economies [Katsimi and Sarantides 2012], not new ones [Brender and Drazen 2013].

Recent empirical studies focus on the cross-country heterogeneity and investigate the drivers and mechanisms of PBCs existence [De Haan and Klomp 2013, Dubois 2016]. Electoral spending expansions have initially been assumed to be characteristic for new democracies and less developed countries [Schuknecht 2000, Block 2002, Shi and Svensson 2002, 2006, Brender and Drazen 2005]. However, recent numerous evidence [Buti and Van den Noord 2004, Mink and De Haan 2006, Tujula and Wolswijk 2007, Efthyvoulou 2012] find support for PBCs evidence in developed countries, i.e. OECD and EU Member States.

Stanova [2012] observes PBCs in Central and Eastern Europe new democracies and finds them to recede over time with increasing number of parliamentary elections conducted. Enkelmann and Leibrecht [2013] based on 1990–2010 data on OECD countries, find PBCs occurrence in total expenditures as well as in specific spending categories mainly in newly democratized Eastern European countries. They also find that election-year expenditure shift towards administrative spending. Dolezalova [2013] report PBCs presence throughout EU Member States but find that the factor of length of democracy has a small impact on the results. Ademmer and Dreher [2016] using data from 1996–2012 for 25 EU countries, show that governments frequently fiscally stimulate the economy in pre-election period, regardless the political system history.

Despite empirical PBCs evidence in the European Union countries in spending on aggregated and disaggregated level, we observe the lack of deeper investigation on PBCs drivers.

The aim of the article is to test the hypothesis that post-communist history affect election cycles in the European Union countries.

Our contribution is that using panel data on all 28 current EU Member States from 1995 to 2015, we find pre-election fiscal manipulation in post-communist countries. We report increased general government spending in total by almost 2% in these countries. We observe also larger spending on three specific categories by economic function, i.e. general public services, public order and safety, and economic affairs in group of eleven EU countries with post-communist heritage. At the same time, we observe almost no significant pre-election fiscal manipulation (except spending on environment) in case of remaining 17 EU Member States.

The agenda of the paper is as follows. The next section gives a description of the data and research methods used. Posterior section presents the empirical findings and the final section concludes.

MATERIAL AND RESEARCH METHODS

We use an annual panel dataset of all 28 European Union countries over the period 1995–2015. The spending data are taken from Eurostat, while data on control variables come from the annual macro-economic database (AMECO) collected by the European Commission. The election data are taken from the Database of Political Institutions reported by the World Bank. Data on regular elections are collected from the Database of Political Institutions reported by the World Bank. We apply the following empirical model:

$$\ln exp_{it} = \alpha_i + \ln exp_{it-1} + \beta X_{it-1} + \gamma elec_{it} + \\ + \lambda\left(elec_{it} \cdot post\_comunist_i\right) + \varepsilon_{it} \quad (1)$$

The variable exp_{it} is the amount of general government expenditure per capita (in natural logarithms) and refers either to the total expenditure or one of ten spending categories by government functions. The Classification of the functions of government was developed by the Organisation for Economic Co-operation and Development and introduced by the United Nations Statistical Division as a standard classifying the purposes of general government activities. The considered ten spending categories are: general public services, defence, public order and safety, economic affairs, environmental protection, housing and community amenities, health, recreation, culture and religion, education, and social protection. The value of

general government expenditure is converted into constant 2010 euro prices in order to make it comparable over time in the analysed period.

The figure displays public spending composition in two European Union country-groups (post-communist and elder democracies) to present the differences in general government expenditure policy between these two groups.

Central and Eastern Europe new democracies spend relatively more on economic affairs and safety, while in remaining EU Member States expenditure on social protection, health, and public services represent larger GDP share. In order to make the value of public spending comparable over time, we have converted them into constant 2010 euro prices. To control for autoregressive tendencies and policy smoothing, we include the lagged dependent variable. By using intercept α_i, we control for time-invariant unobserved and observed characteristics. We include the lagged dependent variable ln exp_{it-1} since fiscal indicators display a great deal of persistence.

Measure X_{t-1} is the vector of socio-economic control variables following previous studies by Shi and Svennson [2006], and Klomp and De Haan [2013a, b, c]. The controls are taken up in the analysis as one-year lagged variables. We include real GDP per capita (in natural logarithms) to control country development level. GDP growth rate capture fiscal policy fluctuations induced by the domestic business cycle. Deficit rule refers the dummy variable that is set to one when we observe an excessive budget deficit (greater than 3% of GDP) in country *i*. Stability and growth pact requirements allow for a launch of an excessive deficit procedure by the European Commission against any EU Member State that exceeds the imposed budgetary deficit ceiling. The procedure enforces the fiscal consolidation to gets EU Member State budget deficit under control. Openness variable is included to present the size of international trade as economic openness indicator. It is calculated as a sum of export and import per capita taken in natural logarithms (in constant 2010 euro prices). Change in CPI represents the level of inflation rate. Overall effect of inflation is not clear *a priori*. On the one hand it affects government spending through nominal progression in tax rates and tax brackets, while on the other hand inflation erodes the real value of nominal debt [Tujula and Wolswijk 2004, Mink and De Haan 2007]. Total dependency ratio measures the age structure of population. It is a sum of two generally inactive groups (i.e. under 15 years of age and aged 65 and over), compared to the number of people of working age (i.e. 15–64 years old). Higher dependency ratio may reduce government revenue and induce increased public spending, particularly social

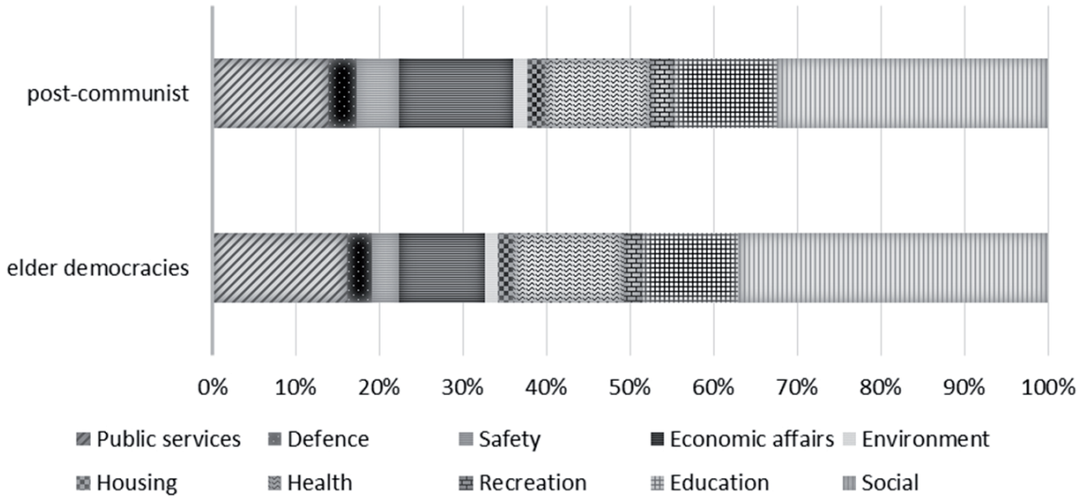

Fig. General government expenditure composition in the European Union

Source: Own elaboration using MS Excel based on Eurostat data.

Table 1. Estimation results for political budget cycles in the European Union

Specification	(1) Total spending	(2) Public services	(3) Defence	(4) Order, Safety	(5) Economic affairs	(6) Environment protection	(7) Housing	(8) Health	(9) Recreation	(10) Education	(11) Social protection
Lagged dep. variable	0.599***	0.582***	0.692***	0.649***	0.359***	0.676***	0.534***	0.716***	0.728***	0.626***	0.792***
	(9.84)	(5.70)	(19.75)	(4.87)	(4.42)	(7.86)	(4.20)	(14.04)	(11.51)	(9.55)	(22.84)
Real GDP pc	0.280***	0.382**	0.466***	0.043	0.608**	0.522**	0.378	0.181	0.175	0.229***	0.068
	(4.39)	(2.25)	(2.96)	(0.56)	(2.28)	(2.47)	(1.46)	(1.68)	(0.95)	(3.08)	(1.21)
GDP growth	–0.000***	0.000***	0.000***	–0.000*	–0.000	0.000	–0.000***	–0.000***	0.000	0.000	0.000
	(–3.00)	(2.89)	(3.48)	(–1.88)	(–0.51)	(0.95)	(–3.89)	(–3.51)	(0.13)	(0.47)	(1.45)
Deficit rule	0.005	0.010	–0.018	–0.009	0.029	–0.033	0.006	0.004	–0.026**	–0.013*	0.008
	(0.75)	(0.75)	(–1.68)	(–0.86)	(1.47)	(–1.06)	(0.25)	(0.61)	(–2.41)	(–2.04)	(1.66)
Openness	0.029*	–0.081	–0.148***	0.074	0.009	–0.101	–0.135	0.044	0.021	0.046	0.053***
	(2.01)	(–1.57)	(–2.95)	(1.40)	(0.10)	(–1.45)	(–1.46)	(1.38)	(0.50)	(1.66)	(3.32)
CPI	–0.000*	0.002*	–0.006***	–0.004***	–0.003***	–0.014***	–0.002*	0.000	–0.001	–0.000	0.000
	(–1.91)	(1.99)	(–11.93)	(–2.82)	(–2.90)	(–6.84)	(–1.72)	(0.53)	(–0.80)	(–0.03)	(0.68)
Dependency ratio	0.000	0.005	–0.000	–0.000	0.000	–0.000	–0.009	0.001	0.003	–0.005**	–0.000
	(0.14)	(1.07)	(–0.00)	(–0.09)	(0.05)	(–0.05)	(–1.19)	(0.53)	(0.67)	(–2.51)	(–0.12)
Unemployment rate	–0.001	0.004	–0.005***	–0.004	–0.001	–0.002	–0.010*	–0.004*	–0.004	–0.001	–0.003
	(–0.55)	(1.31)	(–2.88)	(–1.68)	(–0.19)	(–0.25)	(–1.84)	(–1.94)	(–1.52)	(–0.49)	(–1.60)
EU membership	–0.000	0.091***	–0.058	–0.043**	–0.044	0.059	0.076	0.001	0.047**	–0.030**	–0.005
	(–0.03)	(2.91)	(–1.52)	(–2.14)	(–0.92)	(0.79)	(1.28)	(0.07)	(2.26)	(–2.54)	(–0.47)
Regular elections	0.007	0.029*	0.007	0.022**	0.010	0.007	0.022	–0.005	0.010	0.010*	0.006
	(1.42)	(1.72)	(0.44)	(2.70)	(0.60)	(0.27)	(1.11)	(–0.40)	(0.74)	(1.87)	(1.38)
N	526	526	526	526	526	523	526	526	526	526	526

Note: Estimates of Equation (1); *t*-values are shown in parentheses; * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

Source: Own calculations using STATA based on: AMECO database, Eurostat, World Bank, and Database of Political Institutions.

Table 2. Estimation results for political budget cycles in the European Union: conditional on post-communist legacy

Specification	(1) Total spending	(2) Public services	(3) Defence	(4) Order, Safety	(5) Economic affairs	(6) Environment protection	(7) Housing	(8) Health	(9) Recreation	(10) Education	(11) Social protection
Lagged dep. variable	0.595***	0.585***	0.692***	0.644***	0.356***	0.677***	0.533***	0.719***	0.728***	0.626***	0.792***
	(9.86)	(5.85)	(19.94)	(4.83)	(4.42)	(7.88)	(4.19)	(13.96)	(11.46)	(9.53)	(22.85)
Real GDP pc	0.283***	0.378**	0.466***	0.043	0.608**	0.517**	0.379	0.178	0.175	0.230***	0.0678
	(4.44)	(2.25)	(2.95)	(0.55)	(2.27)	(2.46)	(1.47)	(1.66)	(0.95)	(3.07)	(1.21)
GDP growth	–0.000***	0.000***	0.000***	–0.000*	–0.000	0.000	–0.000***	–0.000***	0.000	0.000	0.000
	(–3.08)	(2.85)	(3.46)	(–2.03)	(–0.56)	(0.86)	(–3.88)	(–3.40)	(0.15)	(0.47)	(1.43)
Deficit rule	0.005	0.010	–0.018	–0.009	0.030	–0.032	0.006	0.004	–0.027**	–0.013*	0.008
	(0.82)	(0.78)	(–1.68)	(–0.79)	(1.50)	(–1.04)	(0.24)	(0.56)	(–2.42)	(–2.03)	(1.68)
Openness	0.030*	–0.080	–0.148***	0.075	0.009	–0.100	–0.136	0.043	0.021	0.046	0.053***
	(1.99)	(–1.54)	(–2.94)	(1.39)	(0.11)	(–1.46)	(–1.46)	(1.37)	(0.49)	(1.66)	(3.32)
CPI	–0.001*	0.002**	–0.006***	–0.004***	–0.002***	–0.014***	–0.002*	0.000	–0.001	–0.000	0.000
	(–1.93)	(2.06)	(–11.80)	(–2.84)	(–2.82)	(–6.86)	(–1.74)	(0.52)	(–0.81)	(–0.03)	(0.69)
Dependency ratio	0.000	0.005	–0.000	–0.000	0.001	–0.000	–0.009	0.001	0.003	–0.005**	–0.000
	(0.17)	(1.12)	(–0.01)	(–0.02)	(0.07)	(–0.03)	(–1.19)	(0.50)	(0.66)	(–2.50)	(–0.11)
Unemployment rate	–0.001	0.004	–0.005***	–0.004*	–0.001	–0.002	–0.010*	–0.004*	–0.004	–0.001	–0.003
	(–0.57)	(1.26)	(–2.86)	(–1.73)	(–0.23)	(–0.28)	(–1.84)	(–1.95)	(–1.52)	(–0.49)	(–1.61)
EU membership	0.000	0.093***	–0.058	–0.042**	–0.043	0.062	0.076	0.001	0.047**	–0.029**	–0.004
	(0.01)	(3.10)	(–1.52)	(–2.11)	(–0.89)	(0.83)	(1.28)	(0.06)	(2.23)	(–2.51)	(–0.46)
Regular elections	–0.002	0.001	0.010	–0.006	–0.018	–0.028*	0.029	0.003	0.016	0.010	0.003
	(–0.29)	(0.09)	(0.41)	(–0.71)	(–0.78)	(–1.72)	(1.17)	(0.43)	(1.33)	(1.48)	(0.89)
Elections × Post_communist	0.019*	0.064*	–0.005	0.062***	0.064*	0.079	–0.017	–0.018	–0.013	0.001	0.007
	(1.94)	(1.72)	(–0.13)	(3.51)	(1.94)	(1.56)	(–0.45)	(–0.68)	(–0.43)	(0.12)	(0.73)
N	526	526	526	526	526	523	526	526	526	526	526

Note: Estimates of Equation (1); *t*-values are shown in parentheses; * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

Source: Own calculations using STATA based on: AMECO database, Eurostat, World Bank, and Database of Political Institutions.

expenditure. Variable unemployment rate explain the labour force impact on public finance. Higher level of unemployment should be positively correlated with increased spending.

The variable $elec_{it}$ is an election variable suggested by Franzese [2000]. It is calculated as m / 12 in election year and (12 – m) / 12 in pre-election year, where m is a month when election is held. In all other years the value of $elec_{it}$ is set to zero. We consider only parliamentary elections which are held on the fixed date, required by the law. Snap elections (earlier than expected) which are the consequence of cabinet fall are not taken up in the analysis. More detail, early elections make incumbent's pre-election fiscal manipulation harder to enforce, due to the time and capacity constraints in engaging additional resources.

To investigate the PBC heterogeneity we include also the dummy variable *post-communist* describing whether any analysed current EU Member State has post-communist roots. It is set to one when EU Member State has post-soviet, post-yugoslav, or Soviet satellite heritage. The parameter ε_{it} refers to an error term.

Finally, the model (1) is estimated using the ordinary least square fixed effects (OLS-FE).

RESULTS

Estimation results presented in Table 1 indicate the election cycle in total general government expenditure (column 1) and ten specific spending categories by government function (columns 2–11) in 28 current European Union countries regardless political system history.

The results are based on regular parliamentary elections. Findings in column 1 show that there is no significant election effect in total expenditure in the EU on average. This indicates no pure PBCs existence in the EU in analysed period. Despite no aggregate spending effect findings from columns 2–11 show that some targeting within specific expenditure categories is observed. We report a pre-election increase in spending on public services (2.9%), order and safety (2.2%), and education (1.0%). At the same time, we do not observe that electoral manipulation negatively affect any specific expending category by government function. Our findings differ from previous studies by Buti and Van den Noord [2004], Mink and de Haan [2006], Tujula and Wolswijk [2007], Efthyvoulou [2012]. The reason for this distinction might be rooted in different time-period and elections classification used.

Estimation results displayed in Table 2 present a more nuanced picture of PBCs existence in European Union countries, conditional on post-communist political history. Findings in column 1 report an increase in total expenditure per capita by 1.9% in post-communist EU countries. The results confirm PBCs existence in these countries and are in line with Stanova [2012], Enkelmann and Leibrecht [2013], and Ademmer and Dreher [2016]. At the same time, we do not observe fiscal manipulation resulting in significant total spending deviation in election period in case of other EU countries. It suggests that, taking into account only regular parliamentary elections, pure opportunistic political budget cycles exist only in new EU democracies but not in elder ones.

Splitting the total government expenditure into 10 specific categories by economic function, we report existence of some targeting spending in post-communist EU Member States. Government spending on public services, order and safety, and economic affairs are increased by more than 6% in pre-election period in these countries. At the same time, we do not observe any significant negative election effect on analysed spending categories in this group of EU Member States. Our findings are partly in common with Enkelmann and Leibrecht [2013]. Splitting panel data on 32 OECD countries into small panel on 10 Eastern EU countries including only 120 observations, they find significant increased spending on administration, economic affairs, environment and social protection. Taking into account results for remaining countries (Table 2, row: regular elections), we report only decreased pre-election spending on environmental protection. Reflecting fact is that estimation variations within spending categories for elder EU democracies turn out to be statistically insignificant.

CONCLUSIONS

The paper explains one of the drivers of country-group specific PBCs in the European Union. Our paper prove political budget cycles existence in post-com-

munist European Union Member States and show that political history play a role in shaping fiscal policy in election time. Our findings confirm results of previous studies underlining the impact of democracy maturity as PBC driver. Taking into account regular parliamentary elections we show that pre-election fiscal manipulation increase total general government expenditure per capita by 1.9% and three specific spending categories by function, i.e. general public services, public order and safety, and economic affairs in post-communist EU Member States. At the same time we observe no significant spending deviations in remaining EU Member States, except pre-election negative effect on expenditure linked to environmental protection. Despite division of total public spending into 10 specific categories, dipper disaggregation is needed for complete estimation results interpretation. We consider this fact as a challenge for the future research.

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ZJAWISKO POLITYCZNEGO CYKLU BUDZETOWEGO W UNII EUROPEJSKIEJ – POSTKOMUNISTYCZNA SPUŚCIZNA

STRESZCZENIE

Celem artykułu jest weryfikacja hipotezy traktującej o wpływie postkomunistycznej spuścizny na występowanie zjawiska politycznego cyklu budżetowego w państwach członkowskich Unii Europejskiej. Wykazano, że w państwach Europy Środkowo-Wschodniej, w których panował ustrój komunistyczny po II wojnie światowej, przedwyborcza manipulacja fiskalna prowadziła do wzrostu wydatków sektora instytucji rządowych i samorządowych ogółem per capita o 1,9%. Ponadto w tej grupie państw UE stwierdzono występowanie istotnego wzrostu wydatków publicznych związanych z działalnością ogólnopaństwową, bezpieczeństwem i porządkiem publicznym oraz sprawami gospodarczymi. W pozostałych państwach członkowskich UE nie stwierdzono zaś istotnych zmian poziomu wydatków publicznych ogółem oraz poszczególnych kategorii wydatków sektora instytucji rządowych i samorządowych w okresie przedwyborczym, z wyjątkiem związanych z ochroną środowiska. Wyniki wskazały na występowanie heterogeniczności politycznych cyklów budżetowych w UE w zależności od historii ustroju politycznego.

Słowa kluczowe: polityczny cykl budżetowy (PBC), cykl wyborczy, wydatki sektora instytucji rządowych i samorządowych, manipulacja fiskalna, Unia Europejska, państwa postkomunistyczne UE

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INSTITUTION EFFICIENCY *VERSUS* THE LEVEL OF DEVELOPMENT OF LOCAL GOVERNMENTS (A STUDY AT THE LEVEL OF POLAND'S REGIONAL DIVISION)

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ABSTRACT

As the socio-economic reality is growing increasingly complex, the role of local governments in the management of events and processes occurring in local communities gains importance. Considering the fact that the basic task of local authorities is to stimulate the growth and development of a given local entity, an analysis was undertaken to the aim of assessing the relationship between the level of local development and the institutional efficiency of local self-governments and vice versa, in a regional approach (NUTS 2). To achieve this aim, mixed data were analysed, that is raw data (acquired via survey from 1,220 municipalities) and secondary data (from the database of the Local Data Bank). The efficiency of local governments was measured with an aggregate factor *EFF*, while the level of development was assessed with the *DEV* measure. The results indicate that the local governments did rather poorly in terms of both efficiency and development. In both cases, the mean value of the applied synthetic measures reached no more than 30% of the maximum attainable score. The basic tools in the research were correlation and regression analysis. Both procedures demonstrated the presence of a relationship between the two analysed categories ($r = 0.365$). Moreover, the analysis of regression showed that the impact of developmental processes on the improvement of efficiency of local governments was stronger that the influence of improved efficiency on developmental processes occurring in the analysed municipalities.

Key words: synthetic measures, institutional efficiency of a municipality, local development, regression analysis, Pearson's correlation coefficient

INTRODUCTION

The role of local governments regarding the management or coordination of events and processes occurring in local communities has been gaining importance over the recent years. Stoker [2011] concluded that local authorities assume such a responsibility in response to changes in contemporary lifestyle and complexity of thereof as well as challenges of the modern world. However, the principal role of local authorities is to stimulate the development and growth of a given local system [Marks-Bielska et al. 2014]. The central place in all actions undertaken for the sake of local development should be occupied by efforts to create and stimulate the economic development, because the economic sphere is fundamental to development processes in all other aspects of life [Marks-Bielska et al. 2017].

The accomplishment of the above objective involves intricate efforts, mainly because each municipality represents various groups of interests (residents, authorities, business, organisations).

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Management of a local community calls for coordination (harmonisation) of these interests. This, in turns, requires knowledge, skills, experience as well as intuition. It is well known that any weaknesses of a municipality's economy are, in equal measures, a consequence of insufficient funds and flaws in the management system [Wojciechowski 2013]. Thus, among the challenges that local authorities face there are the changing expectations and needs of local communities. Management at a local level is a complex and multi-dimensional problem, which involves the management of various development processes that can engage many participants. It encompasses processes, mechanisms and institutions through which local residents, entrepreneurs and communities can express their needs and interests, and which strive towards solving public problems in collaboration with one another [Herrera 2016].

While making every effort to meet the above challenges, local administration must undertake actions whose aim is to build institutional capacities [Savitch 1998]. The local social and economic development depends on both the available economic base and potential financial support, although institutional factors are increasingly often implicated as playing an important part [MacLeod and Goodwin 1999, Gibbs et al. 2001].

Institutional development at a local level involves such steps as formation and implementation of mechanisms and guidelines in order to enhance the efficiency of local government administration offices in actions they undertake within their basic domains of activity (strategic management of funds, human resources, provision of public services social communication, creation of suitable conditions for the development of entrepreneurship) [Marks-Bielska et al. 2017].

Creation of efficient and effective institutions can be supported by continuous research into the concepts, process of formation, strategy of action, monitoring and evaluation of the capacity of these institutions [Vincent and Stephen 2015]. Activities designed to build institutional capacity building can be helpful in the effective use and allocation of the institution's resources. Thus, capacity building implies actions that strengthen knowledge, abilities and skills, thereby leading to improved institutional structures and processes, so that organizations can effectively fulfil their mission and objectives in a sustainable manner.

Fundamentally, desirable institutional changes arise from the fact that efficient institutions assist businesses in making a more efficient use of their potential and continuing their development [Marks-Bielska et al. 2017]. Pro-developmental actions undertaken within the local economic policy are most often directed at supporting the existing business entities and enabling their further development, although another aim is to create conditions that would stimulate the establishment of new companies [Lizińska et al. 2017]. The economic activity of business entities is a necessary condition for the initiation of an economic growth. Companies affect the local economic space by engaging local production means in their business activity, and through various economic relations they stimulate the growth within the regional dimension [Typa 2016]. In market economy, institutional structures, which are composed of individual institutions (formal and informal ones), form a mechanism that allocates resources [Marks-Bielska et al. 2017].

Taking into account the importance of shaping the socio-economic development and institutional efficiency on a local level, it is reasonable to pay attention to both of these issues not only separately but also in terms of their mutual relations. As underlined by Gómes et al. [2016], analysis of interrelations between institutions, local management and development is currently an important area of academic research. Some 20 years ago, the above relations were not considered to be so obvious.

Two main views on the interactions between economic development and institutional efficiency can be found in the literature. On the one hand, the importance of institutional efficiency as a key stimulant of the level of development is indicated (and this view is dominant) [Evans and Harding 1997]; in the other approach, it is not negated that this development determines efficiency [Fried and Rabinovitz 1980].

The main objective of this analysis has been to assess the relationship between the level of local development and the institutional efficiency of local self-governments and *vice versa*, in a regional approach (NUTS 2). The results presented in this paper come from a larger study accomplished within the project

titled *Institutional efficiency* versus *local economic development – shaping factors and interactions*[1].

MATERIAL AND METHODS

The research aim, such as diagnosing the relationship between institutional efficiency and the level of development of the local governments in Poland, was achieved in three steps. The first step was to identify the level of development and institutional efficiency of municipalities, using two aggregate measures to this end, i.e. the efficiency measure (*EFF*) and the development one (*DEV*). The measure of *EFF* was calculated as a sum of weighted partial measures EFF_1–EFF_5, determined for basic fields of activity of municipal governments, i.e. economic and social (EFF_1) (weight 0.25), financial (EFF_2) (weight 0.25), administrative (EFF_3) (weight 0.15), management of the human resources in the local administration offices (EFF_4) (weight 0.20) and provision of social, cultural and educational services (EFF_5) (weight 0.15). The weights for these sub-areas of efficiency were determined during interviews with experts, such as representatives of municipal offices, business environment institutions and entrepreneurs. The partial measures EFF_1–EFF_5, as well as the *DEV* measure, are averaged of normalised values of different variables, which are a combination of raw data (obtained from surveys) and secondary data (from the Local Data Bank)[2]. The survey was conducted at the turn of 2015 and 2016, and the questionnaire was mailed to representatives of local authorities of all Polish municipalities. Complete and correctly filled in questionnaires were returned by 1,220 respondents, which means that the return coefficient reached 49.2% (an error of response in the sample thus obtained was 0.02) – Table 1. In order to verify whether the distribution of municipalities achieved in the study differed from the one present in the whole population (in regional approach) a χ^2 test was applied. In each case, the result was statistically non-significant ($P > 0.1$), which indicated a lack of significant differences between the observed distribution (in the sample) and expected distribution (present in the population).

Prior to the actual calculations, the collected data had been tested for discriminatory properties and mutual correlations, in addition to which they were transformed accordingly. The purpose was manifold, namely: to exclude from the set the so-called quasi-constant variables and traits that were too strongly correlated with each other; to conduct stimulation of negative traits (the so-called destimulants), and to bring the features down to mutual comparability through their normalisation.

Table 1. Structure of the research sample (regional outlook)

Voivodship	Return		Voivodship	Return	
	Number	%		Number	%
Dolnośląskie	80	47.34	Podkarpackie	85	53.13
Kujawsko-Pomorskie	74	51.39	Podlaskie	62	52.54
Lubelskie	102	47.89	Pomorskie	58	47.15
Lubuskie	40	48.19	Śląskie	87	52.10
Łódzkie	86	48.59	Świętokrzyskie	51	50.00
Małopolskie	104	57.14	Warmińsko-Mazurskie	61	52.59
Mazowieckie	135	42.99	Wielkopolskie	110	48.67
Opolskie	35	49.30	Zachodniopomorskie	50	43.86

Source: Own studies.

[1] Project was financed from the funds of the National Centre of Science according to decision DEC-2013/09/B/HS4/03039.

[2] A detailed list of indicators describing institutional efficiency of local governments as well as the development of local governments are presented in the annex.

In the subsequent steps of the analysis, the relationships between the *EFF* and *DEV* aggregate measures were determined, which allowed us to identify the relations between institutional efficiency and the level of development of the municipalities participating in the research. Two methods were employed at this stage[3], so-called Pearson's correlation coefficient[4] (for preliminary identification of the relationship) and linear regression analyses (for a more detailed diagnosis). During the econometric modelling, two options were tested, i.e. the influence of efficiency (an independent variable) on the development of municipalities (a dependent variable), and next the influence of development (an independent variable) on the efficiency of municipalities (a dependent variable).

RESULTS AND DISCUSSION

The research results suggest that local governments in Poland were characterised by quite an unfavourable condition, in terms of both institutional efficiency and the level of development. In both cases, the mean value of the synthetic measure, which aggregated various data pertaining to the analysed municipalities, reached no more than 30% of the maximum attainable score, with *EFF* equal 0.301, and *DEV* just 0.295, on average.

Having averaged the results achieved by local governments from individual Voivodships, it became evident that the highest institutional efficiency (*EFF* = = 0.330) was obtained by local governments from the Dolnośląskie Voivodship while the lowest score (*EFF* = = 0.274) was assigned to the Podlaskie Voivodship. In the former case, the high result was owed to the minimum value being the highest among the whole analysed group ($\min_{EFF}$ = 0.208), as well as a relatively high maximum value ($\max_{EFF}$ = 0.507) (Fig. 1), and one of the lowest dispersion values (191.13%). Moreover, this region was distinguished by the highest percentage of municipalities with the highest institutional efficiency level[5] (25.0%) and the lowest percentage of municipalities in class III (6.25%). Meanwhile, the relatively low share of the municipalities with the highest achievement of the *EFF* measure (6.45%) in the Podlaskie Voivodship was accompanied by the highest, in the whole sample, percentage of municipalities with low values of the synthetic variable (30.65%). The region was also characterised by a low value of the range (0.251 – fourth lowest value) and standard deviation (0.056 – third lowest result).

Other distinguishing regions include the Łódzkie Voivodship, mainly because of the length of range it achieved (Fig. 1). The value of this statistical measure was 0.453, i.e. nearly twice as much as the lowest result (0.230), which was noted in the Kujawsko-Pomorskie Voivodship. Consequently, the former region also had the highest standard deviation (0.070) and coefficient of variability (23.956).

In the second analysed area, i.e. level of development of local governments, the Śląskie voivodship took the leading position (*DEV* = 0.330), while among the regions whose average values of this synthetic measure exceeded the country's average there were Voivodships of: Zachodniopomorskie (0.328), Dolnośląskie (0.320), Pomorskie (0.320), Wielkopolskie (0.318), Lubuskie (0.312), and Opolskie (0.309) – Figure 2. Surprisingly, the Mazowieckie Voivodship scored low, as its average *DEV* equal 0.276 gave it the third lowest position in the country[6]. At the same time, this province was distinguished by the

[3] Calculations were run in Statistica 13.

[4] The analysis took into account the significance test of Pearson's linear correlation coefficient.

[5] Due to the multitude of data harvested at the onset of the study, from 1,220 municipalities, the research sample was divided into three separate sets, distinguished by different intensity of the efficiency factor (*EFF*). Group I included municipalities with the highest values of the synthetic measure, i.e. ones for which the *EFF* was within $\langle \bar{x} + SD, \max \rangle$, i.e. (0.36; 0.62⟩. Group II was composed of municipalities which met the condition: $EFF \in \langle \bar{x} - SD, \bar{x} + SD \rangle$, i.e. ⟨0.24; 0.36⟩ – these entities were treated as municipalities with a moderate level of efficiency. Group III contained municipalities with the lowest *EFF* values, that is the ones within the range $\langle \min, \bar{x} - SD \rangle$, i.e. ⟨0.15; 0.24).

[6] The biggest city (Warsaw) in Masovia did not participate in the study.

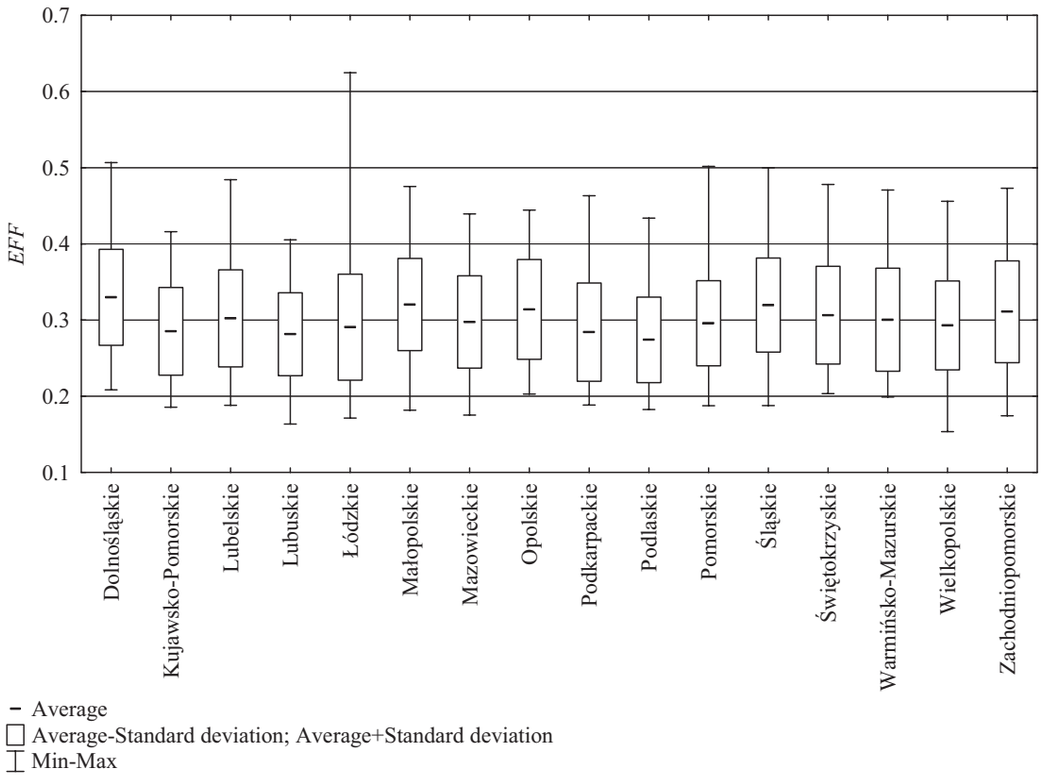

Fig. 1. Distribution of the efficiency index factor (*EFF*) according to the Polish Voivodships

Source: Own studies.

highest variability of the synthetic measure of development (v_k) (19.939), and therefore a relatively high range (R) (0.275). A similar degree of variation was noted in the Łódzkie Voivodship (v_k = 19.075, R = = 0.422) and in Zachodniopomorskie Voivodship (v_k = 19.484, R = 0.305). The most 'stable' one proved to be Opolskie Voivodship, where the variability of *DEV* was 106.96%, and the difference between the maximum and minimum values equalled 0.128. This region was also characterised by the highest percentage of municipalities with moderate development[7] (88.57%) and an absence of administrative division units falling into the group with the lowest achievements of the variable *DEV*. Zachodniopomorskie Voivodship was found to be in a similar situation, as the percentages of municipalities within classes I and II were, respectively, 30.00 and 70.0%. Additionally, the group of Voivodships in which the share of most developed municipalities exceeded 0.25 comprised the Voivodships of: Śląskie (36.78%), Dolnośląskie (31.25%), Pomorskie (31.03%) and Lubuskie (25.00%). Voivodships with a considerable

[7] In order to simplify the analysis, the set of 1,220 municipalities was divided into three separate sets, by analogy to the solution applied in the analysis of the *EFF* factor. Group I contained the most developed municipalities, i.e. the ones whose *DEV* values were within $(\bar{x} + SD, \max\rangle$, i.e. (0.35; 0.64⟩. Group II was composed of municipalities which satisfied the condition: $DEV \in \langle \bar{x} - SD, \bar{x} + SD\rangle$, i.e. ⟨0.25; 0.35⟩ – they were treated as moderately developed entities. Group III included the least developed municipalities, with the *DEV* values within the range $\langle \min, \bar{x} - SD)$, i.e. ⟨0.17; 0.25).

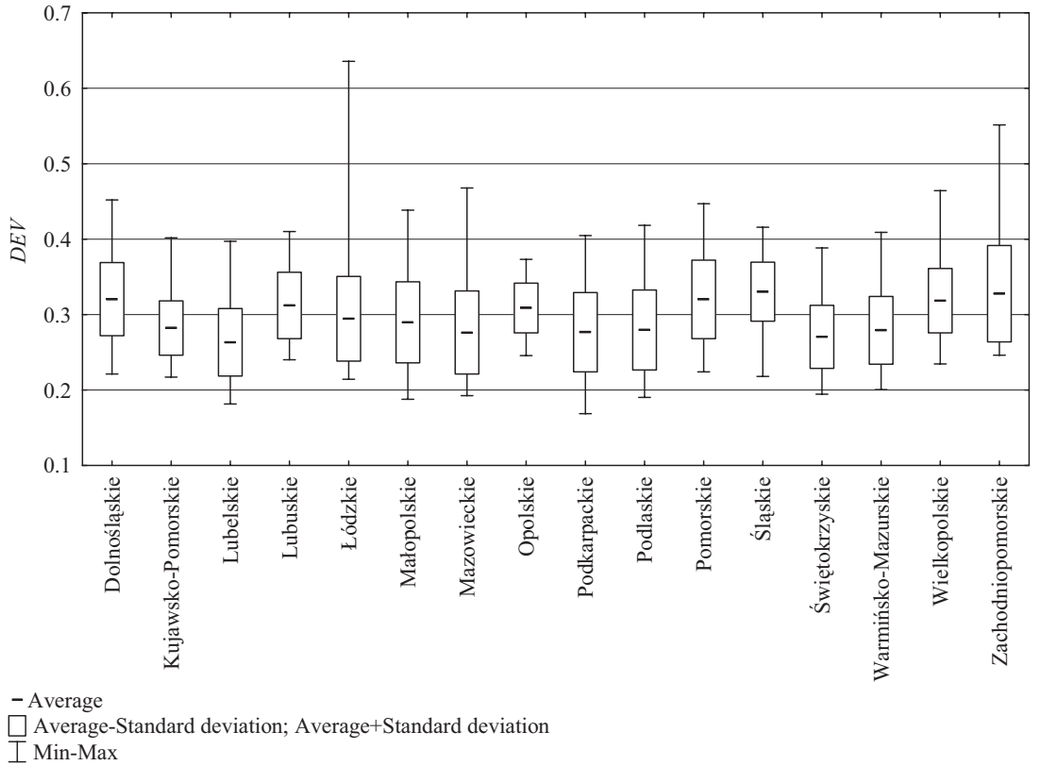

Fig. 2. Distribution of the development factor (*DEV*) according to the Polish Voivodships

Source: Own studies.

share of municipalities with low values of the *DEV*, i.e. Lubelskie (35.29%), Mazowieckie (28.89%) and Świętokrzyskie (27.45%), were at the other extreme.

Our comparison of the values of *EFF* and *DEV* measures in particular provinces enabled us to identify three patterns in their mutual relations[8]:

– Relatively high values of the efficiency factor were accompanied by relatively low values of the development factor (the difference between the *EFF* and *DEV* was within 0.021 and 0.039);
– Both measures assumed similar values and the difference between them was close to zero (ranging between –0.006 and 0.009);
– the level of efficiency was much higher than the level of development, and results of our comparative analyses were within the range of –0.011–0.031.

The first situation occurred in five Voivodships, including Lubelskie, Świętokrzyskie, Małopolskie, Mazowieckie and Warmińsko-Mazurskie, the second one was found in six Voivodships, i.e. Dolnośląskie, Podkarpackie, Opolskie, Kujawsko-Pomorskie, Łódzkie and Podlaskie, while the third one appeared in the remaining five Voivodships, i.e. Śląskie, Zachodniopomorskie, Pomorskie, Wielkopolskie and Lubuskie. These results suggested the presence of correlations and encouraged us to make a deeper analysis of the mutual relation-

[8] To divide the results obtained from our comparison of the *EFF* and *DEV* values, a procedure relying on the range size and *k* parameter, developed by Kukuła [2015] was applied.

ships. To this end, the Pearson's correlation coefficients and econometric modelling were employed.

Statistically significant correlations were determined for nearly all Voivodships except Kujawsko-Pomorskie, Małopolskie and Opolskie. For the other Polish Voivodships, the correlation coefficient ranged from 0.240 (in Mazowieckie Voivodship) to 0.601 (in Łódzkie Voivodship) – Table 2.

Positive values of the correlation coefficients indicated directly proportional changes in both measures, which meant that an increase in the *EFF* was paralleled by an increase in the *DEV* and *vice versa*. The diagnosed relation could be investigated more specifically through an analysis of regression. Detailed results of this procedure are set in Tables 3–4.

Table 2. r-Pearson correlation coefficient

Voivodship	r-Pearson	Voivodship	r-Pearson
Dolnośląskie	0.375[a]	Podkarpackie	0.459[a]
Kujawsko-Pomorskie	0.224	Podlaskie	0.385[a]
Lubelskie	0.264[a]	Pomorskie	0.395[a]
Lubuskie	0.444[a]	Śląskie	0.380[a]
Łódzkie	0.601[a]	Świętokrzyskie	0.446[a]
Małopolskie	0,158	Warmińsko-Mazurskie	0.536[a]
Mazowieckie	0.240[a]	Wielkopolskie	0.441[a]
Opolskie	0,325	Zachodniopomorskie	0.473[a]

a – denote the significance of a given parameter at a level of significance equal 0.01.

Source: Own studies.

Table 3. Results of estimation of the development index versus the efficiency index models for individual provinces in Poland

Voivodship	F	β_0	t	β_1	t	R^2	S_ξ
Dolnośląskie	12.75[a]	0.225	8.32[a]	0.288	3.57[a]	0.141	0.045
Kujawsko-Pomorskie	3.80[b]	0.242	11.59[a]	0.140	1.95[b]	0.050	0.035
Lubelskie	47.52[a]	0.207	9.90[a]	0.186	2.74[a]	0.070	0.043
Lubuskie	7.48[a]	0.211	6.26[a]	0.360	3.05[a]	0.197	0.040
Łódzkie	9.32[a]	0.154	7.30[a]	0.485	6.89[a]	0.361	0.045
Małopolskie	2.61	–	–	–	–	–	–
Mazowieckie	8.16[a]	0.211	9.08[a]	0.219	2.86[a]	0.058	0.054
Opolskie	3.9[b]	0.257	9.66[a]	0.164	1.97[b]	0.106	0.032
Podkarpackie	22.11[a]	0.171	7.37[a]	0.373	4.70[a]	0.210	0.047
Podlaskie	10.43[a]	0.180	5.71[a]	0.364	3.23[a]	0.148	0.049
Pomorskie	10.36[a]	0.211	6.15[a]	0.367	3.22[a]	0.156	0.048
Śląskie	14.34[a]	0.253	12.24[a]	0.241	3.79[a]	0.144	0.036
Świętokrzyskie	12.18[a]	0.181	6.97[a]	0.290	3.49[a]	0.199	0.038
Warmińsko-Mazurskie	23.73[a]	0.172	7.64[a]	0.356	4.87[a]	0.287	0.038
Wielkopolskie	26.15[a]	0.224	11.91[a]	0.322	5.11[a]	0.195	0.038
Zachodniopomorskie	13.8[a]	0.187	4.85[a]	0.451	3.71[a]	0.223	0.057

R^2 – determination coefficient, S_ξ – standard deviations of residuals.

a, b – denote the significance of a given parameter at a level of significance equal 0.01 and 0.1, respectively.

Source: Own studies.

Table 4. Results of estimation of the development index versus the efficiency index models for individual provinces in Poland

Voivodship	F	β_0	t	β_1	t	R^2	S_ξ
Dolnośląskie	12.75[a]	0.174	3.92[a]	0.488	3.57[a]	0.141	0.059
Kujawsko-Pomorskie	3.80[c]	0.184	3.53[a]	0.358	1.95[c]	0.050	0.056
Lubelskie	7.48[a]	0.203	5.55[a]	0.375	2.74[a]	0.070	0.062
Lubuskie	9.32[a]	0.110	1.95[c]	0.548	3.05[a]	0.197	0.049
Łódzkie	47.52[a]	0.071	2.20[b]	0.745	6.89[a]	0.361	0.056
Małopolskie	2.61	–	–	–	–	–	–
Mazowieckie	8.16[a]	0.225	8.61[a]	0.264	2.86[a]	0.058	0.059
Opolskie	3.90[c]	0.115	1.14	0.644	1.97[c]	0.106	0.063
Podkarpackie	22.11[a]	0.128	3.80[a]	0.564	4.70[a]	0.210	0.058
Podlaskie	10.43[a]	0.160	4.47[a]	0.407	3.23[a]	0.148	0.052
Pomorskie	10.36[a]	0.160	3.73[a]	0.425	3.22[a]	0.156	0.052
Śląskie	14.34[a]	0.122	2.31[b]	0.600	3.79[a]	0.144	0.057
Świętokrzyskie	12.18[a]	0.121	2.25[b]	0.685	3.49[a]	0.199	0.058
Warmińsko-Mazurskie	23.73[a]	0.076	1.62	0.805	4.87[a]	0.287	0.058
Wielkopolskie	26.15[a]	0.100	2.64[a]	0.605	5.11[a]	0.195	0.053
Zachodniopomorskie	13.80[a]	0.149	3.35[a]	0.495	3.71[a]	0.223	0.060

R^2 – determination coefficient, S_ξ – standard deviations of residuals.

a, b, c – denote the significance of a given parameter at a level of significance equal 0.01, 0.05 and 0.1, respectively.

Source: Own studies.

Estimated values of the regression coefficient of the models for all Polish Voivodships (except Małopolskie) were positive and statistically significant, mostly at p equal 0.01. This implicated a significant dependence between the measures of development and efficiency in such territorial division units as Voivodship in Poland. The greatest change in the development index caused by a unit increase in efficiency was observed in Łódzkie Voivodship (0.485), followed by Zachodniopomorskie Voivodship (0.451), while the lowest one was noted in Kujawsko-Pomorskie Voivodship (0.140). In contrast, the strongest positive and statistically significant impact on institutional efficiency was observed in the Voivodships of Warmińsko-Mazurskie (0.805) and Łódzkie (0.745). The smallest gain in the efficiency index induced by a unit increase in the development index was observed in Mazowieckie Voivodship (0.264).

Comparison of the regression coefficients β_1 for both models showed that in all these regions where we were able to match the model to the data an increase in *DEV* by one unit stimulated a higher increase in the *EFF* measure than it happened otherwise – the greatest difference occurred in Opolskie Voivodship (0.480), whereas the lowest one was in the Podlaskie Voivodship (0.043). It should be underlined that the models explained the variability of the development and efficiency factors on a significant *albeit* low level, i.e. the coefficient of determination (R^2) ranged from 5.0% in Kujawsko-Pomorskie Voivodship up to 36.13% in Łódzkie Voivodship.

The research results (including the outcome of the correlation and regression analysis) show unambiguously that there are relations between the level of local development and the institutional efficiency in the municipalities which participated in this study.

CONCLUSIONS

Two main views on the interactions between economic development and institutional efficiency can be found in the literature. On the one hand, the importance of efficiency as a key stimulant of the level of development is indicated (and this view is dominant); on the other hand, it is not negated that development determines efficiency. With this duality borne in mind, the authors planned this study in order to verify the relationship between institutional efficiency and development of municipalities. First, the level of institutional efficiency was determined, to which aim two aggregate measures were employed. This part of our analysis showed that the group of 1,220 municipalities which took part in the study was characterised by relatively low institutional efficiency (*EFF* = 0.330), or the level of development (*DEV* = 0.295). The next step was to identify the type, direction and intensity of the dependences between the *EFF* and *DEV* measures. This part of the research showed moderate, positive correlation between the analysed parameters. The Pearson's correlation coefficient for the whole sample was 0.365, reaching the highest value in Łódzkie Voivodship, but falling to its the lowest in Mazowieckie Voivodship (0.240). Then, the regression analysis was used which allowed to specify the intensity of the relationship. It turned out that a unit increase in the *DEV* stimulated a higher increase in the value of the *EFF* than *vice versa*. Comparison of the results obtained for the two regression equations (which was made possible owing to the normalisation of input data) showed that the impact of developmental processes on the improvement of efficiency of local governments was bigger that the influence of improved efficiency on developmental processes occurring in the analysed municipalities.

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ANNEX

Indicators describing institutional efficiency of local governments

Area of efficiency	No of an indicator	Name of an indicator	Character of an indicator
Economic and spatial	x_1	averaged (over the years 2007–2013) number of foundations, associations and social organisations per 10 thous. residents	S
	x_2	averaged (over 2009–2013) percentage of the municipality's geodesic area covered with spatial management plans	S
	x_3	sum of points scored in the survey for questions about: application of business support instruments, entrepreneurship, collaboration of the local government with entrepreneurs, collaboration of the local government with institutions, efforts to improve infrastructure, efforts to improve spatial management	S
Financial	x_4	averaged (over the years 2007–2013) value of the municipality's public debt	D
	x_5	averaged (over 2007–2013) value of the municipal budget result	S
	x_6	averaged (over 2007–2013) contribution of funds acquired from the EU budget in the municipal budget total revenue	S
	x_7	sum of points scored in the survey for questions about actions whose aim is to rationalise the management of finances (including the management of the debt) and contribution of the local community to the planning of investments financed from the municipal budget	S
Administrative	x_8	averaged (over the years 2006–2014) participation in elections of local authorities	S
	x_9	averaged (over 2007–2013) worth of expenditure into public administration in the municipality	S
	x_{10}	averaged (over 2007–2013) number of recall elections (to recall a council or a mayor)	S
	x_{11}	averaged (over 2007–2013) percentage of councilors with higher education	S
	x_{12}	sum of points scored in the survey for questions regarding the organisation and improvement of service provision (including collaboration with other units and institutions), improvement of the organisational structure of the municipal office, expenses on public administration	S
HR management in the municipal office	x_{13}	sum of points scored in the survey for questions regarding: raising qualifications and skills of employees at the municipal office, rational HR policy, efforts to improve communication between employees so as to better the efficiency of services provided	S
Provision of social, cultural and educational services	x_{14}	averaged (over the years 2007–2013) worth of the expenses from the municipal budget into physical culture and sports per capita	S
	x_{15}	averaged (over 2007–2013) worth of expenses from the municipal budget into education and dissemination of knowledge per capita	S
	x_{16}	averaged (over 2007–2013) number of places in nursery schools in relation to the number of children aged 3–6 years	S
	x_{17}	averaged (over 2007–2013) number of places in creches per 100 children aged 0–2 years	S
	x_{18}	averaged (over 2007–2013) worth of expenses from the municipal budget into health care expressed per capita	S
	x_{19}	averaged (over 2007–2013) worth of expenses from the municipal budget into social welfare and policy per capita	S
	x_{20}	sum of points scored in the survey for questions regarding the scope and quality of obligatory and elective services	S

S – stimulant; *D* – destimulant.

Source: Own elaboration.

Indicators describing the development of local governments

Area of development	No of an indicator	Name of an indicator	Character of an indicator
Municipality's financial management	y_1	averaged (over the years 2007–2013) value of the municipal budget's revenue from income taxes from physical persons calculated per 1 resident	S
	y_2	averaged (over 2007–2013) share of own revenue in total budget of municipalities	S
	y_3	averaged (over 2007–2013) worth of own revenue in the municipal budget per capita	S
	y_4	averaged (over 2007–2013) worth of development expenditure from the municipal budget per capita	S
	y_5	averaged (over 2007–2013) share of development expenditure in total expenditure from the municipal budget	S
Infrastructural demand	y_6	averaged (over the years 2007–2013) percentage of the population with access to sewers	S
	y_7	averaged (over 2007–2013) percentage of the population with access to waterworks	S
Entrepreneurship	y_8	averaged (over the years 2007–2013) number of physical persons who run buisness enterprises per 100 working age residents	S
	y_9	averaged (over 2007–2013) number of the national economy enterprises per 1,000 residents	S
	y_{10}	averaged (over 2009–2013) value of the ratio of the new registered businesses to businesses deleted from the state REGON system, per 10,000 residents	S
Situation on labour market	y_{11}	averaged (over the years 2007–2013) share of unemployed persons in the total number of working age population	D
	y_{12}	averaged (over 2007–2013) share of persons working in the total working age population	S
Socio-demographic issues	y_{13}	averaged (over the years 2007–2013) number of postworking age persons per 100 working age persons	D
	y_{14}	averaged (over 2007–2013) value of the internal migration balance in the municipality	S
	y_{15}	averaged (over 2007–2013) value of the balance of foreign migrations in the municipality	S

S – stimulant; *D* – destimulant.

Source: Own elaboration.

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SPRAWNOŚĆ INSTYTUCJONALNA A POZIOM ROZWOJU SAMORZĄDÓW LOKALNYCH (STUDIUM NA POZIOMIE UKŁADU REGIONALNEGO)

STRESZCZENIE

Ze względu na coraz większą złożoność rzeczywistości społeczno-gospodarczej wzrasta znaczenie władz samorządowych w zakresie zarządzania lub koordynowania zjawisk i procesów zachodzących w społecznościach lokalnych. Mając na uwadze, że podstawowa rola władz lokalnych to stymulowanie wzrostu i rozwoju danego układu lokalnego przeprowadzono analizę, której celem była ocena zależności między poziomem rozwoju lokalnego a sprawnością instytucjonalną samorządów lokalnych i *vice versa*, w ujęciu regionalnym (NUTS 2). Do jego realizacji wykorzystano dane mieszane, tj. pierwotne (pozyskane w ramach badań ankietowych od 1220 gmin) oraz wtórne (pochodzące z zasobów Banku Danych Lokalnych). Sprawność samorządów lokalnych została zmierzona za pomocą miary agregatowej *EFF*, a do określenia poziomu rozwoju wykorzystano miarę *DEV*. Z badań wynika, że w samorządach panowała niekorzystna sytuacja zarówno pod względem sprawności, jak i rozwoju. W obu przypadkach średnia wartość miary syntetycznej osiągnęła wartość stanowiącą jedynie 30% maksymalnie możliwej do osiągnięcia noty. Podstawowym narzędziem realizacji celu badawczego była analiza korelacji i regresji. Obie procedury wykazały istnienie związku między analizowanymi kategoriami (r = 0,365). Ponadto regresja wykazała, że siła oddziaływania procesów rozwojowych na poprawę sprawności samorządów lokalnych była intensywniejsza od siły wpływu sprawności funkcjonowania na procesy rozwojowe zachodzące w badanych gminach.

Słowa kluczowe: miary syntetyczne, sprawność instytucjonalna gminy, rozwój lokalny, analiza regresji, korelacja Pearsona

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GOOD FOOD PRINT – THE CONCEPT OF AN IT SYSTEM TRACKING THE LEVEL OF GOOD PRACTICES USED IN ORGANIC FOOD PRODUCTION PROCESS AND IN ITS SUPPLY CHAIN

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ABSTRACT

The aim of the paper is to present and pre-test the method being a modification of the composite measure based on calculating the weighted average value of features corresponding to the degree of various good practices in organic farming. The value calculated by the proposed method is a postulated basis for the operation of an IT system which would enable consumers to follow the production, certification and supply chain processes related to organic food products. The system also allows the manufacturers to choose good sub-suppliers more easily and incline them to achieve perfection at every stage of production. In the paper, the function constituting the main element of the system's algorithm was tested and modified, and the other postulated functions were described.

Key words: quality, transparency, supply chain, aggregate measures, Internet of things, IT system, registers

INTRODUCTION

According to the definition taken from the law of the European Union [Council Regulation (EC) No 834/2007], organic production "is an overall system of farm management and food production that combines best environmental practices (…) and a production method in line with the preference of certain consumers for products produced using natural substances and processes". Thus, in the basic legal act, in addition to the obligation to meet environmental standards and the use of best practices, it is emphasized that organic farming is a response to the specific demand of conscious consumers. The trust seems to be very important, for the producers and the whole supply chain. Customers want to be certain that the food product is actually produced at the best known practices, minimising the negative impacts of the polluted environment and chemical additives that in the long term can have an extremely destructive impact on the health of consumers [Hamzaoui-Essoussi and Zahaf 2012]. The building of trust is provided by a legally established certification system, which monitors producers on a regular basis in the form of periodical inspections ensuring that all activities are compliant with the standards. However, building the next stages of the information society [Bell 1973], we face a new type of customer, often referred to "customer 2.0", which has a number of new features [Gaudin 2011]. It is characterized by a great need to collect comprehensive information about the product, the ability to perform comparisons of product offers, viewing rankings and ratings and a need to use information and mobile tools for this purpose. Another important phenomenon is the constant increase in the scale of organic food production in Poland (Fig. 1) and the European Union. Many producers see their chance

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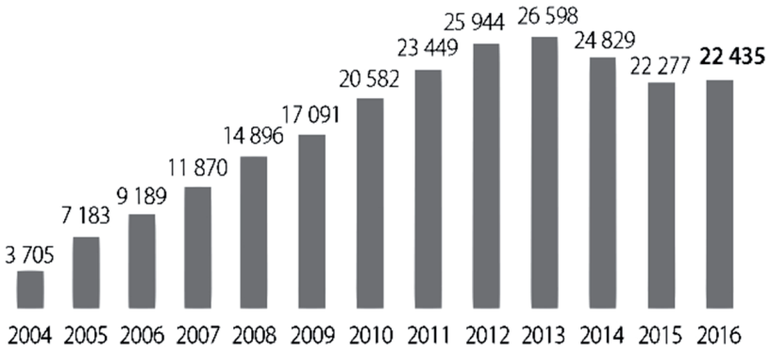

Fig. 1. Number of bio-food producers in Poland in years 2004–2016

Source: Zdrojewska [2017].

in being "eco". The number of agricultural entities conducting organic production in Poland has grown several times over the last several years [Zdrojewska 2017].

At the same time, the development in the following years clearly fluctuates due to the specificity of this production (e.g. the need for crop rotation, avoidance of chemical substances), problems with environmental pollution and supply chain, which makes the production process difficult to maintain for some entities. In addition, according to press reports, from time to time we are witnessing scandals related to abuses within the extended supply chains in the process of organic food production, most often involving into the production cycle ingredients, that do not meet standards despite having the appropriate certificate [Kelly 2017]. In connection with the above-mentioned phenomena, it is postulated to create an IT tool enabling consumers to assess the quality of a particular product based on the degree of good practices measure for the production process by the manufacturer and its suppliers. The Good Food Print system would be a mobile application that would disclose information for a selected product and also calculate a point score (meter) showing the manufacturer's and supplier's propensity to provide information related to the production and delivery process. The main purpose of this study is to present a method that is a modification of the composite measure. It includes calculating the weighted average value of features corresponding to the degree of various good practices application for organic farming. The initial testing of the method behaviour after the introduction of sample data is also described. Also the overall method of the system operation will be presented and described.

RESEARCH METHOD

The essence of system operation is the method being a modification and the specific application of composite measure. The weighted average values of certain characteristics are calculated. They answer the question: to what extent, in the given production element throughout the supply chain, various good practices related to organic food were applied. The main assumption is to provide customers with a transparent and honest system, supplementary to the quality validation certificates and compliance with the best practices of organic production. On the other hand, it enables us to provide manufacturers with a tool that makes it easier to choose good sub-suppliers and to encourage them to achieve perfection at every stage of production. The natural, expected feature of the system will be the promotion of growth of all "eco market" entities, which are characterized by reliability, honesty and transparency. These values will allow consumers to increase trust in entities and products, make optimal choices and promote their best purchasing decisions. The added value for producers (in the case of implementing the system as an IT tool) will be functionalities allowing to keep registers required by the certification rules, necessary for proper management and external control of production

processes. In the course of the direct interview with employees of the Agro-Bio-Test certification body, it was established that currently there are no dedicated solutions to keep such obligatory registers and the producers use Excel or keep them on sheets of paper by hand. The registers will also be a source of data for the system, ensuring its proper reliability and completeness. The system, thanks to the algorithm used, remains extremely open and egalitarian. According to the spirit of ecological production, it does not promote large-scale production in any way. On the contrary, it seems that the best results can be achieved by producers who prefer quality over production volume. In addition, the postulated system will complementary to the system of certificates by deriving the value of the indicator for a specific product, not as in the case of certificates, for the producer.

The indicator (meter) is most often understood as a number expressing the level of a given phenomenon. The most important feature of the indicator is the comparability of its value, allowing to determine the position of a given object compared to other objects [Rogala and Rycharski 2006]. In this case, it will be the product's position against the others as a function of production and supply chain characteristics. It is therefore a function of several features, also called diagnostic variables. There is a multiplicity of attributes (many different features of organic production) so we can define the meter as synthetic, aggregate or composite. The postulated and described features affecting the index can be included in the set of stimulants, the higher value of which indicates a higher level of the phenomenon (object) and thus works in a way that stimulates development [Kompa 2009]. The selection of diagnostic variables and determination of their impact on the object was carried out as follows: the set of products was limited to the area of crop production. Two most important features have been distinguished for the area: fertilization and plant protection. They were established on the basis of the analysis of procedures during the interview with employees of the Agro-Bio-Test certification body.

On the basis of the proposed contractual measure with three levels: 10, 40 and 100, the possible values of qualitative features were defined. The use of the same scale for different features solves the problem of normalization, that is, reducing them to comparability [Zeliaś 2000]. In the future, if it is necessary to apply a greater number of quality features, it is proposed to create a geometrical sequence determining the next values of the feature. The use of a geometric sequence will provide the appropriate motivation to improve production parameters and achieve a clear increase in the score. If the function is used for other types of production, it is also allowed to use other values of features to which the postulated quality scale will not apply. The normalization problem should in this case be solved by the formula dividing the feature value by the base value. In the case of a stimulant, the base value would be considered as assumed maximum value and for the destimulator, minimum value. The index value is based on the following formula:

$$Gfp = \frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k} \cdot \frac{\sum_{i=1}^{l} Gfp(d)_i}{\sum_{i=1}^{l} Gfp(d)_i + Z \cdot l^2}, \quad l > 0 \tag{1}$$

and

$$Gfp = \frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k}, \quad l = 0 \tag{2}$$

where: Gfp – Good Food Print indicator adopting values from the minimum value (greater than zero) to one. The indicator determines the degree of good practices application in the production process and in the supply chain for a specific organic product at a specific producer;
a_i – weight of the the i-feature (value range 0 – 1);
V_i – the value of the i-feature;
Vb_i – reference value (maximum) of the i-feature;
k – number of features;
$Gfp(d)_i$ – value of i-Gfp index for i-supplier product;
Z – "damping" factor;
l – number of suppliers.

For $l > 0$ the presented pattern can be compared to the asymptotic function of Törnquist I:

$$Y \frac{aX}{X+\beta}, \quad \alpha, \beta > 0 \tag{3}$$

where:

$$\alpha = \frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k} \tag{4}$$

$$\beta = Z \cdot l^2 \tag{5}$$

$$Y = Gfp \tag{6}$$

$$X = \sum_{i=1}^{l} Gfp(d)_i \tag{7}$$

It means that, the value of *Gfp* for $l > 0$ tends asymptotically to *Gfp* for $l = 0$ (no suppliers) depending on the value of *X*, i.e. the sum of *Gfp* indicators of the products of these suppliers. The speed of pursuit of the α value will be regulated by the number of suppliers (the more, the slower with geometric progression). The presented method is also based on the values of *Vi* features measured by the IT system based on collected data from the set established for a given type of food production. It is postulated to introduce values for individual qualitative features, which add up to one hundred in the manner justified above in this study.

TESTING OF THE MODEL

For crop cultivation characteristic $V_{(n)}$ "fertilization" – the first level takes the value of 10 and it is obtained for disclosing the certificate number and declaring the keeping of fertilization register (RNU) which is mandatory in the light of the certification rules. The second level and another 30 points are obtained when the producer keeps the RNU (Fig. 2) in the proposed IT system and the content of entries regarding treatments on the crop is disclosed to the public.

The third level and a further 60 points are given to the farm for additional disclosure of the type of fertilizer used, and confirmation by the system that all fertilization operations are carried out using authorized means for organic farming in accordance with the approval set provided by the Crop Fertilization Institute and Soil Science in Puławy (IUNG-PIB). The system confirms this compliance automatically on the basis of the data from the RNU register, and the certification body in addition through soil testing. The third level is also achieved when all fertilization activities are declared as fertilization with own resources. The value of the $V_{(n)}$ feature is therefore 100 when reaching the third level and 40 while the second level, for first it is 10.

In a similar way, the postulated system will verify the value of further features for a given type of crop. For simplicity, let us assume that this is just one more feature of $V_{(o)}$ – plant protection. Let us conduct a simple simulation. We will add the values of features and suppliers' products *Gfp* for hypothetical production. To simplify, the weight of the features we will assume as one and the *Z*-factor will be set at 0.01. The determination of this coefficient will ultimately depend on the conducted research including mass data from farms, thanks to which the optimum value most accurately reflecting the reality will be determined. The simulation used some of the data recorded by Agro-Bio-Test.

Other data entered into the formula: $V_1 = 40$; $V_2 = 10$, which means the first level for the second feature and second for the first one. Next: $Vb_i = 100$; $k = 2$; $Gfp(d)_1 = 0.1$; $Gfp(d)_2 = 0.25$ and $L = 2$. We have two suppliers with relatively low *Gfp*:

$$Gfp = \frac{\frac{40}{100} + \frac{10}{100}}{2} \cdot \frac{0.1 + 0.25}{0.1 + 0.25 + 0.01 \cdot 2^2} \tag{8}$$

So: $\alpha = 0.25$; $\beta = 0.04$; $x = 0.35$ and $y = Gfp = 0.22$.

Date	Parcel	Area (ha)	Plant	Type of fertilizer	Amount of fert.	Own / purchased	Supplier / remarks
<date>	<parcel>	<area>	<plant>	<fertilizer>	<am>	<own-pur>	<supp>

Fig. 2. Example RNU register

Source: Own preparation based on www.agrobiotest.pl

We will now change the quality of suppliers with constant remaining parameters (Table 1), for one supplier (Table 2) and for three suppliers (Table 3).

Table 1. Suppliers quality changes

Parameter	Two suppliers of lower quality than the producer	Two suppliers of the same quality as the producer	Two suppliers of the highest quality
α	0.25	0.25	0.25
β	0.04	0.04	0.04
x	0.35	0.50	2.00
y	0.224	0.231	0.245

Source: Own preparation for one supplier.

Table 2. Supplier quality changes

Parameter	Supplier of lower quality than the producer	Supplier of the same quality as the producer	Supplier of the highest quality
α	0.25	0.25	0.25
β	0.01	0.01	0.01
x	0.10	0.25	1.00
y	0.227	0.240	0.247

Source: Own preparation and for three suppliers.

Table 3. Three suppliers quality changes

Parameter	Three suppliers of lower quality than the producer	Three suppliers of the same quality as the producer	Three suppliers of the highest quality
α	0.25	0.25	0.25
β	0.09	0.09	0.09
x	0.45	0.75	3.00
y	0.208	0.223	0.242

Source: Own preparation.

In our case, the value of *Gfp* tends asymptotically to α, which means that the producer with sub-suppliers will never reach the value of the *Gfp* index for the zero number of suppliers:

$$Gfp = \frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k} \tag{9}$$

We also see that the increasing number of suppliers reduces the "pursuit" speed of the asymptote. The assumption that sub-suppliers "pull" *Gfp* down, especially when there are more of them, and when themselves have lower indexes seems to be right (Fig. 3). The more suppliers and the lower their quality, the greater chance is that a product of organic farming will not be good enough [Hamzaoui-Essoussi and Zahaf 2012]. However, lowering *Gfp* also for one supplier with the same or higher *Gfp* seems to be a formula behaviour that does not fully reflect the reality. For such a situation, the distance of the *Gfp* value from the value of *Gfp* for no suppliers is about 0.01. If, therefore, we increase α by this amount, while ensuring that it never exceeds one:

$$Gfp = \left\{\frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k} + \left(\frac{1-\alpha}{100}\right)\right\} \cdot \frac{\sum_{i=1}^{l} Gfp(d)_i}{\sum_{i=1}^{l} Gfp(d)_i + Z \cdot l^2} \tag{10}$$

$$Gfp = \left\{ \frac{\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{k} + \left(\frac{k - \sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right)}{100k} \right) \right\} \cdot \frac{\sum_{i=1}^{l} Gfp(d)_i}{\sum_{i=1}^{l} Gfp(d)_i + Z \cdot l^2} \quad (11)$$

$$Gfp = \frac{99\sum_{i=1}^{k}\left(a_i \frac{V_i}{Vb_i}\right) + k}{100k} \cdot \frac{\sum_{i=1}^{l} Gfp(d)_i}{\sum_{i=1}^{l} Gfp(d)_i + Z \cdot l^2} \quad (12)$$

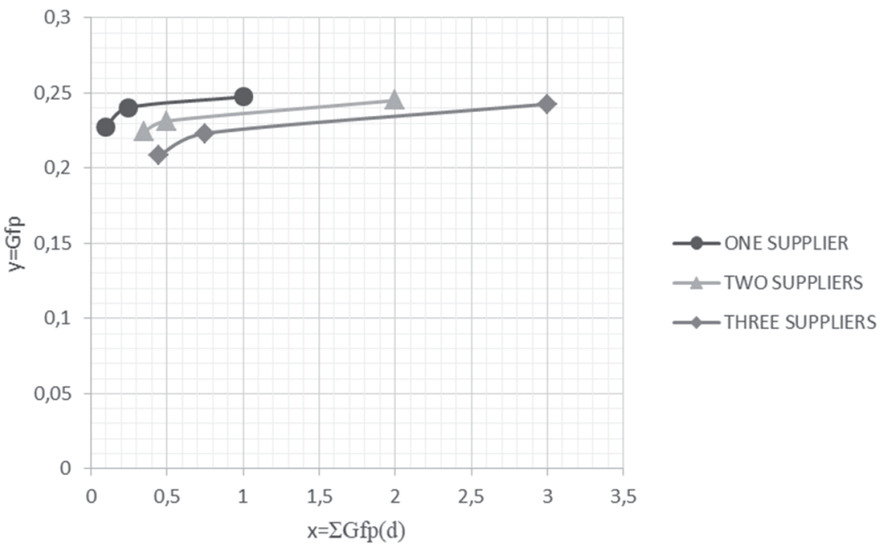

Fig. 3. Changes in the *Gfp* index for a different number of suppliers

Source: Own preparation.

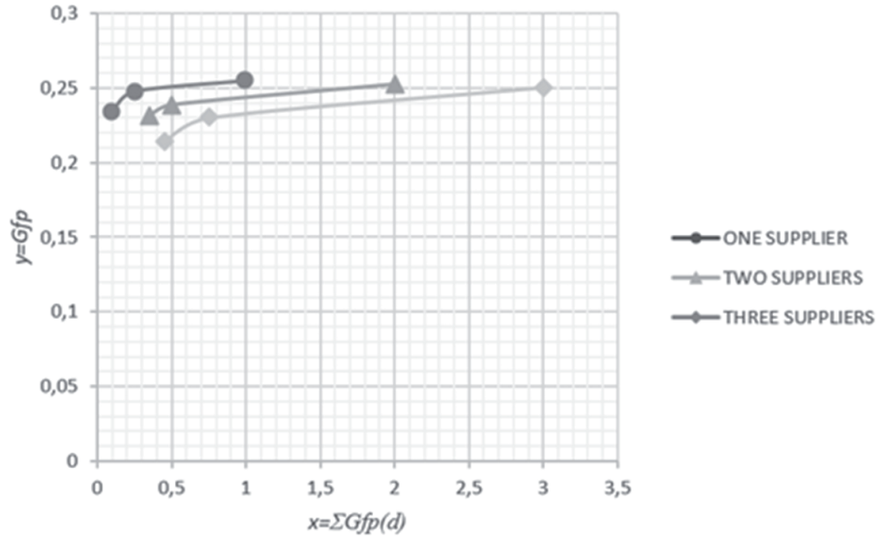

Fig. 4. Changes in the *Gfp* index for a different number of suppliers for changed function

Source: Own preparation.

With such a redesigned formula, we see that the *Gfp* value equation with the *Gfp* value for no suppliers, becomes the case for a single supplier with the same quality factor. For two or three, such a situation is possible only if their quality is the highest (Fig. 4).

OTHER FUNCTIONS OF THE SYSTEM

Technically, the system will use an online database and a mobile application. Scanning the bar code or QR code of the selected organic farming product will allow viewing certificates related to the product. It also would show the whole tree of suppliers, review their certificates and, above all, get the value calculated in accordance with the previously presented method, the *Gfp* index expressed in numerical or graphic form, e.g. stars.

The use of such a system by the consumer will also enable operation in so-called Internet of Things (IoT) formula. Scanning a product in a store associated with location data of a mobile device can create hints for consumers in which stores specific products can be found. It seems to be particularly important in short and dispersed series of products offered in various locations, which is common for organic production. The system also encourages producers to enter data into the system because the more transparent they will be, the more attractive they would appear for the whole chain of production, thanks to accumulative property of *Gfp* index. In addition, the registers within the system are mandatory for certification purposes. It is important to provide the records as easy to use solution for the producer. This feature of the postulated system also seems to be a response to problems related to digital exclusion in rural areas [Śmiałowski et al. 2015].

CONCLUSION

In first stage of the research, the function determining the *Gfp* index was pre-tested and modified. The overall concept of the system seems to be ready for further research and trial implementations. It is postulated in further stages, to simulate the operation of the proposed method on the extended database of farms. It will be necessary to make the final "regulation" so that it behaves in a desirable and fair manner, embracing various modes of approach to organic production. The possibility of using artificial intelligence in place of the "rigid" formula should also be taken into account. The use of machine learning using the induction method, e.g. LEM supplemented by other methods such as regression models would potentially give the effect of greater flexibility in non-standard situations. The next postulated action will be the production of the solution's prototype. It should be noted that there is a considerable potential for extending the system, e.g. information on acting in accordance with Fair Trade certificates and others.

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GOOD FOOD PRINT – KONCEPCJA SYSTEMU INFORMATYCZNEGO ŚLEDZĄCEGO POZIOM WYKORZYSTANIA DOBRYCH PRAKTYK W PROCESIE PRODUKCYJNYM ORAZ W ŁAŃCUCHU DOSTAW ŻYWNOŚCI EKOLOGICZNEJ

STRESZCZENIE

Celem artykułu jest przedstawienie i wstępne przetestowanie metody będącej modyfikacją miary agregatowej polegającej na wyliczaniu średniej ważonej wartości cech odpowiadających stopniu zastosowania różnorakich, dobrych praktyk rolnictwa ekologicznego. Wartość wyliczonego proponowaną metodą miernika jest postulowaną podstawą działania systemu informatycznego służącego konsumentom do śledzenia procesu produkcyjnego, certyfikacyjnego oraz łańcucha dostaw związanego z produktami żywności ekologicznej. System pozwala także producentom łatwiej dobierać dobrych poddostawców oraz skłania ich do osiągania perfekcji na każdym etapie produkcji. W pracy przetestowano i zmodyfikowano funkcję stanowiącą główny element algorytmu systemu oraz opisano pozostałe postulowane jego funkcje.

Słowa kluczowe: jakość, transparentność, łańcuch dostaw, miary agregatowe, Internet rzeczy, system informatyczny, rejestry

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THE MOTIVES, PREFERENCES AND TOURIST BEHAVIOR OF POLES PARTICIPATING IN ENOTOURISM TRIPS

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ABSTRACT

The main aim of the study is to show enotourism as a form of spending free time among Poles. The article presents the frequency and directions of enotourism journeys, motives of these travels and ways of spending time during this type of trips. Survey research were conducted among 223 adult Poles. The research was carried out in two stages: in May and October 2017. The questionnaire was submitted to the respondents through social media and thematic forums regarding wine and enotourism. For most respondents, it was relatively unimportant to study the secrets of viticulture or expand knowledge about wine-making and the traditions of the wine region. The possibility of traditional rest, physical activity during a trip or visiting nearby tourist attractions was definitely more important for them. It can be concluded that most Polish enotourists can be qualified as amateurs or dilettante/layman, for whom wine is an attraction that is used by the occasion and sometimes even by chance, and the decision about the place and direction of the trip is often based on a number of other conditions.

Key words: tourism, wine, enotourism, enotourists

INTRODUCTION

One of the fastest growing types of tourism at the beginning of the 21st century is culinary tourism, which by the World Food Travel Association is very aptly defined as the pursuit and enjoyment of unique and memorable food and drink experiences, both far and near (www.worldfoodtravel.org). Healthy food, "new flavors", famous restaurants or culinary regions are increasingly becoming an important tourist destination. Good cuisine like a magnet attracts not only true gourmets, but also tourists looking for new, original holiday experiences [Stasiak 2013].

One of the more fashionable recently forms of culinary tourism is enotourism, or tourism, whose main "hero" is wine. The increase in interest in wine tourism may result, among others, from changes in tourist trends in the world. In many countries there is a growing interest in ecology and the environment, which is why the fascination with rural tourism, including ecotourism and enotourism, is expanding. Undoubtedly, the fashion for being an "eco" is also a big influence here. The growing interest in food, cooking, and various culinary programs cause an increase in interest in liquors, including wine, which is often not only a component of the food, but also the necessary complement to the meal. Of great importance here is certainly also the increase in the area of vineyards in many regions, which causes intensified actions to improve sales and build the wine brand's knowledge of a given region, which may determine their market success [Thach 2007]. From the point of view of the tourist product connected with the tourist route, vineyards, facilities and institutions associated with the production of wine, constitute attractive wine routes that attract many tourists. These trails are also a form of tourist promotion of

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the region, where even small vineyards become a permanent and valuable element of the landscape [Poczta and Zagrocka 2016], significantly increasing the tourist attractiveness of the region.

Enotourism can be perceived as an attractive element of lifestyle and a peculiar determinant of social position. Enotourists find pleasure in traveling along the vineyard route and enriching their culinary and geographical knowledge by tasting local wines and specialties of local cuisine and getting to know people and places associated with wine [Makowski and Miętkiewska-Brynda 2015]. All this makes the enotourism perfectly fit into the recently popular trend of slow tourism, associated with the collection of unique experiences and impressions, which may be the source of traditional dishes and, of course, wine.

THE CONCEPT AND ESSENCE OF ENOTOURISM AND THE PROFILE OF AN ENOTOURIST

Enotourism (also called oenotourism, wine tourism, or vinitourism, from Greek *oinos* – wine) is a form of tourism in which the main motive of the trip is wine [Theverin 1996, Frochot 2000]. The definition of enotourism proposed by Hall is often quoted. He claims that enotourism is visiting vineyards, wine bars, wine festivals and wine shows, where the vines' attributes of the region are the main reason for visiting tourists [Hall 2005, Byrd et al. 2016]. Aesthetic and taste experiences are very important here, as well as attractions constituting the surroundings of the product, the core of which is wine [Getz and Brown 2006].

It can therefore be said that the essence of enotourism is visiting vineyards combined with getting to know the process of wine production and storage, participation in tasting or degustation, as well as participation in events whose leitmotif is the wine [Hall et al. 2000]. Apart from the wine itself, the attractiveness of the place or region in which it is produced is of great importance for the development of this form of tourism. Tourist values of a cultural and natural character have special significance here [Dowling 1998, Getz 2000]. As Poczta and Zagrocka [2016] adds, an inseparable element of enotourism is visiting tourist attractions of the region and tasting regional dishes that have much to do with wine. Traveling along the wine route gives the opportunity to learn about the lifestyle of vineyard owners, the process of wine production, cultural, historical and natural conditions of the regions where the grapevine is grown. Vale [2014] lists 10 main motives for the implementation of wine tourism: the taste of wine; willingness to learn about wine; willingness to learn about the process of wine production; beautiful landscapes of vineyards; combination of gastronomy and wine; willingness to participate in enotourism events; getting to know the wine culture (rituals of wine culture); admiring the architecture of vineyards, villages and villages in wine regions; the willingness to learn the ecological elements of wine and to gain knowledge about the benefits of wine for health. It can therefore be noticed that enotourism trips are quite a complex phenomenon, and the motives for their making can be very diverse. For this reason, enotourism can be associated with several types of tourism:

- cultural tourism, which is defined as the movement of people to places of cultural attractions in order to obtain information, gain experience and satisfy their needs or as a result of the need for emotions or intellectual cognition that comes from communing with different cultural experiences [Mazurkiewicz 2008];
- rural tourism [Hall 2005], as it takes place mainly in rural areas;
- agrotourism, due to the opportunity to participate in the work and life of winemakers [Mazurkiewicz-Pizło 2015];
- local tourism, which is perceived as being based on real natural, historical and cultural resources of the area, involving various entities from the local community and integrating tourism with other aspects of economic development and strengthening the socio-economic structure of the local community [Gaworecki 2010];
- weekend tourism [Mazurkiewicz-Pizło 2015];
- food tourism [Hall and Sharples 2003].

It should be added here that the condition of proper enotourism is the openness of participants to acquire knowledge related to wine, its product and broadly understood wine culture. The aim is to exclude from the group of true enotourists all more or less accidental visitors, for whom a visit to a wine farm is not associated with the development of knowledge and interests in the

field of wine and is treated only as an opportunity for free drinking or buying cheap liquors [Bosak 2008].

Wine tourism is also perceived as an opportunity for the development of the region and creates the chance for direct wine sales, and thus is an important factor in the development of the wine industry [Jaffe and Pasternak 2004]. Enotourism is also a regional product that contributes not only to the promotion of local wine brands, but also the entire region and even the country. It can bring additional income for owners of agritourism farms, vineyards, cultural facilities, owners of bars or inns and other catering facilities [Sieczko 2009]. Kowalczyk [2003], analyzing the benefits of the development of wine tourism, lists the following:

- increase in the income of farmers, winemakers and wine producers;
- development of tourist and accompanying services;
- improvement of the region's image, often threatened by economic slowdown;
- promotion of preservation of the identity and culture of the region;
- promotion of pro-ecological attitudes among the inhabitants of the region;
- promotion of organic farming development.

Mazurkiewicz-Pizło [2013] adds that a minimum of three perspectives for looking at wine tourism can be indicated: from the point of view of winemakers, tourist agencies (representing a specific area where enotourism develops) and consumers. It can therefore be concluded that wine tourism is: a form of consumer behavior; regional development strategy; attractions related to viticulture and a specific place/region; marketing opportunity for vineyards and wine producers, created by the possibility of direct sales of products, as well as consumer education [Sharma 2005]. This educational aspect in enotourism is emphasized by Carlsen and Ali-Knight [2004]. In their opinion, an appropriately prepared offer, created based on knowledge about wine culture, may contribute to maintaining the true tradition and cultural heritage of wine areas. This is the basis for creating a unique tourist product, whose high value and attractiveness is determined by its authenticity [Bruwer 2003]. It is very important therefore the implementation of sustainable development principles in the regions, which are expressed in the care for natural and cultural environment of the enotourist region, its local community and in the presence of fully aware enotourists [Ruiz Romero De La Cruz et al. 2017].

An interesting typology of enotourism was proposed by Karlsson and Karlsson [2017] at the annual wine tourism conference Città del Vino in Torgiano in Umbria in June 2017. He listed four types of enotourism:

- "Open Door" wine tourism – receiving people for wine tastings and cellar visits. Sometimes people also talk about "cellar door" wine tourism, but that can involve many different things that goes far beyond "open door".
- "Edutainment" (education + entertainment) – this is something more, something a little bit more complex and organised than "just a visit". For example: blending session, harvesting workshop, vineyard nature walks, cooking class.
- "Disneyland" Wine Tourism – it is important to underline that the use of this label is not intended to give it a negative connotation. This is big budget projects, often with mixed contents also including "general" tourism (not directly wine related). For example: restaurant, hotel, museum and many others.
- "Eventification" - this refers to one-time events focussed on wine. For example: wine festivals, fête le vin, gastro-walks, village harvest festival etc.

The types of enotourists are no less diverse as forms of wine tourism. This issue has been widely described in the literature. An example is the division proposed by Charters and Ali-Knight [2000], in which they mention: "coincident" enotourists, medium category enotourists, and people who relish the wine. The same authors also proposed a different division. They share this segment of tourists for: professionals, fascinated neophytes, people interested in wine, as well as wine-tasting [Charters and Ali-Knight 2002]. Another division, proposed by Ibanez Rodriguez [2010] based on the level of knowledge of the secrets of wine production and its tasting, as well as the culture related to wine looks as follows: expert, semi-expert, amateur and dilettante (layman) who came to the wine region by accident. Also Karlsson and Karlsson [2017] notes that not every enotourist is the same. They expect

completely different experiences and sensations. This group distinguishes three segments:

- the wine geeks – want to know everything; wine is the sole purpose;
- the gastro-tourist – food and wine is an important element;
- the passing-by casual (wine) tourist – "We're in a wine region so let's visit a winery".

It is essential that a tourist from an ordinary dilettante/layman turns into a professional or even a half-expert. This is the basis of the economic success of enotourism. This opinion is shared by Widawski et al. [2016] adding that the person interested in a given subject and finding pleasure in it is a tourist returning. It is also important that the enotourism product, which will be appropriately prepared, managed and modified at appropriate times, can ensure effective functioning of tourism entities for years.

At the end of these considerations, it is worth mentioning the conclusions from the observations of Charzyński and Podgórski [2017], who claim that enotourism trips in Poland are interested in:

- mostly men (60%);
- middle-aged people – 46–65 years;
- people with higher education (61.4%);
- urban residents (80%);
- professionally active (77%);
- people for whom the main reason for taking a trip is wine tasting (55%), and rest (45%);
- they travel mainly in Poland (47%), Italy (27%) and Hungary (25%);
- people leaving for a trip with at least one night's lodging (75%);
- undertaking enotourism trips not more than once a year (81%);
- the source of information about the destination is usually the Internet and friends for them.

Enotourists also distinguish certain common inclinations towards traveling. More often, they choose several shorter trips during the year than one longer vacation. During the trip, they visit several places, they rarely stay longer in one place. These people are interested in the local cuisine, as well as the culture of the visited region (monuments, art etc.), and before the trip they are looking for detailed information about the purpose of their journey [Mazurkiewicz-Pizło 2013].

Wine tourism is gaining many supporters not only in countries that are leaders in wine production. In Poland, there are around 500 vineyards and all the time more are being established (www.agrofakt.pl); 201 of them were registered at the National Center for Agricultural Support – KOWR (data as at 10/01/2018, http://www.kowr.gov.pl). Most of the vineyards are located in the southern part of Poland (around Kraków, Nowy Sącz and Przemyśl), as well as Zielona Góra, Sandomierz and Kazimierz Dolny (www.winogrodnicy.pl). The wines produced by some of them even win international competitions. It is worth quoting the results of the Sokół research [2015], which notes that the most popular tourist wine routes in Poland are: Wine and Honey Route of Lubuskie (Lubuski Szlak Wina i Miodu), Wine Route of Małopolska (Małopolski Szlak Winny), Vineyard Route of Podkarpacie (Podkarpacki Szlak Winnic), Sandomierz Wine Route (Sandomierski Szlak Winiarski) and the Gorge of Vistula Wine Route in Małopolska (Szlak Winny Małopolski Przełom Wisły).

At the end, it is worth citing the observations of Thach [2009] regarding the activities aimed at making the development of wine tourism in the area more dynamic. These are:

- creation of wine routes and their appropriate marking;
- organization of special events related to the subject of wine, such as grape harvest, wine festivals that will attract tourists;
- publishing information brochures about vineyards, region, hotels and other information useful for enotourists;
- construction of a regional website;
- establishing partnerships with travel agents to enter a visit to the wine bar in their tour programs;
- building special programs aimed at gaining tourists' loyalty.

However, the most important seems to be the significant increase in the promotion of this form of tourism, as well as the greater involvement of large travel agencies in this segment. The conducted research indicates that enotourism is very poorly promoted, and trips of this type are usually organized individually. It also seems necessary to conduct wider and more accurate research on the preferences, behaviors and expectations of po-

tential and current enotourists. This knowledge should enable tour operators to prepare events that would fit into the tastes and expectations of their clients, which would significantly increase the interest in the offer of touroperators proposing enotourism trips.

PURPOSE OF THE STUDY AND RESEARCH METHODS

The main purpose of the study is to show the motives, preferences and tourist behavior of people who participate in enotourism trips. The paper presents the motives, frequency and directions of enotourism trips and ways of spending time during journey of this type. The sources of knowledge of the subjects on enotourism are also discussed. Survey research were conducted among 223 adult Poles. The research was carried out in two stages: in May and October 2017. In May, pilot studies were carried out on a sample of 66 people. In October, using a modified questionnaire, the survey was conducted among a further 157 people.

The questionnaire was submitted to the respondents through social media (Facebook: discussion groups – paragrafwkieliszku.pl, szkoła sommelierów, Polskie Wina Owocowe) and thematic forums on wine and enotourism (www.wino.org.pl, www.domowawinnica.4ra.pl, www.alkohole-domowe.com, www.forum.winka.net). The questionnaire was asked for people who at least once in the last year participated in an enotourist trip, understood as such, where one of the most important attractions was visiting vineyards connected with getting to know the process of wine production and storage, participation in tasting, as well as participation in events whose leitmotif was wine (definition proposed by the author). The questionnaire consisted of 26 closed questions that allowed respondents to indicate one or several responses. The author is aware that due to the number of respondents, the examined group was not representative.

CHARACTERISTICS OF RESPONDENTS

Among the respondents, there were slightly more women (57.8%). The age of the interviewees was quite diverse: 15.7% of respondents were people from 18 to 24 (most often students) and the age group 25–44 years old accounted for 38.1%, and age group 45–64 years old for 33.2% of all respondents. They were mainly working people, a small part of them additionally studied). Older people (mainly pensioners) accounted for 13.0% of the surveyed group.

The majority of respondents (62.3%) lived in the city. The interviewees were relatively well educated: 57.4% of them had higher education (13.5% of the total were still studying).

ENOTOURISTIC TRIPS OF THE RESPONDENTS

Enotourism is a quite specific form of tourism. The motives for making trips of this type were also specific. The most important for the respondents was the possibility of wine tasting and the opportunity to buy them at attractive prices, as well as the desire to learn about the wine traditions of a given region. Details on this subject are presented in Figure 1.

The possibility of acquiring and expanding information about a specific brand of wine or a particular producer was rather insignificant for the respondents.

Most of the respondents, for the tours of which the main "goal" was wine, went away twice a year. Almost 1/4 of interviewee traveled 3–4 times a year (Fig. 2). However, the group for which this type of travel was rather occasional was also significant. Among the respondents there was also a small group of true enotourism enthusiasts, who traveled for this purpose five times or more a year.

Among the respondents prevailed 4–7-day trips. Quite popular were also 2–3-day weekend trips. Details on this subject are presented in Figure 3.

Often longer trips were also undertaken, which could serve not only the passion associated with wine, but broadly understood recreational purposes. This is indicated by the preferred ways of spending time during the trips of the respondents. In many cases the wine gives way to a typical rest, physical recreation or sightseeing (Fig. 4).

The exploration of the secrets of viticulture or expanding knowledge about wine-making and the traditions of the wine region was relatively unpopular. This indicates the small involvement of a large number of respondents in matters related to wine. In many cases it is treated only as an addition to typical leisure and

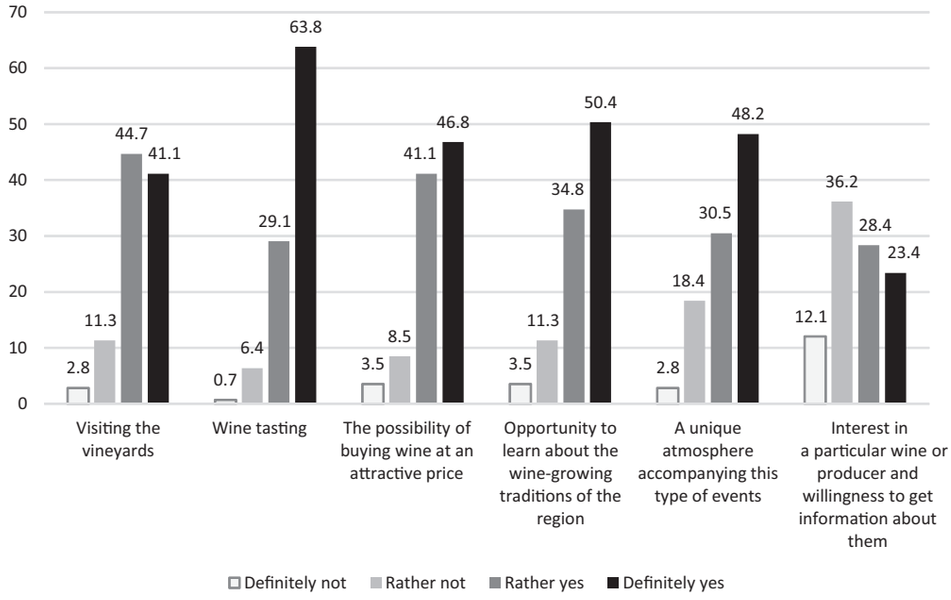

Fig. 1. Motives of enotourism trips declared by the respondents (%, $N = 223$)

Source: Own research.

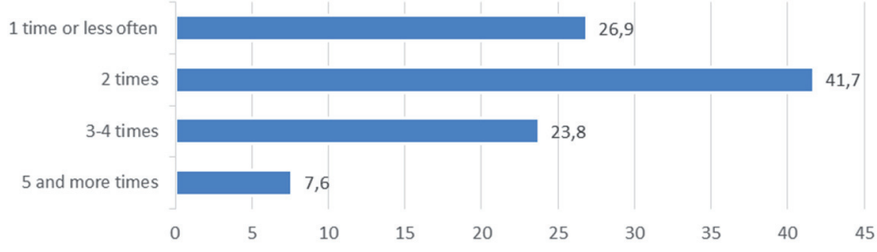

Fig. 2. The average frequency of enotourism trips to which respondents traveled during the year (%, $N = 223$)

Source: Own research.

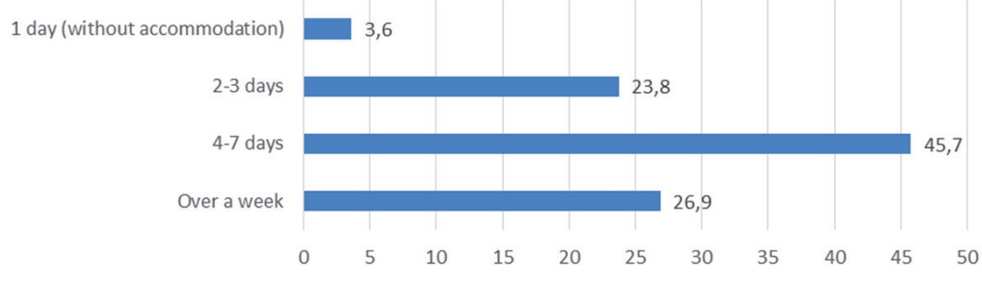

Fig. 3. The average length of enotouristic trips of respondents (%, $N = 223$)

Source: Own research.

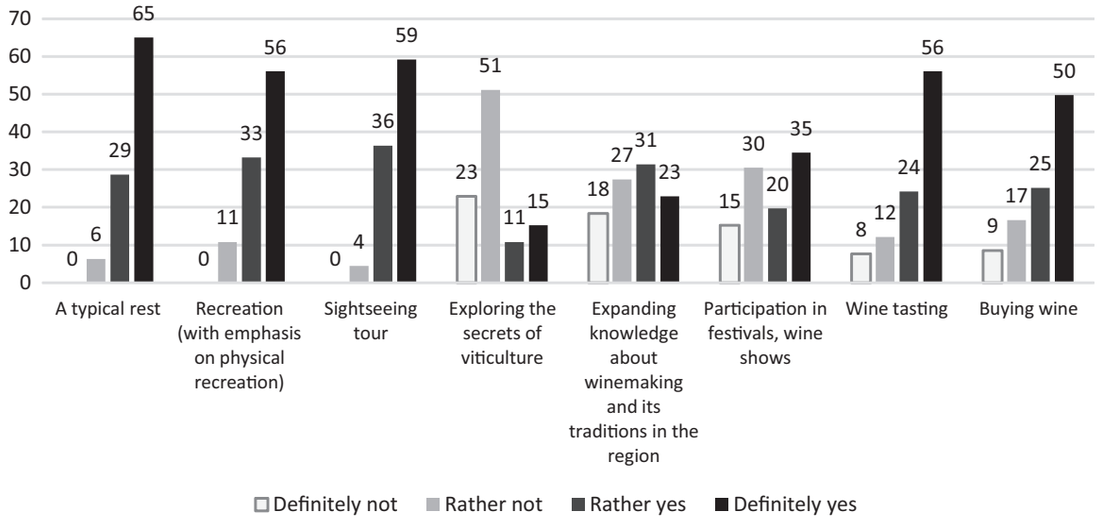

Fig. 4. Preferred by the respondents ways of spending time during enotourism trips (%, $N = 223$)

Source: Own research.

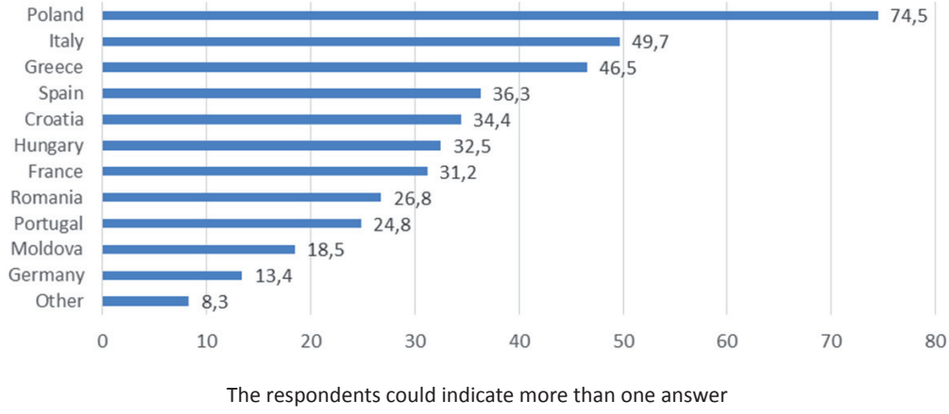

Fig. 5. Directions of enotourism trips undertaken by respondents in the last 3 years (%, $N = 157$ – only respondents who participated in the second round of research)

Source: Own research.

recreational trips. Also visible is the consumerism of the respondents manifesting themselves in the desire for free tasting and buying wine.

Exactly 24.2% of the respondents preferred trips within their own country. Only 16.6% chose to travel abroad. The rest of the respondents (59.2%) carried out their enotourism trips both at home and abroad. In addition to Poland, Italy, Greece and Spain were the country most visited during enotouristic journeys (Fig. 5).

In the "other" category, Slovakia, Austria, the Czech Republic and Ukraine were indicated. It should be emphasized that the enotourism directions indicated by the respondents are very similar to the total number of foreign holiday trips by Poles. It can therefore be concluded that for the vast majority of respondents,

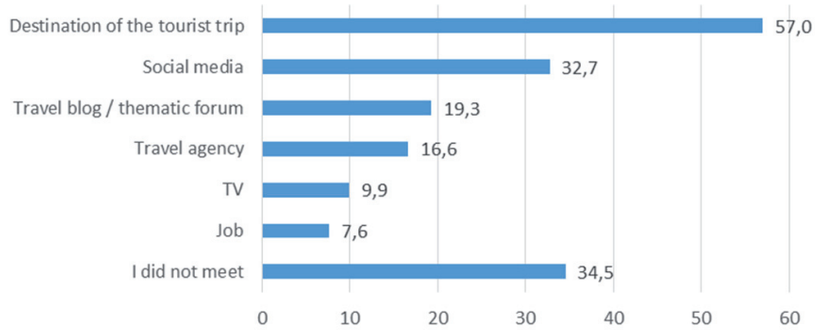

Fig. 6. Places and media in which respondents had contact with the promotion of enotourism (%, $N = 223$)

Source: Own research.

wine was not much more important when choosing a destination, but the popularity and widely understood tourist attractiveness of a given place.

At the end, it is worth indicating the places and media in which the respondents had contact with the promotion of enotourism. Most often it was a tourist destination in which the respondents rested and learned about enotourism on the occasion, and sometimes by accident.

Social media and travel blogs were a frequently indicated source of information and promotion of enotourism. In particular, the latter are usually effective only in relation to people who are interested in enotourism and are browsing such thematic forums. Moreover, it may be surprising that over 1/3 of respondents did not come across the promotion of enotourism at all. This may indicate a small promotion, and thus the low popularity of this form of tourism in Poland (Fig. 6).

The relatively low popularity of enotourism among Polish tourists translates into a very poor number and diversity of travel offers of this type proposed by travel agencies. This may be due to the fact that only 13.9% of respondents used the offer of a travel agency. The others organized their trip individually.

SUMMARY AND CONCLUSIONS

Enotourism is an attractive form of culinary tourism, which is becoming more and more popular among many tourists around the world. Also in Poland there is a growing group of supporters of this type of travel. However, the studies carried out indicate that the attractions related to wine (mainly the possibility of tasting and buying) are usually only an addition to trips undertaken for recreational and sightseeing purposes. Wine tourism is therefore intended not only for wine enthusiasts and people who are interested in wine grape varieties, wine and culinary traditions, etc., but also for people who like to relax with a glass of this drink, and also to expand your sightseeing knowledge, to see something interesting or just relax. As noted by Alen, exquisite gourmets are only 8% of culinary tourists (www.tourism-review.pl). Similar conclusions can be formulated by analyzing the results of the conducted research. For most respondents, it was relatively unimportant to study the secrets of viticulture or expand knowledge about wine-making and the traditions of the wine region that is visited. The possibility of traditional rest, physical activity during a trip or visiting nearby tourist attractions was definitely more important for them. It can be concluded that most Polish enotourists can be qualified as amateurs or dilettante/layman, for whom wine is an attraction that is used by the occasion and sometimes even by chance, and the decision about the place and direction of the trip is often based on a number of other conditions. This does not mean, of course, that "real" enotourism is foreign to Polish tourists. The number of people registered on tourist and travel blogs, whose main topic is wine, the

ever-increasing consumption of wine or the growing number of culinary trips prove that enotourism has a good chance of development in Poland.

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MOTYWY, PREFERENCJE I ZACHOWANIE TURYSTYCZNE POLAKÓW UCZESTNICZĄCYCH W WYJAZDACH ENOTURYSTYCZNYCH

STRESZCZENIE

Głównym celem artykułu jest zaprezentowanie enoturystyki jako formy spędzania wolnego czasu wśród Polaków. W pracy omówiono częstotliwość i kierunki podróży enoturystycznych, motywy podejmowania tych wyjazdów i sposoby spędzania czasu podczas tego typu podróży. Badania ankietowe przeprowadzono wśród 223 dorosłych Polaków. Zostały one zrealizowane w dwóch etapach: w maju i październiku 2017 roku. Kwestionariusz został przekazany respondentom za pośrednictwem mediów społecznościowych i forów tematycznych dotyczących wina i enoturystyki. Dla większości respondentów stosunkowo nieistotne było poznanie tajników uprawy winorośli lub poszerzenie wiedzy na temat produkcji wina i tradycji regionu winiarskiego. Możliwość tradycyjnego wypoczynku, aktywności fizycznej podczas podróży lub zwiedzania pobliskich atrakcji turystycznych odgrywała wśród respondentów zdecydowanie ważniejszą rolę. Można wnioskować, że większość polskich enoturystów należy zakwalifikować jako amatorów lub dyletantów/laików, dla których wino jest atrakcją dodatkową, a czasem nawet przypadkową. Decyzja o kierunku i miejscu wyjazdu często jest podyktowana wieloma innymi przesłankami.

Słowa kluczowe: turystyka, wino, enoturystyka, enoturyści

CONTENTS

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