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LIVING STANDARD, QUALITY OF LIFE, GLOBALIZATION AND COMPETITIVENESS IN THE EU AND THE NEIGHBOUR COUNTRIES – AN EMPIRICAL ANALYSIS

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Abstract. This paper deals with the theoretical and empirical relations between living standard, quality of life, globalization and international competitiveness of countries. While economists are not convinced that competitiveness of countries is a useful concept, because firms and industries compete economically and not countries, the general public, journalists and politicians seem to feel that competitiveness is important. E.g., one of the goals of the European Union is to become the most competitive economy in the world. Furthermore, economists argue, that economic globalization has the potential of increasing economic welfare for all. In this case, the general public is more sceptical. Finally, the general public but even other scientists than economists, seem to believe that living standard and the quality of life are only weakly related to each other. The following results can be mentioned. We found strong positive correlations between our main variables. Our hypotheses are with other words supported.

Key words: Living standard, quality of live, globalization, competitiveness, Gross Domestic Product, the Lisbon Agenda, correlations, European countries

INTRODUCTION

Economists, politicians and journalists are concerned about whether economic development and growth are sustainable or not. Environmental, climate and population changes could have a negative influence on the economic situation and development. While economic development often is described by GDP in total and GDP per head of population, the question is whether these measures are connected with welfare (see e.g. [Vogel & Wolf 2004]). After all, GDP is a measure of production, incomes and final demand. Therefore it is often asked, how living standard and the quality of life is influenced

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by GDP and GDP per head of population (GDP pc). Furthermore, people are concerned about the connection between globalization and national living standard. Finally, it is often asked, whether it is important for a country to be internationally competitive to cope with the challenges of globalization and to be able to make a rising living standard and quality of life possible for its citizens.

This work is inspired by Koreleski [2007], and is based on the work presented in Schuller [2008] and Schuller [2009a]. We use here a similar approach, but chose a larger number of countries and a wider perspective by including globalization and international competitiveness.

The purpose of the project is to analyse theoretically and empirically the connections between globalization and international competitiveness on one hand and average living standards and the quality of life on the other hand.

The paper is organized in the following way. After the introduction, section 2 presents some methodological remarks. In section 3 the empirical variables and relations are discussed and hypotheses are formulated in a rather intuitive way. Section 4 describes the size of Europe, measured as population and GDP. Section 5 mentions some previous results. In section 6 we present correlations between variables and rankings of countries. Section 7 consists of the summary. In section 8 the references are shown. Appendix 1, Appendix 2 and Appendix 3 finish the paper.

SOME METHODOLOGICAL REMARKS

In our investigation, we use several variables: GDP per person, the human development index, the global competitiveness index and others. Some of the variables are indices. For example, the UN constructed the human development index as a combination of several components. When you create an index, you have many alternatives to consider. Each component, c, included in the index has a specific weight, w. You need to determine what components to use, and how important they are. An index is often calculated as a weighted sum of index components: $I = \sum_i w_i c_i$. An alternative construction of an index is to use a multiplicative structure, $I = \prod_i w_i c_i$. Many choices have to be made, and there is no correct construction. In some cases, a country performs relatively well, while in other it does not. For a fuller description of these issues we refer you to Hagén et al [2003] and Olsson [2010]. To some extent, you can form an index to get to the result you want. Lobbyists and political parties use it to argue in favor of their agenda [Olsson 2010]. In our comparisons, we use all indices as they are. We have not changed the components or their weights.

We want to investigate if two variables are related, and if so to what degree. We use correlation as the measure of association. Let us call one variable x and one y. We relate the variables to each other: $y = \alpha + \beta x + \varepsilon$.

The correlation between them is $\rho = \frac{\sigma_x \sigma_y}{\sigma_{xy}}$.

In Figure 1, you find an illustration of the case with no correlation between the variables to the left. In the right graph, the correlation is positive, but not perfect.

Variables can be related for many reasons: i) there may be an underlying factor influencing both variables, ii) one variable may cause the effect on the other, or iii) both variables influence each other in a simultaneous system. In this investigation we often expect positive correlation for these reasons. For a detailed description we refer you to Rodgers and Nicewander [1988].

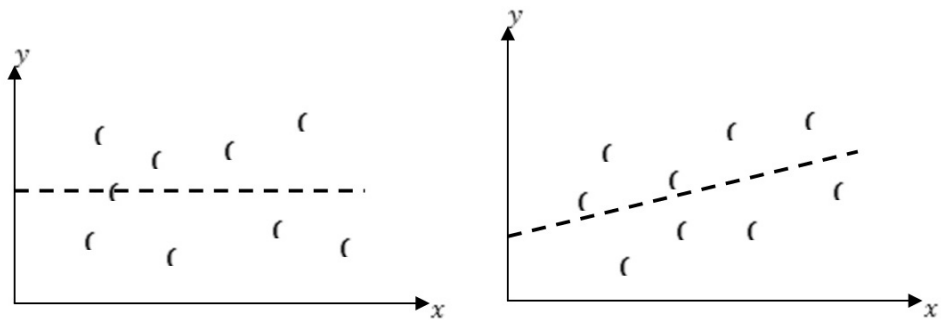

Fig. 1. To the left: No correlation between the two variables, $\rho = 0$. To the right: A positive correlation, $0 < \rho < 1$, between the two variables
Rys. 1. Po lewej stronie: brak korelacji pomiędzy dwiema zmiennymi, $\rho = 0$. Z prawej strony: pozytywna korelacja, $0 < \rho < 1$, pomiędzy dwiema zmiennymi
Source: own elaboration
Źródło: opracowanie własne

VARIABLES AND HYPOTHESES

We use data for 46 countries, which are European or in the geographical neighbourhood of Europe. The variables and rankings are from 2007.

Gross Domestic Product (GDP) can be expressed either in current prices or in constant prices, which are related to a base year. Usually the GDP of a country is expressed in national currency units. If we want to compare a country´s GDP internationally, we have to change to a common measure: either with the help of the exchange rate or the purchasing power parity (PPP), which can be seen as a price level adjusted exchange rate. The PPP shows the national purchasing power relative to the one of other countries, while the exchange rate shows, how many national currency units have to be paid to buy one foreign currency unit. Differences between countries in PPP and exchange rates indicate, that the countries have different price levels.

When should we use PPP and when exchange rates to make international economic figures comparable? If we want to compare the average living standard, expressed as GDP per head of population, we use PPP. If we instead want to deal with international economic transactions like foreign trade or international financial flows, we use exchange rates.

In this paper we analyze the relations between: (I) Average standard of living and quality of life, (II) Globalization, and (III) International competitiveness of nations. These

concepts are expressed by the empirical variables presented in this section. Furthermore, some possible relations between the variables are discussed. These can even be seen as our hypotheses.

(I) Average standard of living and Quality of life

- **Gross domestic product per head of population in purchasing power parities (GDPpcPPP),** which is assumed to give a picture of average living standard in a country.
- **Human Development Index (HDI),** which is a summary of GDPpcPPP, Life expectancy at birth and an education index (Combined Gross Enrollment Ratio – CGER). Yet, including life expectancy, which can be seen as a health indicator, and education, HDI describes important aspects of Human capital, which according to Weil [2009] is an important factor of production.
- **Quality of Life index (QLI)** consists of the following sub-indices: (a) Cost of living, (b) Leisure and culture, (c) Economy, (d) Environment, (e) Freedom, (f) Health, (g) Infrastructure, (h) Risk and safety, (i) Climate.

The three mentioned variables describe the countries´ average standard of living. Positive statistical relations are expected.

(II) Globalization

- **Exports of goods and services, relative to GDP (EXGS)**
- **Imports of goods and services, relative to GDP (IMGS)**

International trade theory (see e.g. [Krugman & Obstfeld 2009]) argues that a country can rise its national income, e.g. expressed by GDP, by participating in international trade because of absolute and comparative advantages and of economies of scale[2]. By trading internationally, a country can increase its productivity, which should lead to increasing incomes. We would expect a positive relation between exports and imports, because exports use production resources/factors and generate incomes, which makes imports necessary and possible. The expected positive relation between exports and imports can be explained in different ways:

- as mentioned, exports need production resources/factors. Rising exports means fewer production resources for domestic demand, which can be satisfied by rising imports.
- exports partly consists of imported inputs. Rising exports of e.g. oil-based chemicals from Sweden need rising imports of oil products to Sweden.
- imports of final products have probably normal goods character: when exports lead to rising national incomes, imports too will rise.
- a final aspect of trade globalization consists of the **balance of exports and imports of goods and services (EX – IMGS)**, relative to GDP. Many observers (for a discussion, see [Porter 1998]) believe that a positive trade balance is a sign of strong international competitiveness of a country, while a negative balance means weak competitiveness. Yet, Krugman [1994] argues strongly against this opinion. Both Porter and Krugman maintain that international competitiveness is more a question for companies and not so much of countries[3]. In this paper we argue – though we agree with Porter

[2]Another aspect is the following one: a country which is trading internationally can demand products, which are impossible to produce nationally. This rises probably welfare.

[3]Krugman mentions, that non-competitive companies can go bancrupt, but not countries.

and Krugman – that because politicians and journalists – and therefore the public opinion – believe that international competitiveness of countries is important (see as an example [The Presidency Conclusions of the Lisbon European Summit 2000]), we should as economists not neglect this concept. We follow in this paper the example of the World Economic Forum (WEF), which both constructs measures of national competitiveness and discusses possible consequences of competitiveness for the economic welfare of countries.

The KOF index of Globalization

While we in this paper are more interested in the relations between international trade, standard of living and quality of life, the public discussion about globalization is often both more comprehensive and more vague. Therefore, we include the KOF-index, which expresses globalization in economic, social and political terms. The three features of the KOF[4] Index have the following weights:

Economic Globalization – 37 per cent

Social Globalization – 39 per cent

Political Globalization – 25 per cent

We expect positive relations between economic globalization, living standards and the quality of life. Furthermore, the purpose of political globalization is often to make international economic and financial flows easier, which would lead to the believe of a positive relation between economic and political globalization. Finally, it seems probable that there are even positive connections between social and economic globalization aspects.

(III) International Competitiveness of Countries:

The Global Competitiveness Index (GCI) of the World Economic Forum (WEF), consisting of 12 pillars, which are divided in three groups (see [WEF 2010]):

(a) Basic requirements: institutions, infrastructure, macroeconomic environment, health and primary education

(b) Efficiency enhancers: higher education and training, goods markets efficiency, labour markets efficiency, financial market development, technological readiness, market size

(c) Innovation and sophistication factors: business sophistication, innovation.

The Business Competitiveness Index (BCI) of the WEF [WEF 2007], which consists of

(a) Quality of the national business environment ranking and

(b) Company operations and strategic ranking

According to the WEF, a competitive country can "...maintain high rates of growth and employment in the medium term" [WEF 2002]. "This concept[5] focuses on the country`s ability to provide its citizens with high and rising standards of living in the medium- and the long run" [WEF 2002]. We would therefore expect positive statistical relations between the variables describing international competitiveness and living standard.

As a conclusion we are expecting to find positive relations between standard of living, trade globalization and international competitiveness.

[4]More detailed information in Appendix 2.

[5]The one of international competitiveness.

The following sources for our variables are to be mentioned. GDPpcPPP and HDI are from the United Nations Development Report [UNDP 2009]. QLI are from The Economist Intelligence Unit [2010]. Exports and imports are from WEF, The Global Competitiveness Report 2009–2010. From the same source we even took the GLI and the BCI. Finally, the KOF Globalization index is from ETH.

1) Economic and population size of Europe and its Neighbour Countries

In this section, we describe the size of the EU, its candidate and potential candidate countries plus a number of other European and neighbourhood countries. The size is expressed by GDP and population. To make GDP comparable between countries, it can either be expressed in exchange rates or in purchasing power parities (PPP).

In GDP terms EU is one of the largest economies in the world (Table 1). Including candidates, potential candidates and other European countries, Europe and some neigh-

Table 1. EU27 and its neighbours – Population and GDP, 2007
Tabela 1. Kraje UE-27 oraz sąsiadujące – Populacja i PKB, 2007

	GDPExrmrd	GDPPPPmrd	Population mio	GDPpcExr	GDPpcPPP
EU27	16849.1	14811.8	493.3	34156	30026
3 Candidates	714.9	1046.8	79.4	9004	13184
4 Potential Candidates	69.5	134.3	17.3	4017	7763
5 Neighbouring Countries (ENP)	196.2	436	66.1	2968	6596
4 Countries	1402.4	2277.9	169.3	8284	13455
3 West European	832.8	569.7	12.5	66624	45576
Sum 46 countries	20064.9	19276.5	837.9	23947	23006
World	54583.8	64909.7	6670.9	8182	9730
% of World	(37)	(30)	(13)		
USA	13751.4	13751.4	308.7	45592	45592
% of World	(25)	(21)	(5)		
China	3205.5	7096.7	1329.1	2432	5383
% of World	(6)	(11)	(20)		
Japan	4384.3	4297.2	127.4	34313	33632
% of World	(8)	(7)	(2)		

mrd: milliards
mio: millions
Sum % of World: 46 countries
GDPExr: GDP in exchange rates, US$
GDPppp: GDP in purchasing power parities, US$
GDPpc: GDP per head of population, US$
In Appendix 1, the countries are mentioned
mrd: miliardy
mio: miliony
Sum % of World: 46 krajów
GDPExr: PKB według kursu walutowego, US$
GDPppp: PKB według parytetu siły nabywczej, US$
GDPpc: PKB na mieszkańca, US$
Kraje zostały wyszczególnione w załączniku nr 1
Source: UNDP 2009; WEF, The Lisbon Review 2010
Źródło: UNDP 2009; WEF, The Lisbon Review 2010

bourhood countries have 30–37 percent of world GDP, depending on whether GDP is expressed in exchange rates or in PPP. We can even observe that – with the exception of the 3 Westeuropean countries – all membership candidates, potential candidates and neighbour countries have significantly lower living standards compared with the average EU27 member. Because the figures are related to the USA, the GDP in PPP and in exchange rates of this country are the same. Furthermore, the conclusion is that the EU27 has a higher price level than the USA, because GDP in exchange rates in the EU27 is larger than GDP in PPP. The price level in Japan is according to the figures in table 1 about the same as in the USA, while China has a lower price level.

SOME PREVIOUS RESULTS

In this section we show some earlier results [Schuller 2009a and 2009b]. We start with the variables forming the HDI (Table 2). Furthermore, we look at HDI, GDP pc and QLI (Table 3).

Table 2. Pearson correlation coefficients: Human Development Index (HDI), GDP pc PPP (GDP pc), Life Expectancy at Birth (LEB), Combined Gross Enrolment Ratio (CGER), 32 European Countries

Tabela 2. Współczynnik korelacji Pearsona: Human Development Index (HDI), PKB per capita wg parytetu siły nabywczej, oczekiwana długość życia (LEB), Combined Gross Enrolment Ratio (CGER), 32 kraje europejskie

	HDI	**GDPpc**	**LEB**
GDPpc	0.874		
LEB	0.834	0.709	
CGER	0.846	0.639	0.513

Sources: [UNDP 2007, Schuller 2009a]
Źródło: [UNDP 2007, Schuller 2009a]

Table 3. Pearson correlation coefficients: HDI Rank, GDP pc Rank, Quality of life Rank (QLI Rank), 32 European countries

Tabela 3. Współczynniki korelacji Pearsona: ranga wg HDI, ranga PKB per capita, ranga jakości życia (QLI), 32 kraje europejskie

	HDI Rank	**GDPpc Rank**
GDPpc Rank	0.941	
QLI Rank	0.829	0.809

Sources: [UNDP 2007, Schuller 2009a]
Źródło: [UNDP 2007, Schuller 2009a]

Finally we investigate the statistical relations between living standards, quality of life, globalization and international competitiveness (Table 4).

The high and positive correlation coefficients are no surprise; after all, the HDI is a summary of the three other variables GDP pc, LEB and CGER.

Table 4. Pearson correlation coefficients: Country rankings with respect to the following variables: Globalization Index (GlobalInd), Global Competitiveness Index (GLCI), Business Competitiveness Index (BCI), GDP pc, HDI, QLI, 58 countries all over the world
Tabela 4. Współczynniki korelacji Pearsona: Rankig krajów uwzględniający następujące zmienne: indeks globalizacji (GlobalInd), wskaźnik globalnej konkurencyjności (GLCI), wskaźnik konkurencyjności biznesowej (BCI), PKB per capita, HDI, QLI, 58 krajów świata

	GlobalInd	GLCI	BCI	GDPpcPPP	HDI
GLCI	0.803				
BCI	0.767	0.964			
GDPpc	0.834	0.880	0.828		
HDI	0.790	0.790	0.859	0.783	
QLI	0.768	0.775	0.729	0.887	0.894

Source: [Schuller 2009b]
Źródło: [Schuller 2009b]

There are high and positive correlations between the variables forming the HDI. Furthermore, countries which are highly ranked regarding GDP pc, are highly ranked regarding QLI and HDI. Finally, countries which are highly ranked regarding HDI are also highly ranked regarding QLI.

As Table 4 illustrates, the correlation coefficients between the country rankings of the GlobalInd, GLCI and BCI are high and positive. An interpretation would be that countries, which are highly globalized, are also highly competitive. Furthermore, countries, which are highly ranked regarding GDP pc, are even highly ranked regarding HDI and QLI. Finally, countries which are highly ranked regarding globalization and international competitiveness, are even highly ranked regarding standard of living (GDP pc, HDI) and quality of life (QLI).

CORRELATIONS OF VARIABLES AND COUNTRY RANKINGS

In this section we present and discuss the correlations between the 9 variables. We use four approaches: (I) EU27: correlations between the variables, (II) EU27 plus the other countries (in total 46 countries): correlations between the variables, (III) EU27: the correlations between the rankings of countries, (IV) EU27 plus other countries (46 countries): the correlations between the rankings of countries. In general we expect positive correlation. According to our hypotheses, standard of living, quality of life, international competitiveness and globalization have positive relations with each other.

In table 5 you find correlations for the 27 EU members. In table 6 we present the correlation coefficients for the 46 countries. We combine the comments for Tables 5 and 6.

We start with HDI, GDP pc and QLI. Because GDP pc is a part of HDI, the positive and quite high correlation coefficients between HDI and GDP pc is no surprise. As we can observe in the tables, the correlation coefficient for the 46 countries is larger than the one for the EU members. The correlation coefficients for HDI and QLI are positive and quite high. Even here we can observe that the correlation coefficient for the 46 countries is higher. Finally, the correlation coefficient for GDP pc and QLI is positive but somewhat lower in the EU case, but quite high for the 46 countries. The correlation coefficients

Table 5. The nine variables, correlations between absolute values, EU27
Tabela 5. Dziewięć zmiennych, korelacja pomiędzy wartościami absolutnymi, UE-27

	HDI	GDPpc	EXGS	IMGS	EX–IM	GCI	BCI	QLI	KOF
HDI	1								
GDPpc	0.767	1							
EXGS	0.044	0.529	1						
IMGS	–0.238	0.268	0.940	1					
EX–IM	0.650	0.855	0.654	0.357	1				
GCI	0.743	0.577	0.055	–0.179	0.549	1			
BCI	–0.822	–0.645	–0.129	0.131	–0.646	–0.942	1		
QLI	0.632	0.494	0.105	–0.068	0.439	0.574	–0.610	1	
KOF	0.684	0.522	0.251	0.008	0.670	0.679	–0.731	0.577	1

Source: authors' own research
Źródło: opracowanie własne autorów

between HDI, GDP pc and QLI are all positive, but substantially higher in the 46 country case, compared with the EU 27.

We continue with globalization on one hand and HDI, GDP pc and QLI on the other hand. Regarding exports and imports, the correlation coefficients are low and some even negative with an exception: The correlation coefficient for Export and GDP pc is positive and above 0.5. We can observe that the correlation coefficients for the EU members are positive and of reasonable size – with the exception perhaps of export and import balance and QLI. We observe that the coefficients are positive, but smaller for the 46 countries. Finally, regarding globalization we can observe that the correlation coefficients are positive and above 0.5. Here the coefficients for the 46 countries are larger than the ones for the EU members.

What about international competitiveness (GCI), HDI, GDP pc, QLI and KOF? All correlation coefficients are positive and above 0.5. We observe that the ones for the 46 countries are larger than the ones for the EU members. There is yet, one surprise, regarding the older Business competitiveness index (BCI): the coefficients for BCI are negative. This can be explained with the construction of the variable: having BCI only in rankings, there is a negative correlation between all other variables of interest and BCI: while the BCI ranking number is rising with deteriorating rank, all other variables are falling.

We even want to mention the high and positive correlation coefficients between exports and imports (0.94 for the EU countries and 0.854 for the 46 countries). If these correlations can be seen as generally valid, the struggle of generations of politicians to expand exports and put obstacles on imports must be seen as rather futile.

Finally, we want to mention the quite large positive correlation coefficients between KOF and GCI. Even here the correlations for the 46 countries are larger than the ones for the EU members.

Let us now have a look at Tables 7 and 8, where the correlations for the countries´ rankings are shown. Starting with HDI, GDP pc and QLI, we can observe that the correlations are quite high. Countries, which are highly ranked regarding HDI are even highly ranked regarding GDP pc and QLI. Even here the correlations for the 46 countries are larger than the ones for the EU members.

Table 6. The nine variables, correlations between absolute values, 46 countries, 2007
Tabela 6. Dziewięć zmiennych, korelacja pomiędzy wartościami absolutnymi, 46 krajów, 2007

	HDI	GDPpc	EXGS	IMGS	EX–IM	GCI	BCI	QLI	KOF
HDI	1								
GDPpc	0.858	1							
EXGS	0.284	0.537	1						
IMGS	0.038	0.235	0.854	1					
EX–IM	0.483	0.662	0.579	0.072	1				
GCI	0.858	0.794	0.286	–0.036	0.601	1			
BCI	–0.897	–0.818	–0.363	–0.050	–0.612	–0.951	1		
QLI	0.883	0.730	0.326	0.167	0.361	0.767	–0.820	1	
KOF	0.883	0.729	0.377	0.174	0.446	0.799	–0.850	0.879	1

Source: authors' own research
Źródło: opracowanie własne autorów

Table 7. The nine variables, rankings of countries, EU27, 2007
Tabela 7. Dziewięć zmiennych, ranking krajów, UE27, 2007

	HDI	GDPpc	EXGS	IMGS	EX-IM	GCI	BCI	QLI	KOF
HDI	1								
GDPpc	0.944	1							
EXGS	0.012	0.132	1						
IMGS	–0.275	–0.143	0.924	1					
EX-IM	0.695	0.752	0.511	0.179	1				
GCI	0.728	0.770	0.056	–0.198	0.614	1			
BCI	0.781	0.821	0.089	–0.195	0.667	0.964	1		
QLI	0.650	0.627	0.176	–0.075	0.552	0.619	0.665	1	
KOF	0.690	0.671	0.292	0.013	0.730	0.661	0.687	0.609	1

Source: authors' own research
Źródło: opracowanie własne autorów

Having a look at the globalization variables, we can observe that the correlation coefficients between exports and imports on one hand and HDI, GDP pc and QLI are quite low and some are even negative. Yet the balances of exports and imports and KOF on one hand have high correlation coefficients with HDI, GDP pc and QLI on the other hand. Countries which are highly ranked regarding export and import balances and KOF, are also highly ranked regarding HDI, GDP pc and QLI.

Finally, we found the following correlations between rankings of international competitiveness, expressed as GCI and BCI on one hand and HDI, GDP pc, QLI and KOF on the other hand. As expected, the correlation coefficients between rankings of GCI and BCI respectively and KOF are high: for the EU27 above 0.6 and for the 46 countries above 0.8. Countries, which are highly ranked regarding international competitiveness, are even highly ranked regarding globalization. The picture is similar, regarding the rankings for GCI and BCI and HDI, GDP pc and QLI: countries, which are highly ranked,

regarding international competitiveness, are also highly ranked regarding HDI, GDP pc and QLI. The correlations for the 46 countries are even larger than the ones for the EU members.

Finally, it can be mentioned, that the correlations between rankings of BCI and other variables are as expected positive. E. g. the ones for GCI and BCI rankings are 0,964 (EU27) and 0,982 (46 countries).

Table 8. The nine variables, rankings of countries, 46 countries, 2007
Tabela 8. Dziewięć zmiennych, ranking krajów, 46 krajów, 2007

	HDI	GDPpc	EXGS	IMGS	EX–IM	GCI	BCI	QLI	KOF
HDI	1								
GDPpc	0.969	1							
EXGS	0.268	0.351	1						
IMGS	0.032	0.054	0.772	1					
EX–IM	0.530	0.639	0.527	–0.066	1				
GCI	0.868	0.911	0.353	–0.009	0.656	1			
BCI	0.886	0.928	0.363	0.001	0.651	0.982	1		
QLI	0.842	0.835	0.354	0.139	0.467	0.814	0.817	1	
KOF	0.832	0.846	0.448	0.199	0.565	0.846	0.847	0.865	1

Source: authors' own research
Źródło: opracowanie własne autorów

When we look at the 27 EU members (table 5), the correlation coefficients between the variables describing living standards (GDP pc and HDI), global competitiveness (GCI), quality of life (QLI) and globalization (KOF) are high and positive. In our material, countries with high livings standard are also internationally competitive, have high quality of life and are strongly globalized.

When the material consists of the 27 EU members plus 19 other countries (the 46 countries, Table 6), the correlation coefficients are even higher, compared with the EU members. Tables 5 and 6 obviously support our hypotheses.

When the EU 27 members are ranked according to the variables expressing living standards, global competitiveness, quality of life and globalization (Table 7), we observe that the correlation coefficients for the rankings of EU members are strongly positive. Countries which are highly ranked regarding living standards are also highly ranked regarding competitiveness, quality of life and globalization. This situation is confirmed, when we look at the 46 countries and there rankings (Table 8). The correlations coefficients are positive and even higher, compared with the EU members. Our hypothesis are obviously supported.

SUMMARY

In this paper, we investigate the theoretical and empirical relations between three groups of variables: (1) Average standard of living and quality of life, (2) Globalization, and (3) International competitiveness of countries. The focus is on the 27 EU member

countries and 19 other countries. According to our hypotheses, several positive correlations between different aspects of living standard, the quality of life, globalization and international competitiveness can be expected.

Politicians and journalists are rather concerned about the competitiveness of Europe. Economists argue that firms and industries compete and not countries. Furthermore, the general public seems to be rather sceptical about economic globalization and fears that economic progress in one part of the world must automatically implicate losses in other parts. Economists present both theoretical and empirical arguments for the welfare enhancing capacity of economic globalization.

The above mentioned three groups of phenomena are expressed quantitatively in nine different variables for 2007 and coefficients of correlations have been calculated. Furthermore, we have separately presented correlations for the 27 EU members and for 46 countries, consisting of the EU members and 19 other European and European neighbouring countries. Finally, we have ranked the countries according to the nine variables and presented correlations between the rankings.

As expected, we found positive and mostly quite high correlations between the Human development index (HDI) on one hand and Gross domestic product per head of population (GDP pc), the Global competitiveness index (GCI), the Quality of life index (QLI), and some aspects of globalization (balance of foreign trade and the KOF index) on the other hand. As Tables 5 and 6 illustrate, the correlations for the 46 countries are often higher than the ones for the EU members.

We can even observe as expected positive correlation coefficients between GDP pc on one hand and GCI, QLI, KOF and the balance of foreign trade on the other hand. Finally the correlations for the KOF index on one hand and the balance of foreign trade, GCI and QLI on the other hand are positive too.

The conclusions are that the correlations mostly support our hypotheses.

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Appendix 1

The following countries are included in our samples: **EU27**: Ireland, Netherlands, Sweden, France, Luxembourg, Finland, Austria, Spain, Denmark, Belgium, Italy, United Kingdom, Germany, Greece, Slovenia, Cyprus, Portugal, Czech Republic, Malta, Estonia, Poland, Slovakia, Hungary, Lithuania, Latvia, Bulgaria, Romania; **3 Candidates:** Croatia, Macedonia, Turkey; **4 Potential candidates**: Albania, Bosnia & Herzegovina, Montenegro, Serbia; **5 ENP countries**: Armenia, Azerbaijan, Georgia, Moldova, Ukraine; **4 other countries:** Kazakstan, Kirgiz Republic, Russia, Tajikistan; **3 West European countries**: Iceland, Norway, Switzerland – in total 46 countries in Europe or the geographical neighbourhood of Europe.

Table A1. The nine variables in absolute values, 46 countries, 2007
Tabela A1. Dziewięć zmiennych w wartościach absolutnych, 46 krajów, 2007

	HDI	GdppcPP	EXGS	IMGS	EX–IM	GCI	BCI R	QOL	KOF
Ireland	0.965	44613	81	70.4	10.6	5.03	24	74	86.92
Netherlands	0.964	38694	75.3	67.3	8	5.4	7	85	91.90
Sweden	0.963	36712	52.4	44.7	7.7	5.54	4	75	89.75
France	0.961	33674	26.6	28.5	–1.9	5.18	17	87	86.18
Luxembourg	0.960	79485	165.0	131.5	33.5	4.88	18	79	85.84
Finland	0.959	34526	44.8	40.1	4.7	5.49	3	77	87.31
Austria	0.955	37370	58.1	51.8	6.3	5.23	8	78	92.51
Spain	0.955	31560	26.2	32.7	–6.5	4.66	27	78	85.71
Denmark	0.955	36130	52.3	51.3	1	5.55	5	81	89.68
Belgium	0.953	34935	89.3	85.8	3.5	5.1	15	78	92.95
Italy	0.951	30353	29.1	29.4	–0.3	4.36	42	80	82.26
United Kingdom	0.947	35130	25.9	29.5	–3.6	5.41	11	72	80.18
Germany	0.947	34401	46.7	39.7	7	5.51	2	78	84.16
Greece	0.942	28517	22.6	35.4	–12.8	4.08	53	71	75.83
Slovenia	0.929	26753	71.4	73.2	–1.8	4.48	35	74	78.78
Cyprus	0.914	24789	47.9	52.7	–4.8	4.23	45	71	82.45
Portugal	0.909	22765	32.7	39.9	–7.2	4.48	30	76	87.54
Czech Republic	0.903	24144	78.9	74.3	4.6	4.58	32	74	86.87
Malta	0.902	23080	84.7	84.2	0.5	4.21	40	77	76.42
Estonia	0.883	20361	72.8	81.7	–8.9	4.74	26	74	79.49
Poland	0.880	15987	41.3	43	–1.7	4.28	56	70	81.26
Slovakia	0.880	20076	86.4	86.8	–0.4	4.45	44	72	85.07
Hungary	0.879	18755	80	77.7	2.3	4.35	47	75	87
Lithuania	0.870	17575	55.4	67.4	–12	4.49	39	72	74.73
Latvia	0.866	16377	44.4	64.7	–20.3	4.41	54	74	71.61
Bulgaria	0.840	11222	63.4	85.5	–22.1	3.93	83	72	75.41
Romania	0.837	12369	29.3	44.6	–15.3	3.97	73	70	71.51
Croatia	0.871	16027	47.3	56.3	–9	4.2	60	77	76.85
Macedonia	0.817	9096	48.1	67.1	–19	3.73	95	62	62.18
Turkey	0.806	12955	23	28	–5	4.25	46	64	64.91
Albania	0.818	7041	20.6	43.3	–19.7	3.48	122	64	55.64
BosniaHercegovina	0.812	7764	28.3	66.3	–38	3.55	107	60	64.68
Montenegro	0.834	11699	26	65.1	–39	3.91	85	60	xxx
Serbia	0.826	10248	21.8	44.7	–22.9	3.78	91	60	65.97
Armenia	0.798	5693	15.2	29	–13.8	3.76	108	61	54.99
Azerbaijan	0.787	7851	63.8	35.6	28.2	4.07	78	55	55.18
Georgia	0.778	4662	30.7	47.2	–16.5	3.83	100	61	61.29
Moldova	0.720	2551	xxx	96.1	xxx	3.64	99	68	63.98
Ukraine	0.796	6914	40.2	44.2	–4	3.98	81	65	68.15
Kazakstan	0.804	10863	48.9	40.2	8.7	4.14	72	53	60.84
Kirgiz Republic	0.720	2006	33.7	64.7	–31	3.34	116	53	58.97
Russia	0.817	14690	30.3	21.9	8.4	4.19	71	57	68.91
Tajikistan	0.688	1753	52.9	64.4	–11.5	3.37	104	52	34.5
Iceland	0.969	35742	35.3	46	–10.7	5.02	16	71	70.66
Norway	0.971	53433	46.4	30	16.4	5.2	13	78	83.53
Switzerland	0.960	40658	56.3	47	9.3	5.62	6	82	90.55

Source: authors' own research
Źródło: opracowanie własne autorów

Table A2. The nine variables, ranking for 46 countries, 2007
Tabela A2. Dziewięć zmiennych, ranking 46 krajów, 2007

	HDIR	GDPpcR	ExGSR	IMGSR	EX-IMR	GCIR	BCIR	QOLR	46KOFR
Ireland	3	3	5	10	4	12	14	18	10
Netherlands	4	5	8	12	8	7	6	2	3
Sweden	5	7	17	26	9	3	3	16	5
France	6	14	37	44	22	10	12	1	12
Luxembourg	7	1	1	1	1	14	13	6	13
Finland	9	12	25	33	12	5	2	12	8
Austria	10	6	13	21	11	8	7	7	2
Spain	10	15	38	39	27	16	16	7	14
Denmark	10	8	18	22	16	2	4	4	6
Belgium	13	11	2	4	14	11	10	7	1
Italy	14	16	35	42	18	23	22	5	19
UK	15	10	40	41	23	6	8	23	21
Germany	15	13	23	35	10	4	1	7	16
Greece	17	17	42	37	34	32	27	27	26
Slovenia	18	18	10	9	21	19	19	18	23
Cyprus	19	19	21	20	25	27	24	27	18
Portugal	20	22	31	34	28	19	17	15	7
Czech Republic	21	20	7	8	13	17	18	18	11
Malta	22	21	4	6	17	28	21	12	25
Estonia	23	23	9	7	29	15	15	18	22
Poland	24	29	27	31	20	25	29	30	20
Slovakia	24	24	3	3	19	21	23	23	15
Hungary	26	25	6	7	15	24	26	16	9
Lithuania	28	26	15	11	33	18	20	23	28
Latvia	29	27	26	16	40	22	28	18	29
Bulgaria	30	34	12	5	41	36	36	23	27
Romania	31	32	34	28	36	35	33	30	30
Croatia	27	28	22	19	30	29	30	12	24
Macedonia	35	37	20	13	39	41	39	36	38
Turkey	38	31	41	45	26	26	25	34	35
Albania	34	40	44	30	38	44	46	34	42
BosniaHerz.	37	39	36	14	55	43	43	39	36
Montenegro	32	33	39	15	45	37	37	39	xxx
Serbia	33	36	43	26	42	39	38	39	34
Armenia	40	42	45	43	35	40	44	37	44
Azerbaijan	42	38	11	36	2	33	34	43	43
Georgia	43	43	32	23	37	38	41	37	39
Moldova	44	44	xxx	2	xxx	42	40	32	37
Ukraine	41	41	28	29	24	34	35	33	33
Kazakstan	39	35	19	32	6	31	32	44	40
Kirgiz Republic	44	45	30	16	43	46	45	44	41
Russia	35	30	33	46	7	30	31	42	32
Tajikistan	46	46	16	18	32	45	42	46	45
Iceland	2	9	29	25	31	13	11	27	31
Norway	1	2	24	40	3	9	9	7	17
Switzerland	7	4	14	24	5	1	5	3	4

R indicates ranking positions for the 46 countries
R wskazuje pozycje rankingowe dla 46 krajów
Source: authors' own research
Źródło: opracowanie własne autorów

Appendix 2: The KOF Index of Globalization

The KOF (Konjunkturforschungsstelle – Business-cycle Research Center) Index of Globalization consist of three aspects (ETH, 2010 KOFIndex of Globalization):

A. Economic Globalization (Weight 37%) (1) Actual Flows: Trade (percent of GDP), Foreign Direct Investments, flows (percent of GDP), Foreign Direct Investment, stocks (percent of GDP), Portfolio Investments (percent of GDP), Income Payments to Foreign Nationals (percent of GDP); (2) Restrictions: Hidden Import Barriers, Mean Tariff Rate, Taxes on International Trade (percent of current revenue), Capital Account Restrictions.

B. Social Globalization (Weight 39%): (1) Data on Personal Contact: Tefephone Traffic, Transfers (percent of GDP), International Tourism, Foreign Population (percent of total population), International Letters (per capita); (2) Data on Information Flows: Internet Users (per 1000 people), Television (per 1000 people), Trade in Newspapers (percent of GDP); (3) Data on Cultural Proximity: Number of McDonald´s Restaurants (per capita), Number of Ikea (per capita), Trade in books (percent of GDP).

C. Political Globalization (Weight 25%): Embassies in Country, Membership in International Organizations, Participation in U.N. Security Council Missions, International Treaties.

Appendix 3: List of variables

GDPpcPPP: Gross Domestic Product per head of population in purchasing power parities

HDI: Human Development Index, consisting of (1) GDPpcPPP, (2) life expectancy at birth and (3) an education index

QLI: Quality of Life Index, consisting of (1) Cost of living, (2) Leisure and Culture, (3) Economy, (4) Environment, (5) Freedom, (6) Health, (7) Infrastructure, (8) Risk and Safety, (9) Climate

EXGS: Exports of goods and services, relative to Gross Domestic Product (GDP)

IMGS: Imports of godds and services, relative to GDP

EX-IMGS: balance of exports and imports of goods and services, relative to GDP

KOF: KOF Index of Globalization, consisting of (1) Economic Globalization, (2) Social Globalization, (3) Political Globalization

GCI: The global competitiveness index, consisting of 12 pillars: (1) Basic requirements: institutions, infrastructure, macroeconomic environment, health and primary education, (2) Efficiency enhancers: higher education and training, goods markets efficiency, labour markets efficiency, financial market development, technological readiness, market size, (3) Innovation and sophistication factors: business sophistication, innovation

BCI: The business competitiveness index, consisting of (1) Quality of the national busimess environment ranking, and (2) Company operations and strategic ranking

STANDARD ŻYCIA, JAKOŚĆ ŻYCIA, GLOBALIZACJA I KONKURENCYJNOŚĆ W UE I W KRAJACH SĄSIADUJĄCYCH – ANALIZA EMPIRYCZNA

Streszczenie. Artykuł podejmuje problem teoretycznych i empirycznych zależności pomiędzy standardem życia, jakością życia, globalizacją i konkurencyjnością krajów. Pomimo iż ekonomiści nie są przekonani co do przydatności koncepcji konkurencyjności krajów, argumentując, iż to przedsiębiorstwa i gałęzie przemysłu a nie kraje konkurują gospodarczo, opinia publiczna, dziennikarze i politycy wydają się być zdania, że problem konkurencyjności jest ważny. Przykładem tego jest fakt, iż jednym z celów Unii Europejskiej jest stać się najbardziej konkurencyjną gospodarką w świecie. Co więcej, ekonomiści twierdzą, że globalizacja gospodarcza może doprowadzić do poprawy dobrobytu dla wszystkich. W tym przypadku opinia publiczna jest bardziej sceptyczna. Co więcej, nie tylko ogólna opinia publiczna, ale również naukowcy inni niż ekonomiści wydają się twierdzić, iż standard życia i jakość życia są w niewielkim stopniu skorelowane ze sobą. Autorzy uzyskali w niniejszych badaniach wyniki wskazujące na silną korelację pomiędzy głównymi zmiennymi. Innymi słowy, przyjęte hipotezy zostały potwierdzone.

Słowa kluczowe: standard życia, jakość życia, globalizacja, konkurencyjność, Produkt Krajowy Brutto, Agenda Lizbońska, korelacja, kraje europejskie

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METHODOLOGY FOR DETERMINING THE AMOUNT OF COMPENSATION FOR NON-CONTRACTUAL USE OF PROPERTY

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Abstract. This paper attempts to design a reliable method for the determination of the amount of compensation for non-contractual use of property. The compensation is equated with the concept of economical and usually means payment being effected service. This applies mainly to pay for work done or made available or acquired right to the conditions specified in the contract. The compensation for non-contractual use of property should, therefore, account for the anticipated income from a lease or rent agreement that would have been concluded if the owner's rights to property had not been limited. In a market economy, the amount of compensation should be determined based on market data, but this approach can be fraught with problems. The authors discuss practical problems associated with the determination of rental income generated by agricultural property, and they propose a modified method for determining the amount of compensation for non-contractual use of property.

Key words: value, lease, property

INTRODUCTION

The right to ownership of property is the cornerstone of every market economy. Its significance has been emphasized in the legislative provisions of the Constitution of the Republic of Poland.

1. Everyone shall have the right to ownership, other property rights and the right of succession.

2. Everyone, on an equal basis, shall receive legal protection regarding ownership, other property rights and the right of succession.

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3. The right of ownership may only be limited by means of a statute and only to the extent that it does not violate the substance of such right.

In recent years, Poland has become an arena for a variety of infrastructure development projects, such as the construction of roads, water supply, gas supply and sewer networks, power supply lines and poles. In the course of this development process, the right to ownership of property was frequently restricted due to an absence of agreements regulating property use. The above has resulted in claims for compensation in virtue of non-contractual use of property. The concept of non-contractual use of property is defined by art. 224 § 2 of the Civil Code, which states that those who make use of property without a legal title are liable to compensate for the use of that property and are held responsible for the wear and tear, deterioration and lhas the right to claim compensation for non-contractual use of his property, and the amooss of property.

Those who use property without the owner's consent are liable to make a payment to its legal owner as compensation for the shared use of property [Konieczny, Kowalczyk 2010a]. Pursuant to the provisions of art. 224 and art. 225 of the Civil Code, the owner unt of compensation [Rudnicki 2002] should be equal to the value of remuneration that the autonomous possessor would pay to the owner had he exercised a legal right to use the property.

The compensation for non-contractual use of property should, therefore, account for the anticipated income from a lease or rent agreement that would have been concluded if the owner's rights to property had not been limited. The compensation for non-contractual use of property (art. 224 § 2, art. 225 of the Civil Code) is determined in the form of a single payment covering the entire period during which the property was used by an autonomous possessor [Konieczny, Kowalczyk 2010b].

COMPENSATION FOR NON-CONTRACTUAL USE OF PROPERTY

The amount of compensation due is determined by market rental rates applicable to the type of property, the circumstances of use and the period of time during which the property remained in the use of an autonomous possessor (decision of the Supreme Court of 7 April 2000, case No. IV CKN 5/2000, decision of the Supreme Court of 15 September 2005, case No. II CK 61/2005). Pursuant to the Resolution of the Supreme Court of 17 June 2005, case No. III CZP 29/05, the owner of property has the right to claim from an autonomous possessor relevant compensation for the use of property, regardless of the claim instituted pursuant to art. 222 § 2 of the Civil Code. It should be noted, however, that claims for compensation in virtue of non-contractual use of property expire after 10 years, and this legal provision significantly restricts the owner's claims. If infrastructure and devices had been developed by an autonomous user on the property at an earlier date (more than 10 years prior to the institution of the claim), the owner is not entitled to compensation in virtue of the entire period of non-contractual use of property, but may claim compensation only for the preceding 10 years. Therefore, the relevant claim can be instituted only in respect of the above 10-year period [Puch 2002].

The right of lease is regulated by art. 693 §1 of the Civil Code. Under the contract of lease, the landlord provides the tenant with the right to use and generate profits from

property over a specified or unspecified period of time, and the lessee undertakes to pay the agreed rent to the landlord. Tenant rights are laws of obligation, they are non-hereditary, and they are awarded for a specific period of time, which means that a lease contract can be concluded for both specified and unspecified term. The manner of property use is monitored by the owner in accordance with the provisions of the lease contract. The contract also sets forth the terms for the calculation of rent due in virtue of leased property.

The lessor-lessee relationship is governed by a number of dependencies that follow from the "legal validity" of each right. The owner who holds a legal title to property may expect streams of income over an unspecified period of time, whereas the lessee is entitled to use the property only during the period stated in the lease contract.

The amount of compensation for non-contractual use of property is determined based on the present-day value of rent due for each year of property use. In line with the limitations imposed by art. 118 of the Civil Code, the amount of compensation is determined based on the following formula:

$$W_{bk} = \sum_{i=1}^{L} D_i \cdot k \cdot P \tag{1}$$

where:

W_{bk} – single payment made in compensation for non-contractual use of property,

D_i – present-day value of annual streams of rent income generated in successive years of property use (*unitary rental income*),

P – area of developed land,

k – coefficient determining an autonomous possessor's participation in the shared use of the developed part of property (if land has been permanently excluded from productive use, e.g. in store yards of excavated soil, k = 1.0). An autonomous possessor's participation in the use of property can be expressed by a multiplier that corresponds to the proportions of shared use.

L – number of periods during which property was used without a legal title.

Coefficient k may not equal zero because this value would defy the principle of shared property use, and it would undermine the legal grounds for the Resolution of the Supreme Court of 17 June 2005, case No. III CZP 29/2005 which states that „...the amount of compensation shall be proportional to the degree of an autonomous possessor's intervention in the legal title, it shall account for the value of property, and the value of anticipated income in virtue of infringement of the legal title to property should be assessed in view of the above considerations. The amount of compensation shall not exceed the property's value".

Based on formula (1) and pursuant to the decision of the Supreme Court of 15 September 2005, the amount of compensation for non-contractual use of property should be determined based on rental rates that fulfill market criteria.

Market rates for property lease are defined as the amount for which the property is leased for a given period of time, provided that this amount is approved by both the lessor and the lessee on the terms stipulated in the lease contract, and that both parties are fully informed, act with due diligence and without coercion [Źróbek, Hłasko 2003].

Market rental rates are determined based on the principle of the most effective use of property, which is defined as the optimal and legal use of free land or undeveloped property that is physically possible, adequately justified, financially feasible and most beneficial.

DETERMINATION OF THE VALUE OF PROPERTY INCOME STREAMS

For the purpose of verifying the presented method of determining the amount of compensation for non-contractual use of property, we have analyzed the discussed procedure with the use of real data from the agricultural property market. The proposed approach stems from the authors' extensive experience in the area, and its use is justified by the fact that even the most effective and theoretically ideal model, algorithm or calculation procedure may be rendered useless when applied in a real market environment.

The study was carried out in the region of Warmia and Mazury, Frombork municipality, Wierzno Wielkie cadastral district. The object of our investigations was hypothetical agricultural property which was used on a non-contractual basis (a part of the property was occupied due to construction works) between 1 October 2006 and 31 December 2010.

The first step in the applied procedure involved the determination of the value of unitary rental income (Di), as per formula (1). For this purpose, we have analyzed contracts for the lease of agricultural property concluded by the Agricultural Property Agency (APA), the largest supplier of leasehold agricultural property. In the third quarter of 2010, the APA concluded 258 lease contracts covering a total area of 3211 ha, marking a nearly two-fold drop from the number of contracts concluded in the second quarter of 2010. In Frombork municipality, Wierzno Wielkie cadastral district, the most recent lease contracts were concluded in 2006, as shown in Figure 1 where the area of leased land plots is represented by the size of the corresponding spheres.

In lease contracts concluded between the lessor (APA) and the lessee, the applicable rental incomes are set by multiplying the traded quantity of wheat in quintals (1 q = 100 kg) by wheat prices published by the Central Statistical Office (CSO). The prices of 1 q of wheat in 2006–2010 are presented in Table 1.

The data presented in Table 1 point to significant variations in the prices of 1 q of wheat per ha between 2006 and 2010, and the above contributed to differences in rental incomes generated in the analyzed years. If the amount of compensation for non-contractual use of property were to be determined by rental rates quoted on the market, the correlation between changes in the price of 1 q of wheat per ha and changes in the price of 1 ha of arable land has to be examined. Our practice seems to indicate that there are no fixed correlations between lease rates stipulated in APA contracts and the market value of agricultural land. In the analyzed area, the most recent lease contracts were concluded in May 2006. Those prices have to be adjusted, but the applied adjustment method does not account for changes that have taken place on the property market. The adjustments, performed based on the consumer price index, are presented in Table 2 (annual indices) and Table 3 (monthly indices for 2006).

It has been assumed that in the analyzed locality of Frombork municipality, Wierzno Wielkie cadastral district, the annual income generated by the APA per m^2 of land would

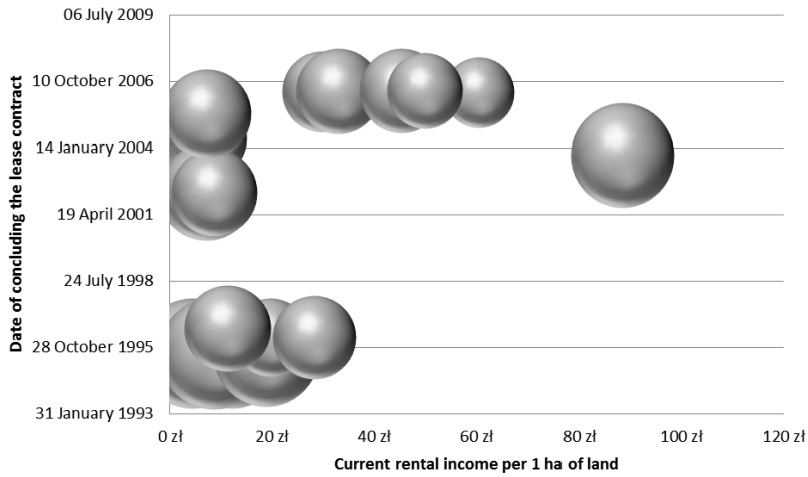

Fig. 1. Value of annual income per ha of arable land based on the contracts concluded by the APA (Frombork municipality)
Rys. 1. Wysokość rocznego czynszu dzierżawnego 1 ha gruntu rolnego na podstawie umów zawartych przez ANR (gmina Frombork)
Source: own compilation
Źródło: opracowanie własne

Table 1. Prices of 1 q of wheat published by CSO in 2006–2010
Tabela 1. Cena 1 dt pszenicy publikowana przez GUS w latach 2006–2010

Period	Value of indicator	Date of publication by CSO
1st half of 2010	PLN 48.03 per 1 q	20-07-2010
2nd half of 2009	PLN 46.49 per 1 q	19-01-2010
1st half of 2009	PLN 51.39 per 1 q	20-07-2009
2nd half of 2008	PLN 53.70 per 1 q	19-01-2009
1st half of 2008	PLN 87.75 per 1 q	18-07-2008
2nd half of 2007	PLN 74.04 per 1 q	17-01-2008
1st half of 2007	PLN 62.35 per 1 q	18-07-2007
2nd half of 2006	PLN 48.17 per 1 q	17-01-2007
1st half of 2006	PLN 39.56 per 1 q	18-07-2006
2nd half of 2005	PLN 35.51 per 1 q	17-01-2006
1st half of 2005	PLN 38.95 per 1 q	18-07-2005

Source: www.stat.gov.pl
Źródło: www.stat.gov.pl

be equal to the product of the average quantity of wheat (in quintals) and the price of 1 q of wheat published by the CSO each year. The consumer price index published by the CSO was used to calculate the adjusted total income (rental income) for the period between 1 October 2006 to 31 December 2010. The incomes from each analyzed year were adjusted to current prices as of 31 December 2010, and they are presented in Table 4.

Table 2. Annual consumer price indices
Tabela 2. Roczny wskaźnik zmiany cen towarów i usług

Year	Consumer price index Previous year = 100
2006	101.0
2007	102.5
2008	104.2
2009	103.5
2010	102.5*

*estimate
*wartość szacunkowa
Source: www.stat.gov.pl
Źródło: www.stat.gov.pl

Table 3. Monthly consumer price indices from October to December 2006
Tabela 3. Miesięczny wskaźnik zmiany cen towarów i usług w okresie październik – grudzień 2006

Year	Month		
	October	November	December
2006	101.6	101.6	101.4

Source: www.stat.gov.pl
Źródło: www.stat.gov.pl

The data shown in Table 4 (columns *b*, *f* and *g*) were used to develop Figure 2 which presents the correlations between annual rent and date. Oval-shaped areas with empty fields denote the amount of rental income per hectare in a given year (column *f*), and black dots indicate the value of adjusted rental income (column g). Adjusted incomes for each year form "clouds" of observations in the range of PLN 121/ha to PLN 236/ha. In the analyzed case, the compensation for non-contractual use of property determined based on the coefficient of shared property use k = 1 will amount to PLN 853.72 per hectare (as per formula 1) and PLN 0.08 per m^2 of land. The resulting "cloud" of adjusted rental incomes results from an absence of direct correlations between rental incomes in each analyzed year and the applied adjustment indices. The use of adjustment indices that are correlated with factors based on which rental incomes were determined in each year would result in a smaller spread between the adjusted rental incomes.

The weakness of the proposed method lies in the fact that market rental rates are difficult to acquire. Present-day rental rates, the price of 1 q of wheat and adjusted rental incomes were determined based on a hypothetical set of data presented in Figure 1, implying that formula (1) cannot be used to determine unitary rental income (Di) or the amount of compensation for non-contractual use of property.

In an attempt to determine the value of unitary rental income (Di) and, consequently, the amount of compensation for non-contractual use of property, with the involvement of formula (1), we have also considered the option of analyzing the compensation for temporary occupation of agricultural property for investment purposes. We have acquired local market data pertaining to lease contracts for the temporary occupation of agricultural land for the needs of a project to upgrade road S22. Annual rental incomes quoted in the above agreements are presented in Table 5.

Table 4. Total rental incomes adjusted by the consumer price index (CPI) as of 31 December 2010

Tabela 4. Suma wpływów z przykładowej dzierżawy waloryzowanej wskaźnikiem zmiany cen towarów i usług na 31 grudnia 2010 r. grudnia

No.	Date	CPI	Total CPI [CSO]	Price of 1 q of wheat in preceding year [from Table 1]	Rent income per ha at the average rate of 3 q/ha [PLN]	Income adjusted as of 31 December 2010 [PLN/ha]
a	*B*	*c*	*d*	*e*	*f* 3*q/ha x col. e*	*g* *col. d x col. f*
1	1 October 2006		1.131	PLN 38.95	29.21*	33.03
		0.998				
2	31 December 2006		1.133	PLN 35.51	106.53	120.71
		1.025				
3	31 December 2007		1.105	PLN 48.17	144.51	159.75
		1.042				
4	31 December 2008		1.061	PLN 74.04	222.12	235.64
		1.035				
5	31 December 2009		1.025	PLN 53.70	161.10	165.13
		1.025				
6	31 December 2010		1.000	4 PLN 6.49	139.47	139.47
Total adjusted rent incomes in PLN/ha						853.72

*for the period from 1 October to 31 December
*dotyczy okresu od 1 października do 31 grudnia
Source: own compilation
Źródło: opracowanie własne

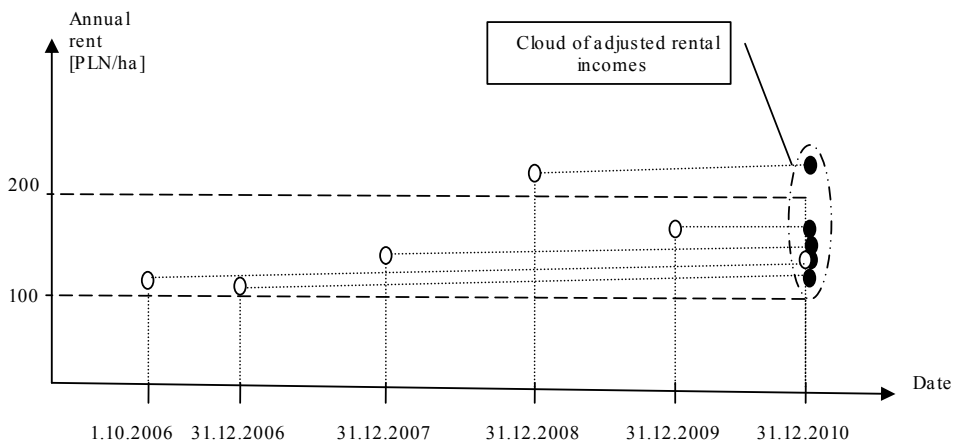

Fig. 2. Adjustment of rental incomes based on adjusted rental incomes from Table 4

Rys. 2. Waloryzacja czynszów dzierżawy nieruchomości z wykorzystaniem zwaloryzowanych czynszów z tabeli 4

Source: own compilation

Źródło: opracowanie własne

Table 5. Specification of lease contracts for agricultural property situated in the vicinity of road S22
Tabela 5. Zestawienie umów dzierżawy gruntów rolnych położonych w sąsiedztwie drogi S22

No.	Cadastral district	Area [ha]	Lease start date	Lease end date	Monthly rental income per m^2	**Annual rental income per m^2**
1	Karszewo	6.0000	2007-09-19	2008-08-31	PLN 0.004	PLN 0.05
2	Wielkie Wierzno	0.0060	2007-07-16	2008-09-30	PLN 2.49	PLN 29.86
3	Nowe Monasterzysko	2.2100	2007-07-01	2008-08-31	PLN 0.02	PLN 0.19
4	Nowe Monasterzysko	1.9995	2007-02-08	2009-02-08	PLN 0.02	PLN 0.20
5	Błudowo	1.0000	2007-03-21	2008-03-21	PLN 0.02	PLN 0.25
6	Wielkie Wierzno	25.0000	2008-03-15	2008-10-01	PLN 0.01	PLN 0.11
7	Nowe Monasterzysko	0.3897	2007-05-07	2008-04-30	PLN 0.05	PLN 0.64
8	Nowe Monasterzysko	0.3897	2008-04-30	2008-09-30	PLN 0.08	PLN 0.91
9	Gronowo Górne	1.0000	2006-12-06	2008-06-30	PLN 0.01	PLN 0.13
10	Nowe Monasterzysko	1.9995	2007-02-08	2009-02-08	PLN 0.02	PLN 0.20
11	Nowe Monasterzysko	1.0000	2007-03-30	2009-02-08	PLN 0.02	PLN 0.26
12	Karszewo	1.4112	2008-01-17	2008-09-30	PLN 0.05	PLN 0.60

Source: own compilation
Źródło: opracowanie własne

The lease contracts presented in Table 5 regulate the relationships between the owners of agricultural property and developers. Lessees use the property for non-agricultural purposes, and the lease contract is concluded for the period required to perform construction works. Agricultural land is occupied temporarily for the needs of investment projects, and lease contracts stipulate additional conditions for land use, e.g. the lessor undertakes to handle all waste which is regarded as dangerous under statutory provisions, such as loam, tree stumps and topsoil, to return the land plot to its original condition and sign waste management documents. In the analyzed case, the proposed rental rates seem to diverge from actual market rates.

PROPOSED METHOD FOR DETERMINING THE AMOUNT OF COMPENSATION FOR NON-CONTRACTUAL USE OF PROPERTY

The amount of compensation for non-contractual use of property is determined based on formula (1):

$$W_{bk} = \sum_{i=1}^{L} D_i \cdot k \cdot P \tag{1}$$

where:
W_{bk} – single payment made in compensation for non-contractual use of property,
D_i – present-day value of annual streams of rental income generated in successive years of property use (*unitary rental income*),

P – area of developed land,
k – coefficient determining an autonomous possessor's participation in the shared use of the developed part of property (if land has been permanently excluded from productive use, e.g. in store yards of excavated soil, k = 1.0). An autonomous possessor's participation in the use of property can be expressed by a multiplier that corresponds to the proportions of shared use,
L – number of periods during which property was used without a legal title.

on the assumption that the amount of income generated from leased property can be reliably established based on market rental rates. If, however, the applied market rental rates appear to have a random character (Section 2), the proposed method has to be modified.

According to Jäger [2009], the general principle is that land users pay rent to land owners based on the lessees' ability to efficiently use the land. Those who can use it most efficiently pay the highest rent. The highest land values should occur when lessees are willing to pay the highest rent, which implies that value is directly based on income. Davaney [2010] subscribes to this theory by observing that the total capitalized value of future income determines the value of property. The above implies that in an absence of information about annual incomes generated from the lease of agricultural property (D_i), the value of earnings can be determined based on the relationship between the value of property appraised by a property expert and the income generated from that property. Pursuant to the provisions of the Regulation of 21 September 2004 on property valuation and appraisal reports, the value of property is defined as the product of regular streams of annual income that can be obtained from the analyzed property and the capitalization ratio or as the quotient of regular streams of annual income and capitalization rate. This dependency is illustrated by the below formula:

$$W_i = \frac{D_i}{R_i} \tag{2}$$

where:
W_i – market value of property,
D_i – annual income generated by property,
R_i – capitalization rate.

Formula (2) can be transformed to present the correlation between the market value of property in a given year and the capitalization rate reported for that year. If W_i is the unitary market value (m^2), the unitary rental income generated by agricultural property can be determined based on the following formula:

$$D_i = W_i \cdot R_i \tag{3}$$

If we account for the correlation between income and property value (capitalization rate), the amount of compensation for non-contractual use of property can be determined based on the following modified equation:

$$W_{bk} = \sum_{i=1}^{L} W_i \cdot R_i \cdot k \cdot P \tag{4}$$

where:
W_i – unitary market value of undeveloped property in successive years,
R_i – capitalization rate,
P – area of land excluded from use,
k – coefficient determining an autonomous possessor's participation in the shared use of the developed part of property (if land had been permanently excluded from productive use, e.g. in store yards of excavated soil, k = 1.0). An autonomous possessor's participation in the use of property can be expressed by a multiplier that corresponds to the proportions of shared use,
L – number of periods during which property was used without a legal title.

Figure 3 presents annual rent incomes (oval areas with empty fields), calculated based on formula $D_i = W_i \cdot R_i$, and adjusted in view of the price index of similar properties as of the date on which the amount of compensation for non-contractual use of property was determined (31 December 2010).

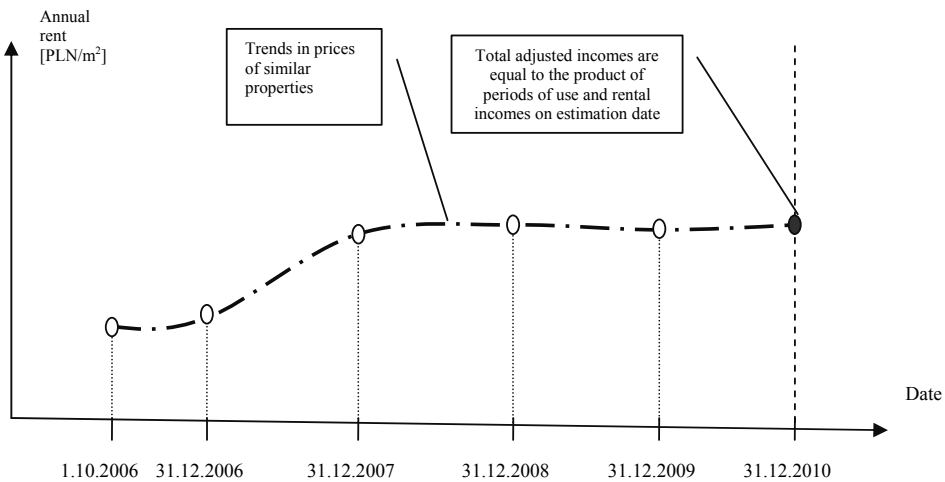

Fig. 3. Adjustment of rental incomes based on trends in the prices of similar properties
Rys. 3. Waloryzacja czynszów dzierżawy nieruchomości z wykorzystaniem trendu zmiany cen nieruchomości podobnych
Source: own compilation
Źródło: opracowanie własne

In line with the above methodology, rental income generated in the past on date X will be adjusted with the use of the property price index. The price index should be determined for properties similar to the analyzed property. The market value of property valid on date X (past) can be converted to market value valid on date Y (present) with the use of the price index of similar properties. This relationship is described by the below formula:

$$W_Y = W_X \cdot (1 + w_{y-x}) \quad (5)$$

where:
W_Y – present market value,
W_X – past market value,
$w_{y–x}$ – price index of similar properties in the period between X and Y.

The rental rate is a derivative of market value, therefore rental rates are adjusted with the involvement of the price index of similar properties based on the following formula:

$$D_Y = D_X \cdot (1 + w_{y–x}) \tag{6}$$

where:
D_Y – present value of annual rental income,
D_X – past value of annual rental income,
$w_{y–x}$ – price index of similar properties in the period between X and Y.

Reliable information on market rental rates is very difficult, if not impossible, to acquire; therefore, incomes were determined by multiplying the present market value of property by its capitalization rate ($W_Y \cdot R$):

$$W_Y \cdot R = D_X \cdot (1 + w_{y–x}) \tag{7}$$

where:
R – capitalization rate for undeveloped property on date Y.

Total rental incomes from the analyzed periods can be calculated with the use of the following formula:

$$D_{X1} \cdot (1 + w_{y–x1}) + D_{X2} \cdot (1 + w_{y–x2}) + \ldots + D_{Xn–1} \cdot (1 + w_{y–xn–1}) = D_{Xn} \cdot L= \\ = W_Y \cdot R \cdot L \tag{8}$$

where:
D_{Xi} – rental income in period Xi (e.g. D_{X1}, D_{X2} …. $D_{Xn–1}$),
W_Y – market value of property on date Y,
$w_{y–xn–1}$ – property price index in the period between $X_{n–1}$ and Y,
L – number of periods that have to be taken into account when rental incomes are adjusted to the level valid on the day when compensation is determined.

The below formula can be used to calculate the single payment made in compensation for non-contractual use of property, assuming that the present value of income lost due to non-contractual use of property is determined based on the property price index:

$$W_{bk} = W_1^* \cdot R \cdot L \cdot P \cdot k \tag{9}$$

where:
W_1* – market value of property on the day when the amount of compensation is determined,
P – are of land that was used without a legal title,
R – capitalization rate for undeveloped property,
L – number of lease periods.

CONCLUSIONS

In a market economy, the value of remuneration for non-contractual use of property should be determined based on market data to provide owners with fair compensation in virtue of the period when their ownership rights were limited. The said compensation should be determined in view of the present-day value of streams of income generated from property lease, land area, the coefficient of shared property use and the number of periods during which property was used without a legal title.

This study discusses problems in determining the stream of incomes for each year of property use, and it proposes an alternative methodology for adjusting rental incomes to the level valid on the day when compensation is determined.

Rental incomes for the period of non-contractual property use may be adjusted to the present level with the involvement of:

- consumer price index published by the Central Statistical Office,
- price index of similar properties.

Our analysis indicates that adjustments involving the price index of similar properties produce the most reliable results. In most cases, the income generated by property is reinvested on the property market, and changes in property prices are directly proportional to changes in the value of capital assets invested on the property market.

To verify the proposed method, the amount of compensation has been calculated based on a practical example. The market value of undeveloped property in the analyzed area is PLN 2.2/m^2, and the capitalization rate for agricultural property is 11%. The length of one year was set at 365 days, and the coefficient of shared use was adopted at 0.5 (the coefficient of shared use is applied to determine compensation for non-contractual use of property). Formula (9) was applied to determine the amount of compensation for non-contractual use of property from 1 October 2006 to 31 December 2010 per m^2 of land area:

$$W_{bk} = \text{PLN } 2.2/\text{m}^2 \cdot 0.11 \cdot 4.25 \cdot 0.5 = \text{PLN } 0.51/\text{m}^2$$

The amount of compensation has been calculated based on real market data, which suggests that correct estimation of compensation components supports reliable determination of the current amount of compensation.

The compensation determined in accordance with the method presented in Section 2 is weakly correlated with real market data. The above results from the use of the consumer price index published by the Central Statistical Office as well as limited access to the rental rates quoted in preceding years.

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METODOLOGIA OKREŚLANIA WYSOKOŚCI WYNAGRODZENIA Z TYTUŁU BEZUMOWNEGO KORZYSTANIA Z NIERUCHOMOŚCI

Streszczenie. W artykule przedstawiono problematykę z obszaru rynku nieruchomości, dotyczącą zagadnienia ustalania wysokości wynagrodzenia z tytułu bezumownego korzystania z nieruchomości. Wynagrodzenie jest utożsamiane z pojęciem ekonomicznym i z reguły oznacza zapłatę za zrealizowaną usługę. Dotyczy to głównie zapłaty za wykonaną pracę albo udostępnioną rzecz lub nabyte prawo na warunkach określonych w umowie. Wynagrodzenie za bezumowne korzystanie z nieruchomości powinno więc obejmować spodziewane korzyści z tytułu ewentualnej umowy najmu lub dzierżawy, która zostałaby zawarta, gdyby nieruchomość nie została zajęta. W gospodarce rynkowej wynagrodzenie takie powinno opierać się na danych rynkowych, co jednak może wiązać się z trudnościami z uwagi na ograniczony dostęp do zawartych umów dzierżawy. W pracy autorzy przedstawili problemy związane z praktycznym wyznaczeniem strumieni dochodów z nieruchomości rolnych, a następnie zaproponowali własną metodykę dotyczącą wyznaczania wynagrodzenia za bezumowne korzystanie z nieruchomości.

Słowa kluczowe: wartość, dzierżawa, nieruchomość

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LOOKING FOR FURTHER DETERMINANTS OF REGIONAL DEVELOPMENT

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Abstract. Contemporary scientists try to determine new or so far not appreciated factors contributing to regional development in order to explain social and economic processes influencing regional disparities. A wide set of potential determinants is considered. One of them is creativity, examined on the level of individuals. There exist quite many supporters of the idea that creativity contributes generally to development, as well as to regional development. A relationship between theses phenomena can be proved statistically, as it was performed in the study with use of Spearman's correlation coefficient. Nevertheless it needs taking into account that creativity concerns wide range of activities, for example artists usually not associated as contributors of economic or regional development.
However, there still remains some area to speculations: to what extent development in some areas attracts creative people to them (so opposite relation to the fact that creative people are determinants of development)? Maybe from some critical point, a development level is a determinant of high density of creative people in some areas? An answer seems not to be easy and requires further research.

Key words: creativity, development determinant, culture, regional development

INTRODUCTION

Science, including economics, sociology, geography even history, etc., has proposed many proposals of factors which in the theory contribute to development, including also regional development. Theories of comparative advantage, industrialization cycles, cultural, religious, geographic explanations, Marxism, dependency, and world-systems theories have all been offered [Guy 1999]. Some of them come from ideologies, other from close studies of past experiences of nations or regions or from current studies on development.

For example David S. Landes in his book *The Wealth and Poverty of Nations* argues forcefully for geographic and cultural determinism as major factors in economic history.

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Taking into account, for the example, the demographics of infant mortality, epidemic diseases and the ownership and control of water resources he drew the conclusion that people who live in tropics simply cannot work as hard or efficiently as those in more temperate climates. It also places temperate Europe and North America in an advantageous position further benefited by the presence of appropriate natural resources [Guy 1999]. Further, Landes confessed that cultural factors are difficult to be accepted by economists as they lie outside the purview of the discipline. On the other hand they are often cited by historians or sociologists as explanations for exceptional economic performance in earlier periods [in this place he referred to Max Weber and *The Protestant Ethic*] or for Japanese achievements today [Landes 1990]. In the group of Polish researches, cultural issues as factors determining competitiveness of a region were indicated for example by Spychalski [Spychalski 2011], who placed a culture model at the top of a proposed pyramid of competitiveness of a region.

MATERIAL AND METHOD

As it can be seen on the example of the theory of Landes that there can exist really different approaches to determinants of regional development. The aim of the paper is a closer study on a concept of creativity (especially of individuals) as a key factor contributing to regional growth acknowledged by many scientists. The paper has been performed within studies in the project entitled Economic and social determinants of rural areas development of the Mazovia region in the suburban and external zone of Warsaw, No N N114 145240.

It was performed on the base of the literature review as well as statistic data from the Eurostat, including data a on human resources in science and technology (HRST)[1] and on regional gross domestic product (PPS per inhabitant) by NUTS 2 regions. There were also used Eurostat's data on number of persons employed in selected cultural occupations (writers and creative artists) as a share of total employment (%) and an indicator exports/imports of high-tech products as a percentage of total calculated as share of exports/imports of high-technology products from a country in total exports/imports from this country at the level of NUTS 1 (countries).

There was used Spearman's correlation coefficient calculated in SPSS (Statistical Package for the Social Sciences) in order to examine if there exists correlation between selected indicators. The indictor describing human resources in science and technology was also presented on the map by NUTS 2 regions in order to visualize differences between European regions.

[1]According to the methodology of the Eurostat, the second indicator represents human resources in science and technology as a share of the economically active population in the age group 15–74 and gives the percentage of the total labour force in the age group 15–74, that is classified as HRST, i.e. having either successfully completed an education at the third level or is employed in an occupation where such an education is normally required.

CREATIVITY AS A DETERMINANT OF DEVELOPMENT

Schumpeter, an author of the classical growth theory, describes in *Development* the general phenomenon of development as a discontinuity that appears because of the emergence of novel phenomena. Schumpeter further identifies the explanation of novelty as the greatest unmet scientific challenge. In this article he for the first and only time connects to his early ideas on economic development. The significance of Schumpeter's early conceptualization of economic development within the broad context of the economy as a whole is to exclude exogenous shocks as explanation for economic development. Novelty must therefore be explained by some factor endogenous to the economic system – Schumpeter attributed endogenous change to the creative acts associated with entrepreneurial activity [Becker et al 2005].

Robert Lucas took a role of creative individuals in economic growth into considerations. He premised that all knowledge resides in the head of some individual person, so that the knowledge of a firm, or economy, or any group of people is simply a list of the knowledge of its members. A main feature of the model will be the social or reciprocal character of intellectual activity: each person gains from the knowledge of the people around him; his ideas in turn stimulate others [Lucas 2009]. This approach can be as well applied to examination of regional differences/disparities in development.

According to Richard Florida, the most fundamental level building block of the creative economy is creative individuals. In *The Rise of the Creative Class* he illustrated that every single human being has creative potential, and discussed the economic value of such creative individuals for innovation in industry [Stolarick et al 2010]. From the regional perspective it is important that competition for talent occurs not only between nations but also between cities and regions, just as competition in many industries occurs at the business-unit, rather than the company, level [Florida 2004]. This direction of thinking about regional development was continued in some next works of a group of researchers, including Florida. Using regression analysis, they found a positive relationship between the density of creative workers and metropolitan patenting activity, suggesting that density is a key component of knowledge spillovers and a key component of innovation [Knudsen et al 2008].

Creativity of individuals as a factor connected with regional development was arisen also by Polish researchers. For example Dziemianowicz, Juchniewicz, Samulowski, Szmigiel [Dziemianowicz et al 2006] indicated creativity of inhabitants of particular region as an area of necessary support from regional authorities in order to enhance competitiveness and innovativeness of enterprises in a region. They indicated that individual's attitudes towards work and economic activity, entrepreneurship and creativity form a social and cultural sphere of a region; a sphere which influences openness to new challenges connected with globalisation and the age of knowledge-based economy. An analysis of other Polish region (Western Pomeranian) led to a conclusion that creativity of inhabitants (also firms and institutions) is an important factor influencing innovativeness of economic entities on rural areas there. In the context of this region, a low level of creativity and entrepreneurship was found as a social barrier of innovativeness which partly contributed to socio-economic marginalization of these areas and the whole region [Łącka 2008].

RELATIONSHIP BETWEEN CREATIVITY AND REGIONAL DEVELOPMENT

Figure 1 presents regional differences in Europe from the perspective of human resources in science and technology. It can be to some extent an illustration of potential of creativity on the regional level in Europe. It can be seen that the highest proportions of labour force involved in creative work are represented by regions in countries traditionally perceived as highly developed.

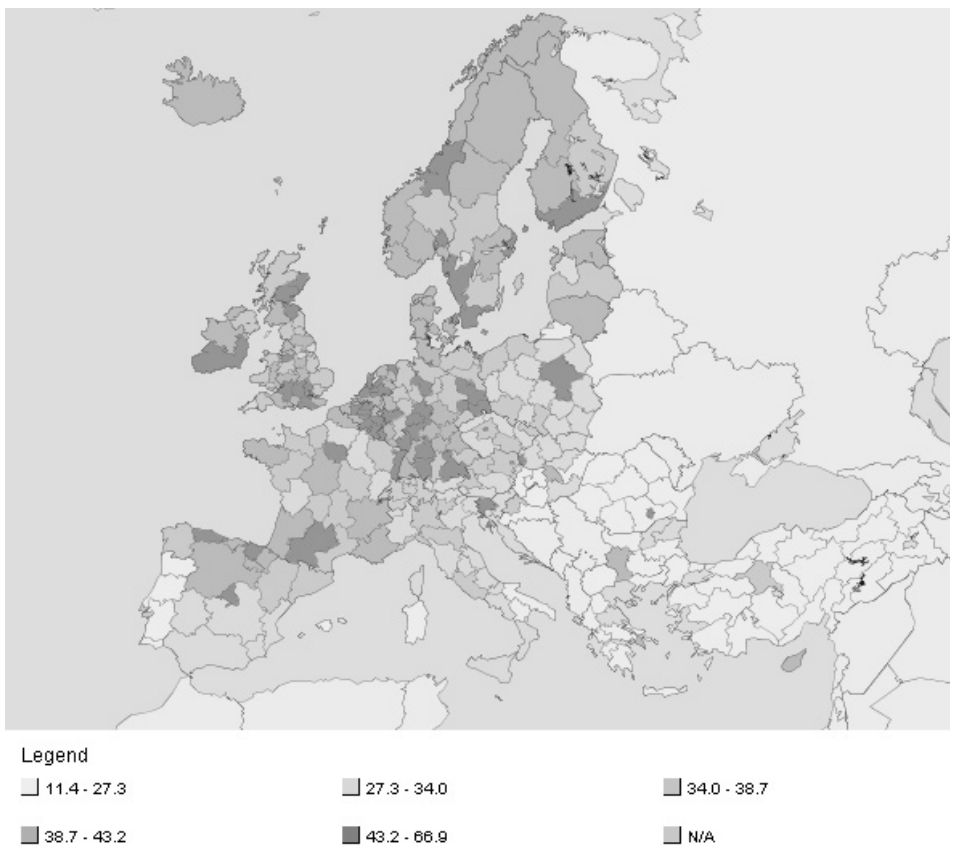

Fig. 1. Human resources in science and technology (HRST) in 2010 by NUTS 2 regions
Rys. 1. Zasoby ludzkie zaangażowane w naukę i technologię w 2010 roku wg regionów (NTS 2)
Source: Eurostat
Źródło: Eurostat

Spearman's correlation coefficient between the indicator describing a level of creative human capital and regional gross domestic product (expressed in PPS per inhabitant) was calculated in order to verify this relation (Table 1). Data characterized the year 2008 because of the latest accessible data in the case of GDP. There was used one-tailed test because of the prediction that these indicators are correlated [Field 2009].

Table 1. Spearman's rho for relationship between human resources in science and technology and regional gross domestic product (PPS per inhabitant)
Tabela 1. Współczynnik korelacji Spearmana dla relacji pomiędzy zasobami ludzkimi zaangażowanymi w naukę i technologię a regionalnym produktem krajowym brutto (w PPS na mieszkańca)

		Human resources in science and technology (HRST)	Regional gross domestic product (PPS per inhabitant)
Human resources in science and technology (HRST)	Correlation coefficient	1.000	.756**
	Sig. (1-tailed)	.	.000
	N	312	297
Regional gross domestic product (PPS per inhabitant)	Correlation coefficient	.756**	1.000
	Sig. (1-tailed)	.000	.
	N	297	297

** correlation is significant at the level 0.01 (1-tailed)
Source: own calculation using SPSS on the base of Eurostat data
Źródło: obliczenia własne z wykorzystaniem pakietu SPSS na podstawie danych Eurostatu

Spearman's rho is an index ranges from 0 (no association) to ±1.00 (perfect association) [Healey 2011]. A Spearman's rho of 0.756 indicates a strong, positive relationship between these two variables.

The author's above conclusion is confirmed by the results of works within the ESPON (European Observation Network, Territorial Development and Cohesion). One of the latest ESPON reports concludes that creative people matter. Regions with high concentrations of creative and cultural industries have Europe's highest prosperity levels. Evidence suggests that jobs and growth follow these creative people as much as creative people follow jobs and growth, and attractive places. As such, creative people are important assets for economic and territorial development. They can support innovation, and their presence can counterbalance migratory flows of the active population to more economic successful regions in Europe. There were formulated 11 messages of the key role for policy development. The most important from the perspective of this study are [ESPON 2011]:

- Economically successful regions tend to have high levels of creative workers among their active population. There is a strong association between GDP per capita and levels of creative occupations. Regions in the most favourable situation are mainly located in Sweden, Finland, Iceland and Central Europe.
- Regional hotspots/concentrations of the creative workforce are mainly the capital and metropolitan regions located in Central and Northern Europe. Capital city regions tend to have a higher share of creative workers than other regions within the same country.
- The creative workforce is a powerful driver in some cities in Europe of inclusive and sustainable growth but public policies encouraging the development of the sector seem an important element at this scale. Within urban agglomerations, the creative workforce appears to concentrate in areas that are attractive in terms of accessibility and urban amenities.

- The fact that some less economically strong regions are experiencing simultaneous growth in GDP and employment in the creative workforce, indicates that creative occupations can contribute to better territorial balance and cohesion. Tailor-made strategies at regional and local level should therefore address the creative workforce as an asset and a development opportunity.

CULTURAL SENSE OF CREATIVITY

The above analysis focused on creativity which can be in the most easily way interpreted from the economic point of view; so creativity of employees or entrepreneurs directly contributes to growth measurable with traditional economic indicators. However, Florida as well as other researches working on his theory indicate that the creative class comprises not only professionals such as doctors, lawyers, scientists, engineers, university professors, but also bohemians made up of artists, musicians, and sculptors; they produce ideas, information, and technology and it is these outputs that are increasingly important for the growth of cities and regions [Batabyal, Nijkamp 2008]. In one of his works, Florida thoroughly examined relationships between this bohemian group, human capital and high-technology. He assumes that the presence and concentration of bohemians in an area signals an environment or milieux that attracts other types of talented or high human capital individuals; as a consequence, the presence of such human capital concentrations in a region attracts and generates innovative technology-based industries [Florida 2002]. This publication includes even a proposal of the bohemian index calculated as the percentage of bohemians in a region compared to the national population of bohemians divided by the percent of population in a region compared to the total national population. Operating this approach he classified following groups as the bohemian: authors, designers, musicians and composers, actors and directors, craft-artists, painters, sculptures, artist printmakers, photographers, dancers, artists, performers, and related workers. An included analysis performed for the regions of the United States with use of a correlation matrix proved quite strong relationship between the bohemia index and high technology industry (0.65 at the 0.01 significance level)[2].

It is difficult to verify this relationship for European regions because of lack of appropriate data on the regional level. An attempt of it was performed basing on such indicators as the number of persons employed in selected cultural occupations (writers and creative artists) as a share of total employment (%) and the indicator exports/imports of high-tech products as a percentage of total (calculated as share of exports/imports of high-technology products from a country in total exports/imports from this country). Moreover, this analysis was possible to conduct only on a level of a country because of data accessibility.

[2]The measure of high-tech industry concentration is based on Milken Institute's *tech-pole index*. The tech-pole index is a composite measure based on the percent of national high-tech real output multiplied by the high-tech real output location quotient for each largest metropolitan regions (MSA) [Florida 2002].

Table 2. Spearman's rho for relationship between the proportion of employed as writers and creative artists and the indicator exports/imports of high-tech products
Tabela 2. Współczynnik korelacji Spearmana dla relacji pomiędzy odsetkiem pracujących pisarzy i artystów oraz wskaźnikiem eksportu produktów wysokiej technologii

		Proportion of employed as writers and creative (2009)	Indicator exports/imports of high-tech products (2006*)
Proportion of employed as writers and creative (2009)	Correlation coefficient	1.000	.406**
	Sig. (1-tailed)	.	.014
	N	29	29
Indicator exports/imports of high-tech products (2006*)	Correlation coefficient	.406**	1.000
	Sig. (1-tailed)	.014	.
	N	29	30

* the most recent accessible data
** correlation is significant at the level 0.05 (1-tailed)
Source: own calculation using SPSS on the base of Eurostat data
Źródło: obliczenia własne z wykorzystaniem pakietu SPSS na podstawie danych Eurostatu

The calculated value of Spearman's rho (Table 2) indicates medium relationship between the proportion of employed as writers and creative artists and the indicator exports/imports of high-tech products, although confirms that it is statistically significant. However taking into account, that density of creative class is much diversified within countries, this result (calculated on the level of countries) should be treated as an introduction to further research in this area. It displays that this relationship is important and requires development on the regional level.

CONCLUSIONS

Dynamically changing social and economic environment induces to looking for new determinants of development. The term "new" can mean completely new ones or those which have been not appreciated so far. Creativity seems to be quite popular and significant factor of contemporary research. However, it needs stressing that it ought to be perceived widely, not only from conventional point of view close to human capital theory; so for instance, some strictly artistic professions should be taken into account – professions which are not usually associated with economic development.

Nevertheless, in view of presented theoretical and empirical contributions a question arises: to what extent creative workforce is a determinant of development (or growth) and from which point development or growth start attracting innovative individuals (so

the opposite relation occurs)? Maybe from some critical point, a development level is a determinant of high density of creative people in some areas? An answer seems not to be easy and requires further research.

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W POSZUKIWANIU KOLEJNYCH CZYNNIKÓW ROZWOJU REGIONALNEGO

Streszczenie. Współcześnie zarówno teoretycy, jak i praktycy rozwoju regionalnego poszukują nowych lub dotychczas niedocenianych czynników w celu wyjaśnienia społeczno-ekonomicznych procesów wpływających na formowanie regionalnych nierówności. Rozważane jest szerokie spektrum czynników, wśród nich kreatywność rozpatrywana na poziomie pojedynczych jednostek. W celu zbadania zależności pomiędzy kreatywnością a poziomem rozwoju regionalnego wykorzystano współczynnik korelacji Spearmana, który potwierdził ich silny związek. W rozpatrywaniu kreatywności należy jednak wziąć pod uwagę znaczenie takich grup zawodowych jak artyści, zwykle niekojarzeni z oddziaływaniem na rozwój ekonomiczny czy regionalny.

Wydaje się jednak, że nadal pozostaje pewne pole do rozważań: na ile rozwój pewnych obszarów przyciąga do nich kreatywnych mieszkańców (a więc zachodzi odwrotna zależność do faktu, że kreatywność mieszkańców wpływa na poziom rozwoju)? Może od pewnego krytycznego momentu to poziom rozwoju jest czynnikiem determinującym wysoką gęstość kreatywnych mieszkańców na jednostkę powierzchni? Odpowiedź nie wydaje się łatwa i wymaga dalszych badań w tym zakresie.

Słowa kluczowe: kreatywność, czynnik rozwoju, kultura, rozwój regionalny

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AN APPLICATION OF CLUSTER ANALYSIS TO COMPARE SELECTED AGRICULTURAL HOLDINGS IN THE KĄKOLEWNICA COMMUNE

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Abstract. The paper presents a comparison of nine agricultural holdings which are dairy farms located in the Kąkolewnica Commune. The analysis was based on results of a survey carried out in the years 2008–2010, and used to prepare a description of the holdings in terms of their area, cultivation structure, cattle stocking rate, economic size and profitability coefficients. The multidimensional cluster analysis was applied to make simultaneous comparisons of the holdings taking into accounts all the characteristics studied. It was found that the holdings could be divided into two groups. One group consisted of the farms with the greatest area, which were also similar to each other in terms of the variables studied. The second group was made up of holdings covering an average or small area, which were more or less different. In this group, holding 9 differed most from the remaining farms. The holding had a much greater area, a higher stocking rate of cattle and greater crop plant harvest volumes. However, these values were not great enough for the holding to be incorporated into the cluster of the holdings covering the greatest area.

Key words: cluster analysis, agricultural holding, profitability index, economic size of a farm

INTRODUCTION

An agricultural holding is characterised by a specific structure which consists of the production sector, production branch and production activity. The two sectors which can be found most frequently on agricultural holdings are: crop plant production and livestock production.

The production type of every farm, which is expressed in the final output of the farm, should follow an efficient utilisation of natural and economic conditions of the holding. The development of a farm is conditioned largely by its production potential which is

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determined by resources – predominantly by their quantity and quality. What also matters is relationships between the resources which affect the effectiveness of agricultural production [Poczta and Kołodziejczak 2004, Majchrzak 2008]. Selection of an adequate production type, based on natural conditions, influences the economic results of agricultural holdings. The results are described by economic indices, for example the profitability index. After the accession to the European Union, measures describing the economic size of agricultural holdings have been introduced, mainly to meet the requirements of reporting. The measures are as follows: Standard Gross Margin (SGM) and European Size Unit (ESU). The measures are calculated based on European Commission legislation and take into account, among others, agricultural holding location (statistical region), type and output [Skarżyńska et al 2002].

Changes that have been taking place in the Polish economy for well over 10 years have also influenced the new situation for all the market participants, including agricultural producers. Polish agriculture is characterized by a heterogeneous level of economic development due to a different economic potential of farms, and historical and natural influences [Jóźwiak 2007]. The aforementioned factors markedly affect effectiveness which, from the perspective of the market, is defined as a benefit from maximised production, in particular sale resulting from optimal allocation of resources having taken into account the existing demand and supply limitations [Jarka 2009].

In economic and agricultural studies based on empirical data, it is frequently necessary to group holdings into as homogenous clusters as possible due to diverse production factors on holdings [Borkowski 1996]. Statistical multidimensional methods make it possible to form groups enabling simultaneous comparisons of units studied in terms of many characteristics. Such methods include cluster analysis which employs data segmentation performed in such a way that it is possible to establish groups of similar units [Stanisz 2007]. Cluster analysis, based on variables describing studied units, finds groups (clusters) of units which are more "similar" to units belonging to the same cluster than to units from other clusters [Jain et al 1999, Holland 2006, Stanisz 2007]. The analysis yields dendrograms depicting clusters of similar units.

The purpose of the present work was to compare agricultural holdings specialised in the same agricultural activity, taking into account production conditions, profitability indices and the economic size unit ESU.

MATERIALS AND METHODS

Analyses were performed basing on the results of surveys carried out in the years 2008–2010 in nine agricultural holdings specialised in milk production in the Kąkolewnica Commune.

The Kąkolewnica Commune is located in the northern part of the Radzyń Podlaski District, Lublin Province, 90 km of Lublin. It is a typically rural commune whose 70% of total area is agricultural land. The land's structure and the level of agricultural structure are favourable. The commune's economy is based on agriculture because soils are of average quality and easy to cultivate mechanically. The holdings' area mainly consists of arable land.

The agricultural holdings were subjected to comparative analysis according to the following criteria: holdin's size, area of land under crops, livestock stocking rate, level of production costs, profitability index and economic size unit (ESU).

The profitability index is a ratio of output to total costs incurred. Economic size of a farm is the sum of Standard Gross Margins of all the enterprises on the farm expressed in euro. The value of one ESU is determined by the European Commission and has been equal to 1200 EUR since 1984. A given holding can be assigned to one of ten size classes (Table 1) based on economic units expressed in ESU [Goraj and Mańko 2009].

Table 1. Economic size classes of agricultural holdings used in EU typology
Tabela 1. Klasy wielkości ekonomicznej gospodarstw rolnych używane w typologii UE

Economic size class	Value in ESU	Nomenclature for farm size classes since 1983/84
I	less than 2	Very small
II	2- < 4	
III	4- < 6	Small
IV	6- < 8	
V	8- < 12	Medium-small
VI	12- < 16	
VII	16- < 40	Medium-large
VIII	40- < 100	Large
IX	100- < 250	Very large
X	250 and more	

Source: L. Goraj, S. Mańko: Accountancy and economic analysis on a farm, published by Difin, Warszawa 2009, p. 39
Źródło: L. Goraj, S. Mańko: Rachunkowość i analiza ekonomiczna w indywidualnym gospodarstwie rolnym, Wyd. Difin, Warszawa 2009, s. 39

The descriptive and statistical methods were used in the study. Cluster analysis was applied to compare individual farms in terms of the production characteristics and economic indices. The Euclidean distance was used as a distance measure and the single linkage as a clustering method. The farms were compared in terms of the following 14 characteristics: agricultural land area, arable land area, area of land under crops, harvest volume of crop plants (triticale, cereal mixes, corn for green mass) livestock stocking rate in livestock units, profitability index and economic size of a farm (ESU). In order to determine numbers of clusters grouping farms, the dendrograms were divided using the agglomeration sequence and Mojena's rule. According to this rule the "cutting" point is the distance of a linkage for which the following inequality is fulfilled:

$$d_{i+1} > \bar{d} + ks_d$$

where:
$d_o, d_1, \ldots, d_{n-1}$ – linkage distances for stage n, n–1, …, 1,
$\bar{d}$ – average value of linkage distance,
s_d – standard deviation of linkage distance,
k – constant 1.25.

The variables describing the farms were expressed in different units so they were standardised.

The calculations were performed by means of Statistica 9.0 PL.

DESCRIPTION OF FARMS

The surveyed holdings are dairy farms only. They are commodity holdings which derive their income from milk production. Cereals cultivated on these farms are used to produce animal fodders.

The average agricultural land area was 39.4 ha, of which 24.21 ha was arable land and 15.2 ha was under meadows and pastures. The numbers indicate that comparisons were made of large farms only. There were no orchards on the farms. Holdings 4 and 5 covered the largest area and holdings 2 and 8 were the smallest (Table 2)

Table 2. Types of land and their area on the surveyed farms in ha
Tabela 2. Stan gruntów w badanych gospodarstwach w ha

Holding nr	Agricultural land (ha)				Forests (ha)	Land occupied by buildings (ha)	The remaining land (ha)	Total (ha)
	Arable land	Orchards	Meadows and pastures	Total				
1	18.0	–	14.0	32.0	0.5	0.7	–	33.2
2	12.3	–	3.5	15.8	0.1	0.4	–	16.1
3	25.0	–	15.0	40.0	1.5	0.8	0.5	42.8
4	50.0	–	30.0	80.0	0.5	1.0	–	81.5
5	45.0	–	25.0	70.0	3.0	2.0	–	75.0
6	15.0	–	15.0	30.0	0.5	0.5	–	31.0
7	6.7	–	14.0	20.7	–	0.6	–	21.3
8	13.5	–	4.0	17.5	0.5	0.2	–	18.2
9	32.4	–	16.3	48.7	–	0.9	–	49.6
Mean	24.21	–	15.2	39.41	0.94	0.78	0.05	40.96

Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

The soil of the surveyed farms belonged mainly to quality classes V, IVa and IVb. None of the farms had soils classified as class I. Only one farm had mostly good soils of classes II and IIIa (over 13 ha). Holding 4, which was the largest, had the same areas (10 ha) of class IIIb, IVa, IVb, V and VI. The second largest holding had mostly soils of class V which represented 75% of the arable land. The smallest farms (2 and 8) had predominantly class IIIb soils (Table 3). As shown in table 3, most soils were poor, the poorest being noted on holding 5. Three out of nine holdings had average quality soils. Holding 8 was the only farm which had good soils.

Figure 1 displays cattle stocking rate in livestock units (LSU). An increasing tendency was found on almost all farms (from 2 to 7). The number of livestock units in successive years remained on a similar lever for holding 8. Holding 9 had the same LSU numbers in the first two study years whereas in 2010 the number slightly increased. The opposite trend was observed for holding 1 where LSU number in 2010 dropped compared with the previous years.

Table 3. Area, structure and grading index of the surveyed farms in 2010
Tabela 3. Powierzchnia, struktura i wskaźnik bonitacji gleb w badanych gospodarstwach w 2010 roku

Holding nr	Area	Soil quality class									Grading index
		I	II	III a	III b	IV a	IV b	V	VI	Total	
1	ha			3.0	3.0	4.0	3.0	5.0		18.0	0.92
	%			16.7	16.7	22.2	16.7	27.8		100.0	
2	ha				2.0	3.5	2.5	1.81	2.45	12.3	0.74
	%				16.3	28.5	20.3	15.0	19.9	100.0	
3	ha			3.0	4.0		10.0	5.0	3.0	25.0	0.78
	%			12.0	16.0		40.0	20.0	12.0	100.0	
4	ha				10.0	10.0	10.0	10.0	10.0	50.0	0.72
	%				20.0	20.0	20.0	20.0	20.0	100.0	
5	ha				2.0	4.0	5.0	34.0		45.0	0.68
	%				4.4	8.9	11.1	75.6		100.0	
6	ha				4.0	6.0			5.0	15.0	0.78
	%				26.7	40.0			33.3	100.0	
7	ha				3.7		3.0			6.7	1.03
	%				55.2		44.8			100.0	
8	ha				7.0	6.5				13.5	1.13
	%				51.9	48.1				100.0	
9	ha		1.8	5.5	2.8	11.2	10.1	1.0		32.4	1.04
	%		5.6	17.0	8.6	34.6	31.2	3.1		100.0	
Total (ha)		–	1.8	11.5	38.5	45.2	43.6	56.81	20.45	217.9	

Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

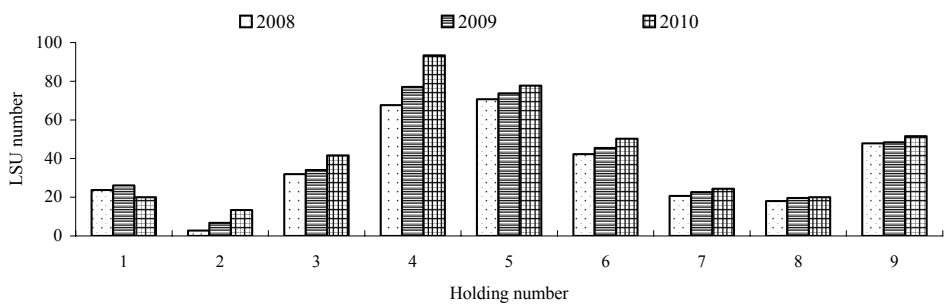

Fig. 1. Cattle stocking rate in LSU on the holdings in 2008–2010
Rys. 1. Obsada zwierząt wyrażona w SD w gospodarstwach w latach 2008–2010
Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

Crop plant production of holdings specialised in livestock production is generally limited, and triticale, cereal mixes and maize for green mass are cultivated. The area under these crops was similar on most holdings with the exception of the largest farms (4 and 5) where more maize for green mass was cultivated, compared with the remaining crops. Per 1 ha crop yields were different in successive years and ranged from 3.0 to 5.0 t for mixes and from 22 to 62 t for maize (Table 4) depending on the growing season and holding.

Based on the nomenclature of size classes (ESU), the surveyed holdings represented classes I to VIII. In general the holdings tended to increase in size in the years 2008–2010. In 2008 the farms were mainly medium-large (ESU 16–40) and medium-small (ESU 8–16). Holdings 3, 4, 5, 6 and 9 were classified as medium-large, and holdings 3, 7 and 8 were medium-small. In 2009, two medium-large farms (4 and 5) increased in area and became large holdings with the ESU values ranging from 40 to 100. In 2010, the dominant role was played by medium-small farms (holding 1, 2, 7 and 8). The number of medium-large and large farms did not change compared with 2009 (Table 5).

Table 4. Area under crops, yields and harvest volume of basic crop plants cultivated on the surveyed farms in 2009–2010

Tabela 4. Powierzchnia zasiewów oraz plon i zbiór podstawowych roślin uprawianych w badanych gospodarstwach w latach 2009–2010

Characteristic	Holding number	Triticale			Mixes			Maize for green mass		
		2008	2009	2010	2008	2009	2010	2008	2009	2010
Area under crops [ha]	1	5.00	5.00	5.00	8.00	8.00	8.00	5.00	5.00	5.00
	2	1.50	1.50	6.26	2.00	2.00	2.50	1.45	1.45	3.50
	3	5.00	5.00	5.00	10.00	10.00	10.00	10.00	10.00	10.00
	4	13.00	13.00	13.00	8.00	8.00	8.00	9.00	29.00	29.00
	5	9.00	11.00	13.00	10.00	13.00	15.00	15.00	16.00	17.00
	6	4.00	4.00	4.00	5.00	5.00	5.00	6.00	6.00	6.00
	7	1.00	1.00	1.00	1.00	3.00	2.70	2.70	2.70	3.00
	8	5.00	6.00	4.00	4.00	4.00	4.00	4.50	3.50	5.50
	9	4.00	3.20	2.00	17.40	16.00	16.40	11.00	13.20	14.00
Yield [t·ha^{-1}]	1	5.00	5.50	3.50	4.50	5.00	3.00	30.00	31.00	25.00
	2	4.00	4.00	4.00	4.00	3.80	3.50	35.00	38.00	40.00
	3	3.80	4.40	3.70	4.40	5.00	3.20	29.00	30.00	27.00
	4	3.30	3.40	3.80	3.50	3.80	3.50	50.00	48.00	45.00
	5	3.80	4.50	4.50	4.00	4.00	3.40	35.00	35.00	40.00
	6	5.00	5.00	5.00	4.00	4.00	4.00	25.00	22.00	27.00
	7	4.00	4.00	3.00	3.00	3.00	3.50	27.00	28.00	29.00
	8	4.00	4.10	4.10	4.00	3.90	4.00	40.00	40.00	40.00
	9	3.30	3.50	3.40	3.75	3.80	3.86	62.00	60.00	60.00
Harvest [t]	1	25.00	27.50	17.50	36.00	40.00	24.00	150.00	155.00	125.00
	2	6.00	6.00	25.04	8.00	7.60	8.75	50.75	55.10	140.00
	3	19.00	22.00	18.50	44.00	50.00	32.00	290.00	300.00	270.00
	4	42.90	44.20	49.40	28.00	30.40	28.00	450.00	1392.00	1305.00
	5	34.20	49.50	58.50	40.00	52.00	51.00	525.00	560.00	680.00
	6	20.00	20.00	20.00	20.00	20.00	20.00	150.00	132.00	162.00
	7	4.00	4.00	3.00	3.00	9.00	9.45	72.90	75.60	87.00
	8	20.00	24.60	16.40	16.00	15.60	16.00	180.00	140.00	220.00
	9	13.20	11.20	6.80	65.25	60.80	63.30	682.00	792.00	840.00

Source: authors' own compilation based on the survey

Źródło: opracowanie własne na podstawie ankiety badawczej

Table 5. Economic sizes of the surveyed holdings in ESU in 2008–2010
Tabela 5. Wielkości ekonomiczne badanych gospodarstw w ESU w latach 2008–2010

Years	Holding number								
	1	2	3	4	5	6	7	8	9
2008	13.408	1.663	18.803	39.934	39.450	24.944	12.742	10.764	26.788
2009	14.718	3.993	19.981	44.257	41.127	26.621	13.763	11.602	25.922
2010	11.403	8.118	23.702	53.425	43.289	29.136	14.471	11.785	30.850

Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

The output of almost all the holdings increased year by year. The exception to this rule was holding 1 where there was a 17% drop in the output value in the year 2010 compared with 2009, and holding 2, covering the greatest area, whose output value in 2009 was at almost the same level as in 2008 (Table 6).

Total production costs in the successive years increased for all the surveyed farms. The majority of total costs was largely determined by increasing fuel oil and mineral fertiliser prices. The data of this study revealed that in 2010 the increase in total costs was much greater than in 2009 (Table 6).

The analysis of profitability indices demonstrated that the value of final gross output of almost all the holdings covered the total costs incurred on production. The exception was holding 2 whose profitability index in 2008 was by 100% lower. Over the next years the farm increased livestock unit stocking rate, which yielded an increase in profitability indices to 119.6% in 2009 and 188.2% in 2010. Values of profitability indices on most farms decreased in successive years as indicated by the dynamics of their change. The profitability index increased year by year for holding 2 only and its value rose systematically by 21.8 and 57.3%, respectively.

COMPARISON OF SURVEYED FARMS BY MEANS OF CLUSTER ANALYSIS

Dendrograms show that the holdings formed similar clusters in all the study years. As indicated by agglomeration schedule results and Mojena's rule, cutting of dendrograms took place after step 7. As a result, the surveyed holdings were divided into two clusters (groups) every year. A clearly separate cluster was formed by holdings 4 and 5 (the largest ones); the second group was created by the remaining farms.

The agglomeration schedule (linking of units) for 2008 indicated that holdings 1 and 6 were the most similar; they were the least diverse because their cluster was formed at step 1. The holdings had a similar agricultural land area (32 and 30 ha, respectively), similar harvest volume of triticale and maize for silage and a similar profitability index (190 and 201%, respectively). However, they had a different economic size (13.4 and 24.94 ESU, respectively). At step 2, holding 3, which had a greater area but a lower profitability coefficient (178%), joined the cluster formed by holdings 1 and 6. Although holdings 7, 2 and 9 formed a cluster with the aforementioned farms, they entered the cluster at the penultimate step of agglomeration. It means that holdings 2 and 7 were similar to each other in terms of the examined characteristics but they were rather different from holdings 1, 3 and 6. Holding 8 was most different from the remaining farms (Figure 2, Table 7).

Table 6. Output levels, total production costs and profitability indices for the surveyed holdings in 2008–2010
Tabela 6. Kształtowanie się wielkości produkcji, kosztów całkowitych produkcji i wskaźnika opłacalności w badanych gospodarstwach w latach 2008–2010

Specification	Years	Holding number								
		1	2	3	4	5	6	7	8	9
Output value in PLN	2008	111 000	22 200	154 290	388 500	342 990	188 700	124 023	111 400	185 400
	2009	116 280	29 070	161 880	444 600	359 100	199 500	140 524	125 900	193 600
	2010	102 000	54 000	183 600	502 800	380 400	222 200	151 197	144 500	219 000
	Dynamics 2009/2010	104.8	130.9	104.9	114.4	104.7	105.7	113.3	113.0	104.4
	Dynamics 2010/2009	87.7	185.8	113.4	113.1	105.9	111.4	107.6	114.8	113.1
Total costs in PLN	2008	58 200	22 600	86 700	183 600	181 000	93 600	90 300	64 550	151 800
	2009	60 500	24 300	91 900	238 900	189 200	96 000	11 6690	83 210	169 550
	2010	75 900	28 700	100 400	405 900	254 900	120 600	12 8600	83 510	193 600
	Dynamics 2009/2010	104.0	107.5	106.0	130.1	104.5	102.6	129.2	128.9	111.7
	Dynamics 2010/2009	125.5	118.1	109.2	169.9	134.7	125.6	110.2	100.4	114.2
Index of production profitability (%)	2008	190.7	98.2	178.0	211.6	189.5	201.6	137.3	172.6	122.1
	2009	192.2	119.6	176.1	186.1	189.8	207.8	120.4	151.3	114.2
	2010	134.4	188.2	182.9	123.9	149.2	184.2	117.6	173.0	113.1
	Dynamics 2009/2010	100.8	121.8	99.0	87.9	100.2	103.1	87.7	87.7	93.5
	Dynamics 2010/2009	69.9	157.3	103.8	66.6	78.6	88.7	97.6	114.4	99.1

Source: authors' own compilation based on the survey
Źródło: opracowanie własne na podstawie ankiety badawczej

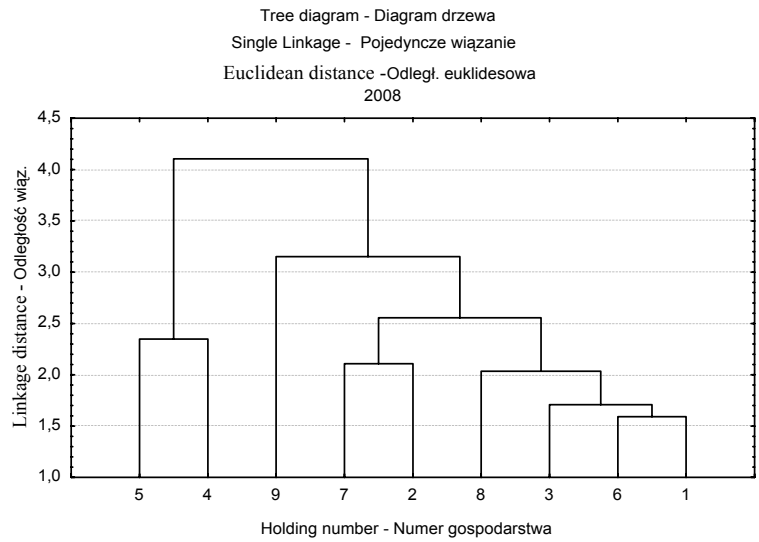

Fig. 2. Clusters formed by the holdings in 2008
Rys. 2. Skupienia utworzone przez gospodarstwa w 2008 roku
Source: authors' own calculations
Źródło: obliczenia własne

The dendrogram for 2009 is very similar to the dendrogram for 2008 but the agglomeration schedule was different (Figure 3). In 2009 the shortest distance was found between holdings 1 and 3. Holdings 2 and 7 formed a cluster at step 2 so they were more similar to each other than in 2008. The crop plant harvest volumes of the farms were the lowest, they had the lowest cattle stocking rate and the lowest profitability indices. Holding 8 was most similar to holdings 2 and 7 in 2009. Holding 9 did not form a cluster with the remaining farms in 2008 and 2009 until step 7.

In 2010, the smallest holdings, that is 2 and 8, were most similar to each other because they formed a cluster at the first step so the distance reflecting differences between the objects was the smallest. These holdings, covering the smallest areas, differed slightly as to the livestock stocking rate (13.34 and 20.0 LSU, respectively), economic size (8.11 and 11.78 ESU, respectively) and crop plant harvest volume. As the dendrograms and agglomeration schedule demonstrated, holdings 6 and 3 were similar, too; They formed a cluster at step 2. They has similar values of cattle stocking rate (50.2 and 41.68 LSU, respectively), triticale harvest volume (20.0 and 18.50 t, respectively) and profitability coefficient (184.2 and 188.2%, respectively). Holdings 7, 1 and 9 joined the cluster at further steps, which is also showed in the dendrograms. The finding indicates that the farms were dissimilar to each other and to the remaining farms (Figure 4, Table 7).

Table 7. Agglomeration schedule (linking) of holdings into clusters
Tabela 7. Przebieg aglomeracji (łączenia) gospodarstw w skupienia

Linking process	Distance	Number of farms entering the cluster								
2008										
Step 1	1.59	1	6							
Step 2	1.71	1	6	3						
Step 3	2.03	1	6	3	8					
Step 4	2.10	2	7							
Step 5	2.34	4	5							
Step 6	2.55	1	6	3	8	2	7			
Step 7	3.15	1	6	3	8	2	7	9		
Step 8	4.10	1	6	3	8	2	7	9	4	5
cutting point – 3.48										
2009										
Step 1	1.32	1	3							
Step 2	1.70	2	7							
Step 3	1.60	1	3	6						
Step 4	2.09	2	7	8						
Step 5	2.37	1	3	6	2	7	8			
Step 6	2.76	1	3	6	2	7	8	9		
Step 7	3.00	4	5							
Step 8	4.20	1	3	6	2	7	8	9	4	5
cutting point – 3.54										
2010										
Step 1	1.10	2	8							
Step 2	1.59	3	6							
Step 3	2.09	2	8	3	6					
Step 4	2.09	1	2	8	3	6				
Step 5	2.10	1	2	8	3	6	7			
Step 6	3.10	4	5							
Step 7	3.63	1	2	8	3	6	7	9		
Step 8	4.68	1	2	8	3	6	7	9	4	5
cutting point – 4.01										

Source: authors' own calculations
Źródło: obliczenia własne

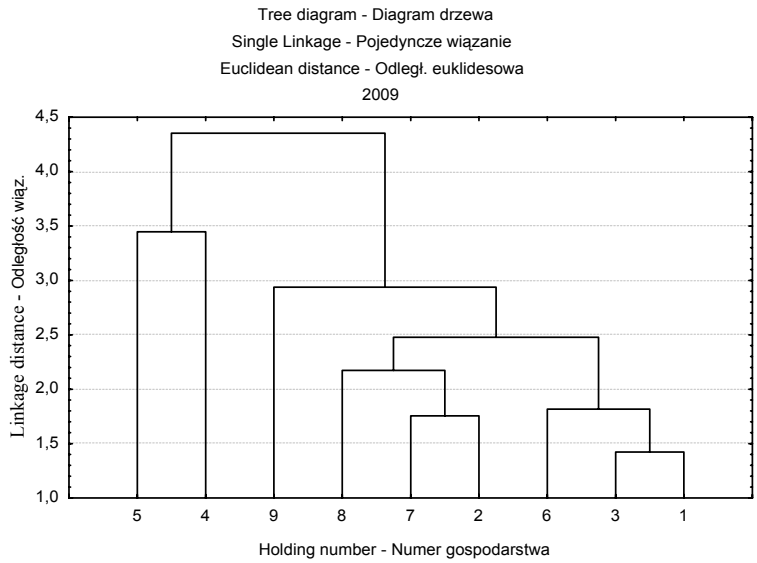

Fig. 3. Clusters formed by the holdings in 2009
Rys. 3. Skupienia utworzone przez gospodarstwa w 2009 roku
Source: authors' own calculations
Źródło: obliczenia własne

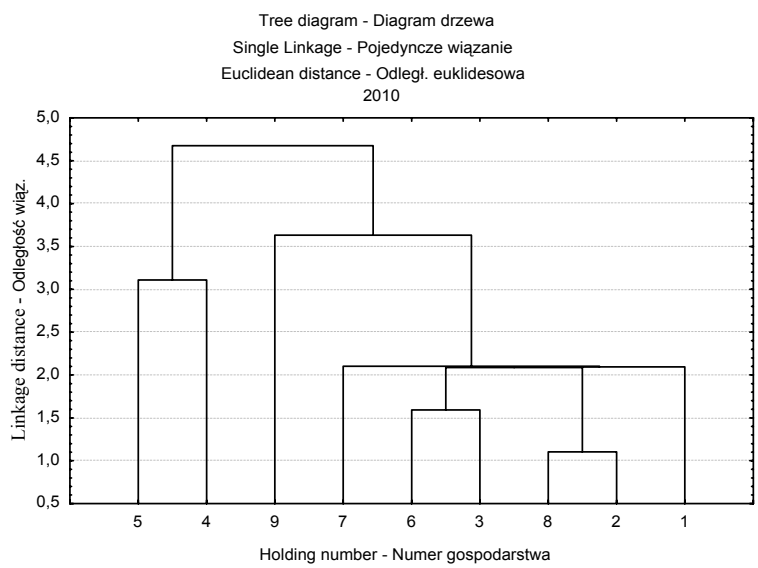

Fig. 4. Clusters formed by the holdings in 2010
Rys. 4 . Skupienia utworzone przez gospodarstwa w 2010 roku
Source: authors' own calculations
Źródło: obliczenia własne

SUMMARY

The first step in economic studies of agricultural holdings is to look at farm resources, production conditions, production activities, and economic results. Having completed a detailed description, one can attempt an analysis of activities of the holdings. The surveyed farms specialised in commodity milk production. The average area of a farm was almost 40 ha, which indicates that they were large holdings whose activities, however, were carried out on poor-quality soils. Crop plant production of the farms was limited to three basic crop plants, that is triticale, cereal mixes and maize for silage. The area under these crops increased following an increase in cattle stocking rate. Also, the holdings differed as to the economic size (ESU).

The cluster analysis sorted the holdings into two clusters each year. One cluster consisted of farms with the largest area and greatest economic size. The other cluster was created by the remaining farms. Within the latter cluster the linkage distance (which is indicative of probability) between individual farms changed following changing production conditions, which can be seen in dendrograms and is indicated by agglomeration sequence results for the years 2008–2010. In this cluster, the greatest linkage was found for holding 9 which was merged with the remaining farms of the cluster at the penultimate step. Values of the characteristics describing this holding were quite different form the values describing the remaining six farms of the cluster. The differences were not large enough, however, for holding 9 to form a separate cluster.

The main characteristics influencing the similarity or dissimilarity of the surveyed holdings included: agricultural land area, arable land area, stocking rate in livestock units, economic size of a farm and profitability coefficient.

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WYKORZYSTANIE ANALIZY SKUPIEŃ DO PORÓWNANIA GOSPODARSTW ROLNYCH W GMINIE KĄKOLEWNICA

Streszczenie. W pracy przedstawiono porównanie dziewięciu gospodarstw rolnych specjalizujących się w produkcji mleka w gminie Kąkolewnica. Podstawą analizy były wyniki ankiety badawczej przeprowadzonej w latach 2008–2010. Na jej podstawie gospodarstwa scharakteryzowano pod względem: powierzchni, struktury uprawy, obsady bydła, wielkości ekonomicznej gospodarstwa oraz współczynników opłacalności. Do porównania gospodarstw pod względem wszystkich badanych cech jednocześnie użyto wielowymiarowej analizy skupień. Na jej podstawie stwierdzono, że badane gospodarstwa można podzielić na dwie grupy. Jedną grupę stanowiły gospodarstwa obszarowo największe, które są jednocześnie podobne do siebie pod względem badanych cech. Drugą grupę tworzyły gospodarstwa o średnim i małym areale, które w większym bądź mniejszym stopniu różniły się między sobą. W tej grupie gospodarstwem najbardziej różniącym się od pozostałych było gospodarstwo 9, które charakteryzowało się znacznie większym areałem, większą obsadą bydła i większymi zbiorami uprawianych roślin. Wielkości te nie były jednak na tyle duże, aby gospodarstwo to zostało przyłączone do skupienia utworzonego przez największe obszarowo gospodarstwa.

Słowa kluczowe: analiza skupień, gospodarstwo rolne, wskaźnik opłacalności, ekonomiczna wielkość gospodarstwa

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THE IMPORTANCE OF A PRODUCT BRAND FOR AGRICULTURAL PRODUCERS WHEN PURCHASING MINERAL FERTILIZERS

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Abstract. The market of mineral fertilizers is one of the most important markets of agricultural production means of industrial origin. The specific character and importance of mineral fertilizers in agriculture makes it worth to pay special attention to the issues related to their purchase by agricultural producers. This paper presents results of empirical research concerning the importance and impact of a fertilizer brand on purchase decisions made by farmers. The results of the research concerning the extent of recognition of compound fertilizer brands among farmers were also shown. The results of the research demonstrated that a fertilizer brand, as a factor shaping farmers' behaviours in the examined market, depends on the age of agricultural producers and the area of agricultural holdings. As it appears from the correspondence analysis performed, a very large influence of a fertilizer brand on purchase decisions was characteristic of the agricultural producers running agricultural holdings with an area of 30–49.99 ha and 100 ha or more.

Key words: mineral fertilizers, brand, correspondence analysis

INTRODUCTION

In recent years, considerable changes in the product structure of mineral fertilizers took place in Poland. Currently, the sale offer for those products in the domestic market is very broad. The companies operating in the market of mineral fertilizers changed their position from passive distribution of fertilizers to very active searching for customers and increasing the sales volume. Production and trade companies on the examined market use different strategies, methods and techniques addressed to the buyers in order to encourage them to purchase particular kinds of fertilizers.

The market of mineral fertilizers in Poland is oligopolistic and non-price forms of competition (diversification, branding, advertising, etc.) are predominant there. An es-

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sential way of capturing the market of fertilizers is to develop a correct marketing strategy for a company. Currently, one of the most important marketing tools for competing in the market of mineral fertilizers in Poland is the brand [Piwowar 2011]. The largest domestic manufacturing companies in the fertilizer sector worked out characteristic names (brands) of products. For example, the names of *Polifoska* or *Lubofoska* fertilizers indicate explicitly their manufacturers. Behind a brand name there lies the manner of managing an organization, specific organizational culture and key values, which determine the standards for managing a given production company. It often happens that, apart from a name or a colour scheme, also a symbol that indicates that the product is associated with a specific company appears on fertilizer packaging. If a company has a strong brand recognizable by customers, such a situation improves the position of the company in relation to agents and competitors [Dębski 2009].

The complexity of the entire decision-making process undertaken by farmers increases along with the development of the market of mineral fertilizers. Demand for knowledge concerning the behaviours of agricultural producers in the examined market increases too. According to the latest behaviour theory, both economic and non-economic factors shape the behaviour of consumers. In this regard, also the important role of knowledge, experience and market information is indicated [Kieżel 2004]. The consumer behaviour in the market is shaped mainly by economic, socio-cultural and psychological factors. Some researchers also distinguish marketing determinants [Woś, Rachocka, Kasperek-Hoppe 2011]. The problems of market behaviours of farmers discussed in this study are in the centre of interest of many scientific disciplines, inter alia, sociology, psychology, economics and agriculture. Behaviours of agricultural producers are shaped to a high extent under the influence of the natural and social environment. The character of a region, in which agricultural producers have their agricultural holdings, may be very important in the shaping of their behaviours. The behaviours in the market of mineral fertilizers depend not only on psychological and social factors, but also on the knowledge of farmers and their rational, economically-grounded choices.

The main aim of this study is to present the importance of a mineral fertilizer brand in purchase decisions made by agricultural producers. The subject matter of the research described in this paper was also the recognition of compound mineral fertilizer brands among farmers, while the results of the research were to help answering the following research questions: *Is a fertilizer brand an important factor in purchase decisions in the market of mineral fertilizers? Which brands available in the domestic market are characterized by the highest recognition among farmers?*

METHODOLOGY AND SOURCES OF MATERIALS

The basis for this paper was a questionnaire surveys carried out among the farmers that use agricultural lands in three selected districts of Lower Silesian Province. It has been assumed for the surveys that agricultural holdings with an area exceeding 5 ha will be eligible to be in the test sample. The test sample included 319 agricultural holdings. Farmers from eighteen communes of Lower Silesian Province took part in the questionnaire surveys. From the analysis of the gathered material it appears that the total area of

arable lands in the surveyed agricultural holdings was 10,993.93 ha, which constituted 5% of the arable lands in the three examined districts. The difference in the respondents' age (the age range of 18–71 years) was quite high – 53 years, while the average age was 45 years. Among the respondents, there prevailed men (89%). The analysis of data revealed that the surveyed agricultural producers were characterized mainly by considerable experience in agricultural production. On average, the respondents have worked in an agricultural holding for 23 years. From the analyses performed it appears that over 87% of the surveyed agricultural producers had secondary education or basic vocational education, while 9% had higher education. The smallest group constituted agricultural producers with primary education (4%). More than 64% of the respondents declared education with an agricultural profile.

The measuring tool for the original surveys was an author's survey questionnaire. The scope of the survey included, inter alia, the problems discussed in this study that relate to the factors determining the decisions concerning the choice of fertilizers, as well as a detailed identification of the needs and expectations of the farmers in the scope of mineral fertilizers. The questionnaire surveys carried out in 2009 were a part of the research work leading to a deeper understanding of problems related to the competition and competitiveness in the market of mineral fertilizers in Poland [Piwowar 2011].

Eight factors were selected for analysing the behaviours of farmers: price of fertilizer, brand of fertilizer, quality of fertilizer, technical equipment of agricultural holding, crop cultivation technology, nutritional requirements of crops, the country of production of fertilizer, and habit (tradition). In the opinion of the author, the selected factors may significantly determine the behaviours of agricultural producers in the examined market of agricultural production means. The choice of factors was intentional, and the basis for the selection was provided by the conclusions from the research conducted earlier in the market of mineral fertilizers in Poland [Piwowar 2007, Spiak, Piwowar 2007], as well as by author's experience acquired during work in the fertilizer industry. The factors chosen for the research were mainly of economic character, however the author is aware that other groups of factors, including psychological and socio-cultural factors, are also important.

The correspondence analysis method, classified in the group of exploratory methods, was used for processing the results of the empirical research. The methodology of the analysis is based on the χ^2 test of independence. For the needs of this study, so-called mean square contingency (mean square contingency coefficient – φ^2) was used for measuring the strength of the dependencies between the examined features. Analyses based on Burt Table were performed within the study in order to investigate the co-occurrence of categories of many variables [Stanimir 2005]. The correspondence analysis referred to in this paper was carried out with the use of the *'STATISTICA 9'* software.

When analysing the questionnaire survey data, there were used two indicators for measuring the extent of brand recall among consumers: spontaneous brand awareness and aided brand awareness [Kozielski, Pogorzelski, Dziekoński 2011]. The list, which provides a basis for investigating the aided awareness of compound fertilizer brands, contained 6 brand names of compound fertilizers popular in Poland (*Polifoska*, *Lubofoska*, *Amofoska*, *Polimag*, *Poliwap*, *Polidap*). The compound fertilizers included in the list are the basic product range offered in the market of mineral fertilizers in Poland.

THE IMPORTANCE OF THE BRAND IN COMPARISON WITH OTHER FACTORS DETERMINING THE BEHAVIOUR OF AGRICULTURAL PRODUCERS IN THE MARKET OF MINERAL FERTILIZERS

The questionnaire surveys allowed obtaining the information about factors that shape the behaviours of farmers in the market of mineral fertilizers. The results of the surveys allowed assessing the influence of the selected factors on agricultural producers' decisions regarding purchase of mineral fertilizers (Figure 1).

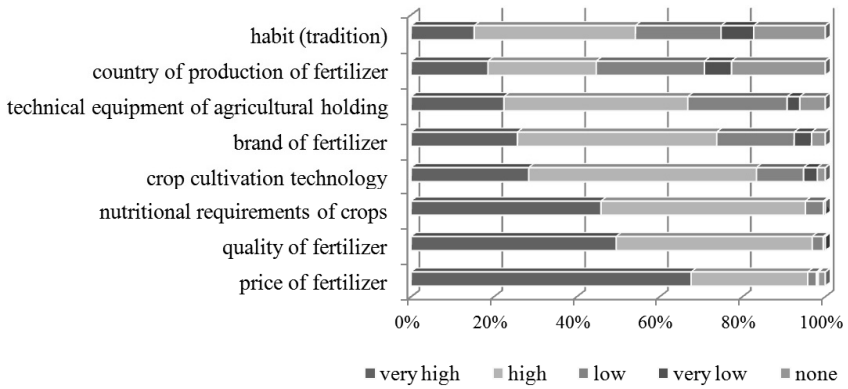


Fig. 1. The importance of the selected factors in decisions concerning purchase of mineral fertilizers – according to farmers
Rys. 1. Ważność wybranych czynników przy wyborze nawozów mineralnych w opinii rolników
Source: own study based on the surveys carried out among farmers
Źródło: opracowanie własne na podstawie przeprowadzonych badań producentów rolnych

The results of the surveys shown that most respondents evaluated the selected factors as very important or important. From the analysis of the material collected in the questionnaires it appears that the most important factor that, according to agricultural producers, contributes to making a decision on the purchase of particular mineral fertilizer, is the price of fertilizer. Subsequently, the agricultural producers mentioned quality of fertilizer, nutritional requirements of crops, crop cultivation technology used in the agricultural holding, the brand of fertilizer, technical equipment of the agricultural holding, and the country of production of the fertilizer. According to the respondents, the least important factor is a habit (tradition). In particular the latter fact is interesting, because there is a general opinion that agricultural producers have a conservative approach to the issues related to the purchase of agricultural production means.

From the viewpoint of the deliberations presented in this study, it is worth emphasising that 73.8% of the respondents mentioned the fertilizer brand as a very important or important factor affecting the decisions concerning the purchase of mineral fertilizers, which stresses the importance of this factor in the decision-making process. In order to determine the relationships between the importance of a brand when purchasing mineral fertilizers and the demographic and social features of farmers, a correspondence analysis was performed. Values of the χ^2 statistic, the critical value of χ^2 and mean square contingency φ^2 for the analysed variables are given in Table 1.

Table 1. Statistics values χ^2, critical values $\chi^2_{\alpha=001}$ (in parentheses), and mean square contingency φ^2 for the following features: brand of fertilizer, age, education, arable land area, district

Tabela 1. Wartości statystyki χ^2, wartości krytyczne $\chi^2_{\alpha=001}$ (w nawiasach), średniokwadratowa wielodzielczość φ^2 dla cech marka nawozu, wiek, wykształcenie, obszar użytków rolnych, powiat

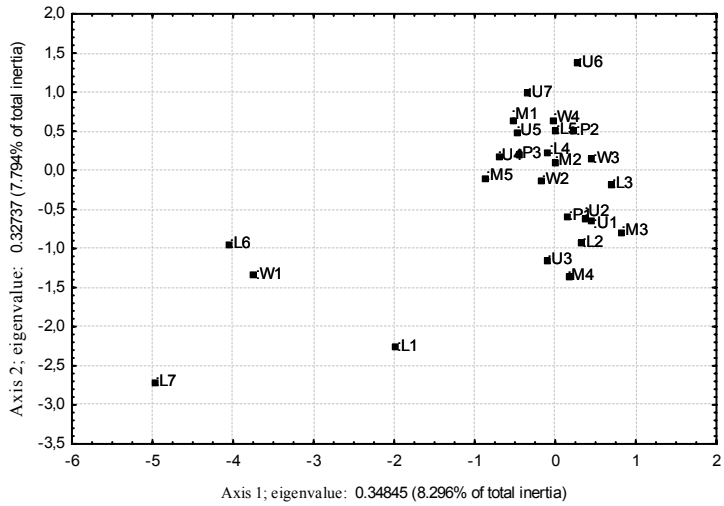
φ^2 \ χ^2	Age	Education	Arable land area	District
Brand of fertilizer	61.398 *(42.980)* / 0.192	18.972 *(26.217)* / 0.059	74.727 *(42.980)* / 0.234	4.398 *(20.090)* / 0.014

Source: own study
Źródło: opracowanie własne

The result of the χ^2 test of independence showed that the hypothesis on the independence of features should be rejected for two pairs of features: fertilizer brand – farmer's age, and fertilizer brand – arable land area. Thus, it can be concluded that the brand of fertilizer, as a factor shaping farmers' behaviours in the market of fertilizers, depends on the age of agricultural producers and the arable land area of their agricultural holdings. When comparing the values of mean square contingency φ^2, it can be noticed that the strength of the dependencies between the features was the highest for the following pair of features: mineral fertilizer brand – arable land area.

For optimal representation of the co-occurrence of the investigated variables, bivariate projection space was adopted. Graphic presentation of the results of the analysis of the correspondence is presented in Figure 2.

From the graphic presentation of simultaneous occurrences of the categories of the investigated variables it appears that there is co-occurrence of some categories of features. Particularly interesting are the dependencies occurring between the examined factor and the demographic and social features of farmers. When interpreting the results of the correspondence analysis, it can be concluded that there are relationships between the statements on the importance of brand when making decisions regarding purchase of fertilizers and the size of an agricultural holding. The correspondence between the statements on low (M3) and very low (M4) importance of the brand in the selection of fertilizer and relatively smaller agricultural holdings, (U1, U2) and (U3) respectively, was particularly characteristic. The second regularity indicates the occurrence of co-existence of the category of very high importance of the brand (M1) when purchasing fertilizers and the agricultural holdings with an area of 30 to 49,99 ha (U5) as well as large agricultural holdings with an area of 100 ha and more (U7).



Variable	Brand of fertilizer					Age							Education				Arable land area							District		
	very large	large	small	very small	none	<19	20-29	30-39	40-49	50-59	60-69	>70	primary education	vocational educ.	secondary educ.	higher education	5-9.99	10-14.99	15-19.99	20-29.99	30-49.99	50-99.99	100 and more	Wrocławski district	Strzeliński district	Kłodzki district
Symbol	M1	M2	M3	M4	M5	L1	L2	L3	L4	L5	L6	L7	W1	W2	W3	W4	U1	U2	U3	U4	U5	U6	U7	P1	P2	P3

Fig. 2. Graphic presentation of the results of the analysis of the correspondence between the importance of the brand when purchasing mineral fertilizers and the investigated features of farmers

Rys. 2. Graficzna prezentacja wyników analizy korespondencji znaczenia marki przy zakupie nawozów mineralnych przez producentów rolnych z badanymi cechami rolników

Source: own study

Źródło: opracowanie własne

AWARENESS AND PERCEPTION OF MINERAL FERTILIZER BRANDS AMONG AGRICULTURAL PRODUCERS

The questionnaire used as a measuring tool in the survey allowed measuring the indicators of awareness of fertilizer brands among the surveyed farmers. The survey questionnaire included questions that aimed at determining two indicators of brand awareness:

- spontaneous brand awareness (respondents gave a brand without any help),
- aided brand awareness (respondents indicated a brand from the prepared list).

As it appears from the research, *Polifoska* is a brand with the highest recognizability. The indicator of spontaneous awareness of this brand at the level of 25–38% (depending on the study area) gives it the position of the leader in the market of mineral fertilizers. The following brands were much less recognizable: *Lubofoska*, *Lubofos*, *Amofoska*, *Agrofoska* and *Polimag*.

Also the research on the aided awareness of compound fertilizer brands showed that Polifoska was the most frequently mentioned brand of fertilizers. The indications of the respondents in the scope of the aided awareness of the most popular brands of compound fertilizers were higher than in the case of the spontaneous awareness. This concerned mainly two brands of fertilizers: *Lubofoska* and *Amofoska*.

Marketing strategies of companies operating in the mineral fertilizer market are based more and more often on building a high level of brand awareness and a positive brand image. This results from the fact that from the viewpoint of a company the key issue is to create a desired image of the company and its products [Ślusarczyk 2009]. For producers of mineral fertilizers the brand image, i.e. a set of brand attributes, is especially important. The set of such attributes creates in consumer awareness a certain abstract concept characterizing and differentiating a brand. In order to examine the image of the selected brands of mineral fertilizers, a verbal association test was used in the research. The use of a verbal association test for examining the opinions on a product is important, because it may be very helpful in the research of motives for purchase [Mazurek-Łopacińska 2002]. For example, the set of associations of agricultural producers related to the *Polifoska* brand concerned mainly the following words: good, quality, little care, Poland. This indicates that the image of the *Polifoska* brand is positively shaped among farmers, which may be conductive to making decisions on purchasing fertilizers of this brand.

It should be emphasized that from the viewpoint of a company the fact of having a positively perceived brand allows strengthening its position in the market and gaining a competitive edge. As it was stressed by Patkowski, the brand is an element of company's competitive advantage [Patkowski 2010]. Good recognizability of a brand and its favourable image increase the probability of selecting this brand from a set of brands considered for purchase. The escalating competitive struggle in the market of mineral fertilizers and the increasingly broader range of the offered products are conducive to the growing importance of a brand in the examined market of agricultural production means.

SUMMARY

The results of the research showed that the most important factors that contributed to farmers' decisions on purchasing specific mineral fertilizer are as follows: fertilizer price, fertilizer quality, and nutritional requirements of crops. Subsequently, the agricultural producers mentioned the crop cultivation technology used in the agricultural holding, the brand of fertilizer, technical equipment of the agricultural holding, and the country of production of the fertilizer. However it should be emphasized that almost every third agricultural producer indicated the fertilizer brand as a very important factor in making decisions on the purchase of mineral fertilizers. The influence of this factor was comparable with the influence of the equipment of the agricultural holding and the production technology used.

The correspondence analysis showed that the selection of the fertilizer brand as a factor in the purchase decisions regarding mineral fertilizers depended on the age of agricultural producers and the arable land area in their agricultural holdings. A characteristic feature was the co-occurrence of the statements about little and very little importance of a brand when purchasing fertilizers with the relatively smaller agricultural holdings, as

well as the correspondence of very great importance of a brand when purchasing fertilizers with the agricultural holdings larger in terms of the area. The questionnaire surveys showed that the respondents knew the brands of mineral fertilizers available in the domestic market. As it appears from the research, the *Polifoska* brand is characterised by a particularly high level of awareness (both spontaneous and aided one) among farmers.

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ZNACZENIE MARKI PRODUKTU PRZY ZAKUPIE NAWOZÓW MINERALNYCH PRZEZ PRODUCENTÓW ROLNYCH

Streszczenie. Rynek nawozów mineralnych jest jednym z najważniejszych rynków środków produkcji rolnej pochodzenia przemysłowego. Specyfika i znaczenie nawozów mineralnych w rolnictwie sprawiają, że warto zwrócić szczególną uwagę na zagadnienia związane z ich zakupem przez producentów rolnych. W artykule przedstawiono wyniki badań empirycznych dotyczących znaczenia i wpływu marki nawozów na decyzje zakupowe podejmowane przez rolników. Zaprezentowano również wyniki badań dotyczących stopnia znajomości marek nawozów wieloskładnikowych przez producentów rolnych. Wyniki badań wykazały, że marka nawozu jako czynnik kształtujący zachowania rolników na badanym rynku zależy od wieku producentów rolnych i obszaru gospodarstw rolnych. Jak wynika z przeprowadzonej analizy korespondencji, bardzo duży wpływ marki nawozu na decyzje zakupowe cechował producentów rolnych prowadzących gospodarstwa rolne o powierzchni 30–49,99 ha oraz 100 ha i więcej.

Słowa kluczowe: nawozy mineralne, marka, analiza korespondencji

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FACTORS INFLUENCING THE DECISION-MAKING PROCESS OF BEEF CONSUMERS

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Abstract. The main aim of this research was to conduct consumers' attitudes and behaviour toward beef and to get know factors influencing purchase decisions as well as barriers discouraging consumers to choose this kind of meat. The research was conducted on 10 groups of consumers: housewives aged 35–65. The research was run by means of focus study. The results indicate that beef is perceived to have positive nutritional, health, and sensory attributes and it is bought for special family occasions. However, popularity of this meat is severely restricted because of barriers deep-rooted in consumers' minds: (1) price – beef is much more expensive comparing to other kinds of meat and it is less efficient; (2) it needs a lot of consumer commitment – it is rather difficult to prepare and time-consuming so some consumers cannot cope with this type of meat and do not have the guarantee of obtaining the desired culinary effect. The last factor mentioned by consumers was (3) lack of acceptance among children – female consumers state that children usually do not like this kind of meat due to its sensory properties.

Key words: decision process, consumer, beef

INTRODUCTION

Consumer behavior is a complex of reactions to internal and external stimuli causing the deficiency feeling referring to the object. The objectification of this deficiency is determined by the level of awareness, values, social norms and the availability of resources to meet the needs. A particular example of consumer behaviour is the consumer behaviour on the food market. Such behaviours are implied on the one hand by feeling a sense of hunger, appetite (the original internal stimulus), dietary patterns (secondary internal

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stimulus), and on the other hand, they are under the influence of particular elements of marketing referring to food (food product, its price, availability, the way of product attribute communicating) as well as the natural environment, socio-cultural and economic conditions [Gutkowska, Ozimek 2002]. According to Narojek [1993], food behaviour is an activity and ways of proceeding referring to meet the food needs and depends on various factors. The activity and ways of proceedings refers to food product's choice, the organization of buying, storing, meals planning, the frequency of their consumption, as well as the food quality. Some of the mentioned behaviours affect the nutritional food value, and the other ones refers to the overall accuracy of nutrition, mainly when it comes to the health. Consumer behaviour is caused by various factors. Factors influencing food behavior in general includes as follows: geographical, cultural, economic, social and psychological agents [Narojek 1993]. Jeżewska-Zychowicz [1996] notes that in the literature there are three groups of factors affecting behaviour in the field of food and nutrition: (1) relating to food, (2) referring to the individual making the choice of food and (3) factors according to the external environment. Babicz-Zielinska [2000] classifies them as follows:

- "associated with the product factors", defining its physicochemical, sensory properties (taste, smell, appearance, texture); functional characteristics (packaging, availability, convenience); its nutritional value;
- "associated with the consumer", including personal characteristics (age, sex, education); psychological factors (personality, experience, mood); physiological factors (state health, satiety, hunger);
- "environmental factors", including economic factors (price, income); cultural agents (beliefs, and convictions); social ones (social status, fashion, environmental influences).

According to Matuszewska [1992], among the factors influencing the food acceptance there are as follows: physical, chemical and nutritional properties of products, short-term physiological body effects (hunger, saturation, thirst, appetite), sensory factors, socio-economic and psychological (price, product availability, tradition, cultural and religious characteristics). Socio-economic, sensory and psychological factors influence on the formation, or the disclosure of specific attitudes and opinions about products which cause the acceptance and food choice.

METHODOLOGY AND DATA SOURCES

A qualitative approach was used in the study. The main aim of this approach is to know the ways of thinking and assessing referring to research objects. Qualitative research respond to exploratory questions and it is designed to clarify issues which slipping out quantitative research methods. It also allows to know opinions, ways of expressing thoughts, emotions and proper established customs and habits. In order to determine how consumers perceive the food quality referring to animal origin products, the study was carried out using the method of focus groups (focus group interview – FGI)[1]. Focused

[1]Research financed by European Regional Development Fund under The Innovative Economy Op-

interviews are carried out mostly in groups of 8 to 12 consumers selected on the basis of specific criteria for targeted testing [Kędzior 2005, Maison 2001]. A characteristic feature of this type of research is to use the group dynamic and common ideas generation by participants selected to the study [Kędzior 2005, Maison 2001, Maison 2007, Nikodemska-Wołowik 1999]. The research by focus groups was conducted in November and December 2010. In order to ensure the greatest homogeneity degree of the studied consumers groups, 10 women aged from 35 to 65 years were recruited into each group. There were completed 10 FGI sessions and each session lasted approximately 2.5 hours. The sample was selected in a targeted manner in accordance with the essence of this method. The consumer responsibility for food shopping and meal preparation in the household were the main criterions of consumer recruitment. The other criteria which were taken into account were as follows: an economic criterion (positive evaluation of family financial situation), the frequency of beef consumption (1. the regular intake – three times per month: four groups; 2. the potential intake – two times per month: four groups, 3. the occasional purchase – consumers who rarely purchase meat or do not buy it: two groups). The main aim of the study was to determine consumer's attitudes and the behaviour with respect to beef in order to identify various barriers in the decision process.

Interviews were conducted by the so-called "moderation script", which includes the following issues: (1) consumer attitudes and behavior with regard to cooking and food preparation, (2) perceived positive and negative traits of meat with the particular emphasis on beef, (3) the use of beef in the household, (4) making purchase decisions according to beef (the place of purchase and decision-making process), (5) identifying factors influencing the purchase of beef, and barriers to purchase, and (6) opinions about the concept of communication of selected characteristics of beef. The recorded discussion was used to prepare the precise transcripts. This material was analyzed by the experts by preparing a written development of the main results. Then, according to the principles of qualitative data analysis [Maison 2001], the obtained results were organized and the material has been categorized by the major research problems.

RESULTS AND DISCUSSION

In the opinion of the respondents the meat should be included in the daily diet because of its significant role in nutrition. According to the FGI participants' opinions, meat gives the proper energy and satisfies human's hunger for long time comparing to other food products. Meat also can be used to prepare many dishes, and thus it has got the great potential and diversity. According to respondents, meat requires the special preparation due to the children preferences who are not always keen on this type of food. On the other hand, the adverse meat effects may relates to human health, which can be associated with the type of material (for example too high level of fat in the meat) or the wrong preparation way (the fried meat). A few illustrative comments follow:

- *We all like the meat, it is tasty.*
- *It is needed for health; it is essential (...) so the grit, the satiety.*

erational Programme, 2007–2013, Optimizing beef production in Poland according to strategy from "fork to farm".

- *Dinner diversity; there is greater opportunity to create some different dishes.*
- *Quickly you can prepare something like cutlet/chop, and this is filling. When I played with the dumplings, my sons asked me about dinner, cause it's dessert.*
- *This is the basis of dinner. There is no diner without meat, simply.*

According to respondents, each type of meat should be characterized by certain attributes. Among the most frequently beef purchase factors which were taken into account, consumers mentioned sensory qualities such as taste and smell and preferences of family members. In the case of beef, consumers mainly pointed out that meat should be juicy with a lively, bright red colour ("not too dark colour"). In the consumer opinion, beef should not contain too much fat, and the fat cannot be yellow colour. The age of the animal from which the meat was obtained was an important meat quality indicator (so-called "young beef", without veins), and thus the meat should result in the appropriate size dish ("not too large pieces"). Meat freshness was one of the most important attributes mentioned by participants. They also stressed the health benefits of this type of meat and its "uniqueness" comparing to other types of meat. Here again, the following comments illustrate these interpretations.

- *And if you buy for the broth you have to pay attention to fat, it must be white not yellow.*
- *(...) and the smell, the smell here is very important.*
- *(...) taste, smell, appearance (...).*
- *It contains a lot of proteins and it is one of the healthiest meats.*
- *In these anemic states it improves the condition of the body, improves the level of hemoglobin. It is recommended meat.*
- *It is healthier, because the world actually went in the direction of such industrial farming.*
- *After eating beef the man is not such hungry.*
- *It is delicious and such a little bit unique; this meat is different.*
- *It is (...) rich in iron; healthy.*
- *(...) freshness probably.*

An important element of the study was to investigate decision-making process of beef consumers. The decision-making process is generally distinguished in five phases of varying duration [Gajewski 1994]: (1) feeling the need (awareness), (2) looking for the alternatives, (3) evaluation of alternatives, (4) the purchase decision, (5) feeling after purchase. The analysis of obtained results indicate that some consumers, do food shopping taking into consideration the specific thought of action plan. Those consumers want to buy raw material for the proper dish, however it happens that consumers can change the decision in the shop when another attractive raw material is available. In the light of the results, the buying process can be summarized as follows: (1) the consumer choice referring to trusted butcher shop, (2) the comparison referring to various types and parts of meat including beef, (3) the final decision. Here, the following some comments illustrate these interpretations.

- *When I go to the shop I think: "I am buying today the stew" but I look around–and there is "so nice" beef. And I do not know what to do because the beef should be chill; so I buy the beef very often and I put it in to the fridge.*

- *You come to the shop to buy the meat for broth soup for example and you see nice/ pretty beef so you can prepare "bitki"− so you buy it.*
- *I see such a nice piece of meat; let's say pork ribs − and there is no bones in it so I take it and I can use it for example on the next day.*
- *Sometimes I want to buy chicken but I see pretty beef meat so I change the plans (I give up) and I prepare something different.*
- *When I plan the stew and there is now meat for stew I give up; or there is only "stringy" beef (...).*
- *(...) when there is beef for the gravy, and we want the beef for the other dish, not for the gravy in fact, we also give up.*
- *I come to the shop and I say that I want something for broth soup and the lady knows me from years so she shows which piece is better.*
- *I come to the shop, and there is the counter and I see what is good, and after that I say that I want a piece from the particular part.*
- *I watch, I stand and look/stare and ask, I indicate the piece, but the lady recommends pork, and I know that it is fresh pork and I know that pork chops will be.*
- *When I go to the butcher shop and I say that I want the meat in order to roast it, the seller tells me to come on the next day and he promises to leave the meat for me. On the next day the meat no longer exists, but I have put it off.*

The main factors that could possibly change the consumers' initial beef purchase are as follows: an attractive and inviting display of meat and a recommendation of a trusted seller. However, in situations when the meat appearance does not meet the customer expectations, the consumer is ready to cancel the purchase. Among the motives encouraging the consumer to prepare the specific dishes mentioned by surveyed participants were:

- The need of meals diversity ("The beef was not prepared for dinner for a long time");
- More festive lunch or the guests invitation;
- The seller recommendation;
- The taste of beef – "the desire for a particular dish" ("I would like to taste the stew with buckwheat");
- Consideration referring to health aspects;
- The family needs.

The following comments may present consumer point of view.

- *(...) When I see a piece of meat or I have to prepare a dinner for a larger number of people, I usually prepare beef.*
- *Or any specific requirement that maybe we can do this and that.*
- *I plan, I have the time and I will spend time for it on Saturday.*
- *When I see it I buy it.*
- *I plan it usually.*
- *I go to the shop to buy the pork but when I see a nice piece of beef I have an idea and maybe I buy a piece of beef too.*
- *My husband sometimes comes and says that he would eat some meat, maybe beef. So I go straight to the shop. And he prepare the dish, the onions, frying and in the evening it smells throughout the house. And we have got it for the supper.*

- *I have been buying lately a ground beef because of my daughter's anemia, and often I buy a little of it, about 20 or 30 grams, and the lady grinds the meat for me. I buy it for my daughter's health.*
- *I also plan Strogonoff for example, I do it every Sunday in fact.*
- *(...) there were chickens or pancakes, so now it is turn to the beef. I care about the diversity.*
- *When I invite guests, I prepare two meat dishes. And usually one of them it is pork or poultry and the other is always beef.*

Besides the factors which motivate the consumers to purchase beef, participants indicated the factors considered by them as the "shopping barriers". Other findings also indicate that consumers want to have an easy access to the groceries that they choose and to be able to afford them [Kowalska 2011]. In FGI research among the most frequently mentioned barriers were as follows: beef cost, preparation time, lack of ideas/concepts to prepare the beef, the problem with the availability the proper meat, lack of acceptance among children. With regard to the price, beef is perceived being significantly more expensive than other types of meat. Depending on the type of beef its price in consumer opinion reaches up to 50–60 zł per kilo. The price barrier makes that this meat is perceived to be quite elegant and it is not suitable for every occasion, thus it is bought on special occasions. Therefore beef is purchased for more family dinners on Sunday, or on a special occasion when guests are invited for a supper. A few illustrative comments follow.

- *I think that if beef was as much expensive as pork, the majority of people would buy beef in fact.*
- *It is not the most tasteful meat but the most expensive one in fact.*
- *Veal is expensive, beef may not be so expensive as veal, but in fact it is expensive also.*
- *Beef is getting more and more expensive every day, and this is the worst.*
- *Firstly beef is expensive and secondly it is more work-consuming, therefore it is prepared/eaten just for the variety.*
- *When the children were smaller I used mainly the veal or the veal and poultry. And now mainly poultry and pork. It is because of the price.*
- *Today in the morning I bought a brisket rib plate, 14.70 zlotys per kilo. It was in one part; and nice pork ribs – 9 zlotys. But that's because there is the gradation and we buy a bit less meat, but at this same price/for the same price.*

Preparation time was another factor limiting the choice of meat in the store. Beef is perceived to be "difficult" to prepare and it is time-consuming. Female consumers, particularly from younger age groups, also mentioned about their failures associated with the preparation of tasty beef. The process of preparing this kind of meat is associated with keeping it in the flood and long frying or cooking, therefore in general from consumer point of view this meat is not suitable for "quick lunch". These comments below illustrate the consumer perception referring to difficulties with beef preparation.

- *I'll do this beef; for example "zraziki" take more time; the chicken – very fast; cut and there is; and beef needs more time.*
- *It needs much time because it is tough.*
- *Preparation takes longer, burning lasts longer, it is more complicated.*
- *The disadvantage is the difficulty in preparation and time-consuming.*

- *I seasoned it and it is really in the refrigerator 2 days in the oil and in the spices (...) pickled in it (...).*
- *Poultry push out the beef because of its ease of preparation.*
- *You celebrate the beef. It is not on every day. It is not so common (...).*
- *The cooking process is longer unfortunately. It happens very often, that it is tough. If it is fried it is not simply to chew.*

Moreover, the consumers emphasized that currently young housewives are less familiar with the beef and with the methods for its good preparation. Since the beef is not very popular meat, women often cannot deal with it and they are even afraid of "culinary failure". Therefore, some female consumers rarely buy beef, and if it happens to them it is usually the meat for soup or stew; however after several failed attempts the women are getting to discourage to this kind of meat. Here again, the following comments illustrate these interpretations.

- *Beef; I think you have to be a specialist.... it's not that popular. We do not have tradition (heritage) from home(...). I associate it with exquisite (...).*
- *You have more ideas for pork than for beef. − You can cut poultry and it is done, and what you can do with beef – not so many dishes.*
- *And it incredibly "shrinks" and my family is eager to eat meat for breakfast, lunch and dinner. I am seriously; and this meat is really expensive; for example you buy 1 and half kilo and you prepare "bitki" and you have one more dinner. And that's all.*
- *Even if I like it and I think that it is nice, there is no guarantee that I can get this to make a good meal.*
- Another factor which was mentioned by participants as limiting the beef purchase is the problem with the choice of meat (a problem with the meat availability). Because of the fact that the beef is not so popular among many women, they also do not know how to choose the right piece of meat in order to gain a success, and for this reason some women gives up the beef purchase. There were also opinions referring to shop owners who order this type of meat very rarely because of low consumer attention. The following comments confirm this opinions.
- *Young mums do not have time to spend for the beef.*
- *I also admit that I buy in a shop which is next to me, but what's odd, despite the fact that beef is expensive, it quickly disappears and you have to go to the shop very early in the morning to buy. And I asked – they order little amount because it changes the colour and nobody wants to buy it; so it goes so quickly.*

In general, among the meat purchase points which were mentioned by FGI participants were small shops and bazaars, and when it comes to hypermarkets, the consumers' opinions were rather negative. With regard to the butcher shop and a bazaars, it was emphasized that the products are fresher and frequent of supply comparing to other purchase points. It was also underlined that there is the possibility to check the freshness through the senses (eg sight or smell), and the direct contact with the seller allows for further checking of the raw material before purchasing and making sure that the meat is fresh. Participants emphasized that in small shops the sellers (including local shops) show a greater interest and professionalism; generally it is nicer and the shop assistant is more likely to respond to consumer questions. According to respondents, contact with the seller is easier by the fact of "being a regular customer". From the consumer point of view,

buying in the supermarket is more anonymous and it is lack of certainty referring to meat freshness. In the opinion of respondents, the supermarket service is often unpleasant for clients and the sanitary conditions are very low. A few illustrative comments follow.

- *It is cheaper in supermarkets but in these small local shops (...) they have a really beautiful meat. As you go, what you want, they will show, cut, grind.*
- *Large quantities of meat are brought in hypermarkets, so hypermarkets are filled with meat. For example, Real (...) my friend works there, so there are promotions in every Thursday in Real; so the pork loin is sold for 9 zl. And I suspect why pork loin on the bone is after 19 zl, and the boneless is sold at about 9 zl.*
- *As we look for something in our shop we can ask the seller more specifically; so when you ask if it is fresh you receive the honest answer.*
- *If you go to this shop and the meat is not fresh they will tell you not to buy the meat and they say that you can come tomorrow. You can trust to the seller and you are sure that you will buy the fresh meat.*
- *I do not buy in the supermarket but for example on the bazaar and I know that it is good quality.*
- *I do not buy in Tesco. (...) The fresh meat is mixed with outdated products, because they must sell everything.*

Another factor limiting the beef purchase by consumers is the children reluctance to eat this type of meat. FGI participants declare that children do not accept beef, because of the taste, and hardness. However beef is perceived by consumers as being very healthy, thus mothers try to use it in modified (changed) form in some foods such as broth and dumplings filled with meat. Some comments below illustrate these point of view.

- *That's very good if it is cooked well (...). I remember when I was in the kindergarten the meat was tough, I remember when I was resting I kept it still in the mouth.*
- *It is reach in iron, children do not want eat the red meat, unless it is "hide" in something.*
- *We must look on it in order to check if it is "stringy" for sure, because the children do not want to eat such beef.*
- *My son says that it is hard/tough and he does not want to eat it.*
- *I do not buy because my children do not want to eat.*
- *My kids do not like it, but if they liked it I would have bought it.*
- *A child does not associate me with beef; husband – yes (...); for me it is food (powerful food) for adults.*

Buying barriers refer to consumer risk associated with various elements: social, psychological (self-doubt and the opinion of family or friends), economic (the high price of beef), risk of loss of time (a long time to prepare a meal) and functional one (lack of repeatability of quality in relation the raw material; problem with the availability and reproducibility of raw material).

CONCLUSIONS

Analysis of the qualitative research results indicates that beef is perceived to be positive for health comparing to the other types of meat (it is low in fat, it contains many valuable and essential nutrients). However, popularity of this meat is severely restricted because of barriers deep-rooted in consumers' minds as follows: (1) price – beef is much more expensive comparing to other kinds of meat and it is less efficient, (2) it needs a lot of consumer commitment-it is rather difficult to prepare and time-consuming so some female consumers cannot cope with this type of meat and do not have the guarantee of obtaining the desired culinary effect. Moreover it is not easy to select and purchase a good piece of meat and it is easy with the culinary failure. The last barrier factor is (3) lack of interest among children – female consumers observe that children usually do not accept this kind of meat due to its sensory properties (eg taste, hardness). According to the younger consumers the popularity of beef has declined and now it is rather rarely used in the households in order to meal preparation. Moreover, beef is rather planned for special occasions, such as family celebrations. Among older consumers popularity and skills preparations are higher which is associated with a particular lifestyle connected with lower labour force participation and with the family activity.

Decision-making process referring to beef is quite special. As noticed, the decision relates to planned purchases, for example special occasions. Moreover, when it comes to the selection of specific meat cuts, the decision depends on the suggestions and seller advice. The decision can be also changed according to prepared or pre-planned dish which is connected with the available assortment. Consumers can change their decisions, both in relation to particular parts of beef and toward to the other types of meat, such as pork or poultry. It seems that in the further stage of research, the most important area is to know the ability how to communicate the consistent quality of raw material. Moreover, the crucial point is to provide information according to the appropriate culinary methods for selected parts of beef in order to reduce the purchase barriers and the risk referring to beef perceived by consumers.

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CZYNNIKI WARUNKUJĄCE PROCES DECYZYJNY KONSUMENTÓW WOŁOWINY

Streszczenie. Podstawowym celem przeprowadzonego badania było poznanie postaw, a szczególnie zachowań konsumentów w odniesieniu do czynników powodujących zakup mięsa wołowego oraz określenie barier ograniczających wybór tego rodzaju mięsa. Badanie przeprowadzono na 10 grupach konsumentów (gospodynie domowe w wieku 35–65 lat) wykorzystując metodę zogniskowanych wywiadów grupowych. Wyniki badań wskazują, że wołowina jest postrzegana jako mięso o pozytywnych walorach odżywczych, zdrowotnych oraz sensorycznych; jest kupowana ze względu na ważne uroczystości rodzinne. Jednakże popularność tego mięsa jest ograniczona z powodu barier głęboko zakorzenionych w świadomości konsumentów takich jak: (1) cena – wołowina jest mięsem znacznie droższym w porównaniu do innych rodzajów mięs oraz jest mniej wydajna; (2) mięso to wymaga większego zaangażowania konsumenta – jest raczej trudne w przygotowaniu oraz wymaga czasu, w związku z czym konsumenci mają problemy z przygotowaniem tego rodzaju mięsa oraz nie mają gwarancji uzyskania pożądanych efektów kulinarnych. Ostatnim czynnikiem wymienianym przez badanych był (3) brak akceptacji wśród dzieci – konsumentki twierdziły, że dzieci zazwyczaj nie lubią tego mięsa ze względu na jego właściwości sensoryczne.

Słowa kluczowe: proces decyzyjny, konsument, wołowina

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THE MACROECONOMIC DIMENSION OF THE EFFECTIVENESS OF THE SYSTEM APPROACH TOWARDS THE MANAGEMENT[1]

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Abstract. The study provides the results of the analysis of the relation between the number of the granted certificates of management systems, chosen macroeconomic data and indicators characterizing the EU27 member states. The strongest correlations were noticed between the number of gathered certificates and such factors as: employment in medium-sized enterprises, the value of trade and the value of foreign investments, the area, the population and the weak correlation was noticed with the inflation. While the problem of the influence of the certification on the activity in the microeconomic scale was described in details in literature, it is hard to find a lot of studies in which the relations between the number of the certified organizations in the country and its macroeconomic condition were analyzed.

Key words: management systems, ISO certificates, macroeconomic conditions

INTRODUCTION

Under conditions of the increased market competition and continuous changes, which accompany the business activity each enterprise faces the extremely difficult task which is an identification of all elements and aspects of functioning of the organization as well as environment factors, which largely determine its development.

The effective way, which sets the direction for the actions of the organization and allows to monitor the degree of the achievement of the goals and the thorough analysis of problems appearing in the organization, is the implementation of the system approach towards management. Its main objective is to maximize the profit of the enterprise, while maintaining a balance between individual elements of the organization.

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The system approach towards managing the organization consists of managing individual aspects of functioning of organization, such as: quality, food safety, environment, information security etc.

Organizations implement more and more universally numerous system solutions as confirmed by the Figure No. 1, showing the structure of certificates obtained by enterprises in the EU countries. The system approach towards the management is based on requirements of individual norms, such as:

- ISO 9001 – it includes requirements concerning the quality management system which an enterprise should take into account, in order to both demonstrate its ability for delivering products that meet legal and customer requirements and increase customer satisfaction [Łunarski 2008].
- ISO 14001 – Environmental management systems. Requirements and guidelines for implementing, which are the base for an enterprise to apply for the certificate. The main objective is to create the effective system of the environmental management, which is a part of the integrated management system in the organization. It is the intention of the system to assist organizations by achieving business objectives, while complying with the principles of the protection of the environment [Poskrobko 2007].
- ISO 16949 – ISO/TS 16949: 2002 is an ISO technical specification, in which the American (QS-9000), German (VDA6.1), French (EAQF) and Italian (AVSQ) norms of quality management systems in the automotive industry were standardized, in order to eliminate the need of multiple certification schemes depending on needs of recipient systems. Except the needs described in the standard, also individual requirements of a customer may appear, which are required by individual manufacturers of vehicles [ISO/TS 16949: 2009].
- ISO 27000 – ISO/IEC 27001 – an international standard standardizing information security management systems. It was published on the basis of the British BS standard

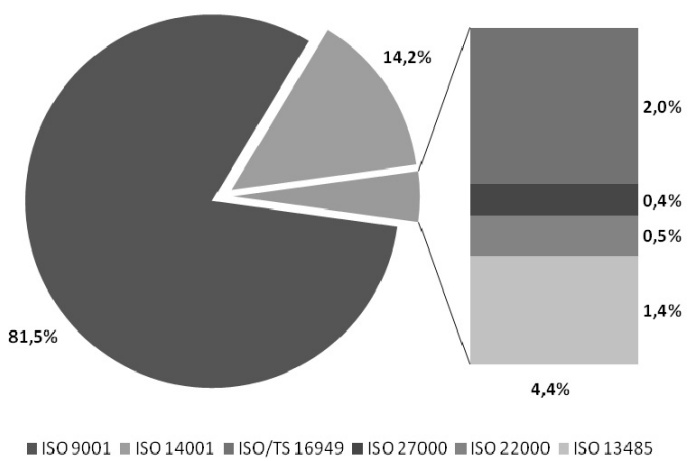

Fig. 1. Structure of certificates in the European Union
Rys. 1. Struktura certyfikatów w Unii Europejskiej
Source: own study 2010 on the basis of ISO Survey 2009
Źródło: opracowanie własne 2010 na podstawie ISO Survey 2009

7799-2, published by BSI, on the 14th October 2005. It was in Poland, that the standard ISO/IEC 27001 was published as PN-ISO/IEC 27001: 2007 on the 4th January 2007. ISO/IEC 27001: 2007 is a specification of information security management, with which conformity may be confirmed by audits, on the basis of which certificates are issued.

- The standard EN ISO 22000:2005, Food safety management systems – Requirements for any organization in the food chain, was issued in 2005, while its Polish version – the standard PN-EN ISO 22000:2006 Food safety management systems – Requirements for any organization in the food chain comes from 2006. This standard has the structure similar to the standard PN-EN ISO 9001:2009 "The quality management systems – Requirements" and the standard PN-EN ISO 14001:2005 "The environmental management systems – specifications and guidelines for implementation" what greatly facilitates their mutual integration [Wysokińska-Senkus 2009].
- ISO 13485 "Medical products – quality management systems – requirements for the systems due to legal requirements" specifies requirements for quality management systems, which can be implemented by organization for designing and development of production, installation and servicing medical devices as well as designing, development and providing services associated with it.

While studies, which confirm the impact of implementation of the systems on microeconomic variables characterizing organizations, are widely known [Wysokińska-Senkus 2008], the studies on relation between the number of certificates and variables characterizing individual economies had not been found. Therefore the author of the study decided to make an attempt to conduct such analysis.

METHODOLOGICAL BACKGROUND OF THE STUDY

The units of the study were the countries being members of the European Union (EU27). The study consisted in determining the coefficient of correlation between the number of certificated organization within the scope of previously defined norms[2] and basic macroeconomic indicators describing economies such as: population, area, unemployment rate, inflation, number of active enterprises, GDP per capita, number of employed people, employment structure by sizes of the enterprises, added value of the industry, the labour productivity, value of the export, value of the import, average salary, minimum salary, the difference between the remuneration of men and women (%), the inflow of foreign investments, investments abroad. The data for the study were from 2008 and were the most up-to-date available data at that time.

[2]ISO 9001 norms – quality management systems – Requirements, ISO 14001 – Environment management systems – Requirements and guidelines for applying, ISO 16949 – Quality management systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations 1, ISO 27001 – information systems, safety requirements, ISO 22000 – food safety management systems – requirements for any organization in the chain of food manufacturers, ISO 13485 – medical products – quality management systems – requirements towards systems due to legal requirements.

The Pearson's linear correlation coefficient which is a measure of the strength of the relation between two measurable characteristics was used as the tool of the analysis. It takes the values from the range: –1 < r < +1 and can be calculated as follows [Aczel 2000]:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \overline{y})^2}},$$

$$r_{xy} \in [-1, 1].$$

$$\overline{x} = \frac{1}{2}\sum_{i=1}^{n} x_i, \overline{y} = \frac{1}{n}\sum_{i=1}^{n} y_i$$

where:
x and y are random variables with continuous distributions,
x_i, y_i are values of random samples of these variables (i = 1, 2,..., n),
$\overline{x}, \overline{y}$ – average values of these samples.

The positive sign of the coefficient of correlation points out to the existence of the positive interdependence (positive), negative however indicates the negative interdependence (negative). The closer the value of the modulus of the coefficient of the correlation to 1 is, the stronger the correlative relation between examined variables is. It is as an indication that it is assumed that correlation between two characteristics is: indistinct – if modulus of r < 0.3; average – if 0.3 < modulus of r < 0.5; clear – if modulus of r > 0.5.

RESULTS OF THE ANALYSES

The summary table (Table 1) presents the correlation coefficients. Due to the strong positive relation between the number of ISO 9001 certificates and other ISO certificates, which were analysed in the study, the detailed results will be discussed only on the example of the relation between the number of ISO 9001 certificates and other characteristics.

The analysis showed the strong positive relation between geographical (area of the country) and demographic variables (the population) – that was 0.501 and 0.764 respectively. Such a relation does not appear in the rest of the world. The existence of such a correlation can be explained in connexion with the relation with the number of registered enterprises and, consequently, with strong competition in the European Union. The distribution of variables – the number of certificates and the population – were presented on Figure 2 and the distribution of variables: the number of certificates and the number of enterprises were presented on Figure 3.

Table 1. The correlation table of selected ISO standards and macroeconomic indicators
Tabela 1. Tabela korelacji wybranych norm ISO i wskaźników makroekonomicznych

		Area Powierzchnia	Population Liczba ludności	ISO 9001	ISO 14001	ISO/TS 16949	ISO 27000	ISO 22000	ISO 13485	Unemployment Bezrobocie
		A	B	C	D	E	F	G	H	I
ISO9001	1	.501(**)	.764(**)	1	.890(**)	.609(**)	.565(**)	–0.010	.582(**)	0.076
ISO14001	2	.612(**)	.715(**)	.890(**)	1	.529(**)	.648(**)	–0.024	.428(*)	0.051
ISO16949	3	.555(**)	.860(**)	.609(**)	.529(**)	1	.437(*)	–0.057	.939(**)	0.028
ISO27000	4	0.271	.654(**)	.565(**)	.648(**)	.437(*)	1	–0.062	.509(**)	0.225
ISO22000	5	0.042	0.024	–0.010	–0.024	–0.057	–0.062	1	–0.095	–0.061
ISO13485	6	.419(*)	.818(**)	.582(**)	.428(*)	.939(**)	.509(**)	–0.095	1	–0.075

		Inflation Inflacja	Number of companies Liczba firm	GDP per capita PKB na 1 mieszk.	Value added Wart. dod.	Employment Zatrudnienie	Employment structure (%) Struktura zatrudnienia % (nf.)			
							Micro Mikro	Small Małe	Medium Średn.	Large Duże
		J	K	L	M	N	O	P	Q	R
ISO9001	1	–0.254	.845(**)	0.029	.682(**)	.784(**)	0.325	0.007	–.502(**)	–0.134
ISO14001	2	–0.246	.791(**)	0.047	.662(**)	.762(**)	0.219	0.012	–.483(*)	–0.018
ISO16949	3	–0.297	.648(**)	0.045	.827(**)	.847(**)	–0.028	–0.021	–0.270	0.195
ISO27000	4	–0.212	.411(*)	0.015	.745(**)	.731(**)	0.021	–0.199	–0.384	0.278
ISO22000	5	–0.047	0.060	–0.143	–0.110	–0.026	.600(**)	–0.388	–.451(*)	–0.314
ISO13485	6	–0.295	.539(**)	0.109	.849(**)	.816(**)	–0.092	–0.015	–0.238	0.253

		Productivity Prod. pracy	Export and import/ca Eksp. i imp./ca	Export Eksport	Import Import	Average wage Średnia płaca	Minimum wage Płaca min.	Incoming investment Napływ inwestycji	Investments abroad Inwestycje za granicą
		S	T	U	V	W	X	Y	Ż
ISO9001	1	0.177	0.029	.585(**)	.637(**)	0.124	0.192	.502(**)	.514(**)
ISO14001	2	0.161	0.047	.495(**)	.567(**)	0.090	0.112	.537(**)	.568(**)
ISO16949	3	0.161	0.045	.905(**)	.892(**)	0.193	0.191	.648(**)	.647(**)
ISO27000	4	0.116	0.015	.533(**)	.591(**)	0.234	0.207	.712(**)	.758(**)
ISO22000	5	–0.129	–0.143	–0.096	–0.078	–0.427	–0.093	–0.139	–0.126
ISO13485	6	0.220	0.109	.923(**)	.898(**)	0.307	0.440	.675(**)	.663(**)

Source: own elaboration based on EUROSTAT 2010, ISO Survey 2009
Źródło: opracowanie własne na podstawie EUROSTAT 2010, ISO Survey 2009

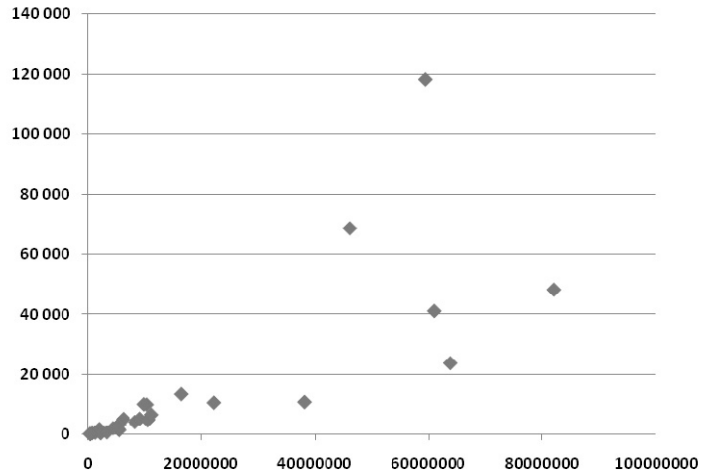

Fig. 2. The relation between the number of the ISO 9001 certificates and population of the EU27 countries
Rys. 2. Zależność pomiędzy liczbą certyfikatów ISO 9001 a liczbą ludności w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

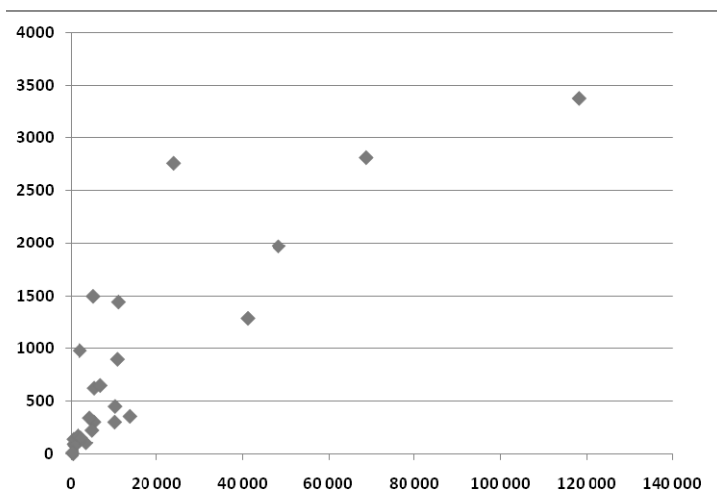

Fig. 3. The relation between the number of the ISO 9001 certificates and the total number of companies in the EU27 countries
Rys. 3. Zależność pomiędzy liczbą certyfikatów ISO 9001 a liczbą przedsiębiorstw w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

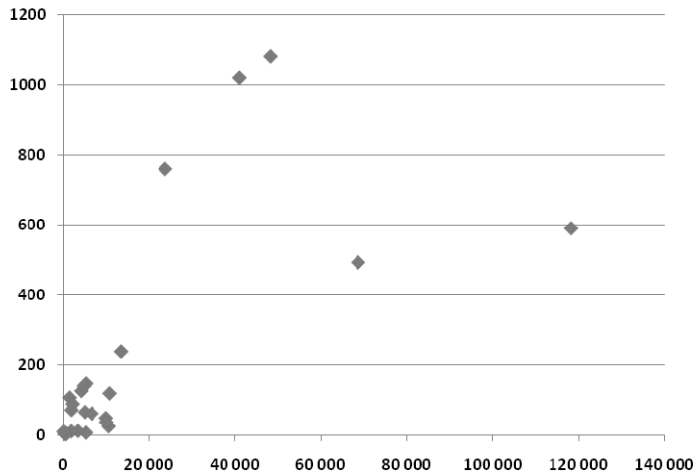

Fig. 4. The relation between the number of the ISO 9001 certificates and the value added in the EU27 countries
Rys. 4. Zależność pomiędzy liczbą certyfikatów ISO 9001 a wartością dodaną w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

Such a significant positive correlation between the number of ISO 9001 certificates and the number of enterprises can be explained by the fact that many organizations implement the ISO 9001 standard due to the fact that it has become an essential standard of operation in many fields and it increases the marketing prestige of the organization, as well as it contributes to construction of the competitive edge of enterprises.

The analysis of the relation of the number of certified organizations and the value added of economies demonstrated that these are the features strongly related with one another – the correlation coefficient of 0.682. It is possible to find reasons for appearing of such a relation in combination with analysis of the relation of the number of certificates and the number of people employed – 0.784 (Figure 5), and with the number of certificates and the value of the trade: of export – 0.585 (Figure 6) and of import – 0.637 (Figure 7).

It is possible to explain such relations with fact that by holding certificates, the enterprises meet customary requirements for the quality of goods and services, in the trade exchange, they are able to conduct the free trade on a higher scale than other countries in the world and additionally the products of higher value added are subject to a trade within countries of the EU27 (Figure 4).

The analysis of the relation of the number of certificates and the employment structure in enterprises in terms of their size revealed a statistically significant negative relation towards medium-sized enterprises – –0.502 and a moderate positive relation towards micro-enterprises – 0.325. This is due to the fact that medium-sized enterprises, which are the most numerous among the certified organizations, take care particularly about the productivity (Figure 8).

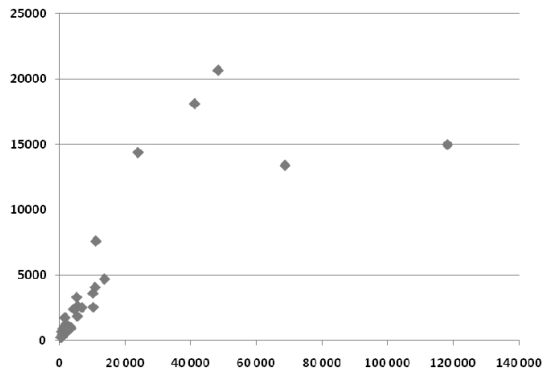

Fig. 5. The relation between the number of the ISO 9001 certificates and workforce in the EU27 countries
Rys. 5. Zależność pomiędzy liczbą certyfikatów ISO 9001 a liczbą pracujących w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

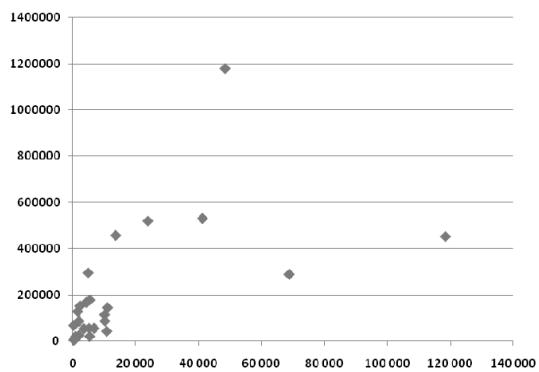

Fig. 6. The relation between the number of the ISO 9001 certificates and export of the EU27 countries
Rys. 6. Zależność pomiędzy liczbą certyfikatów ISO 9001 a wartością eksportu w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

The countries, in which the number of certified enterprises is higher, are also perceived better as the aim of foreign investments (Figure 9). It is evidenced by a high positive correlation between the inflow of the foreign capital and the number of certificates – 0.502. These countries handle also quite well as potential investors – in this case the value of the coefficient is 0.514 (Figure 10).

One more relation is noteworthy – between the number of certificates and the inflation. The correlation coefficient of –0.254 points out to the fact that it is in countries, where more certified enterprises operate that the lower inflation rate is recorded.

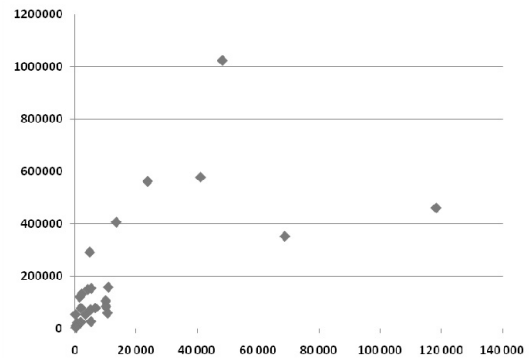

Fig. 7. The relation between the number of the ISO 9001 certificates and import of the EU27 countries
Rys. 7. Zależność pomiędzy liczbą certyfikatów ISO 9001 a wartością importu w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

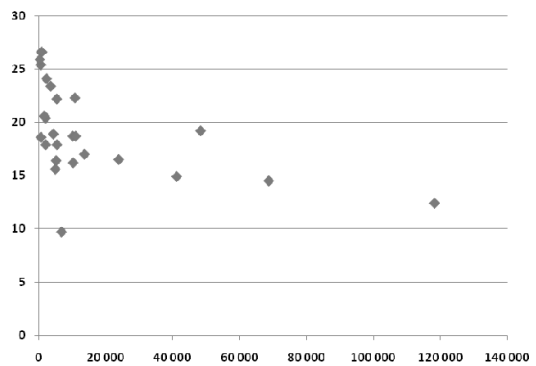

Fig. 8. The relation between the number of the ISO 9001 certificates and number of SME workers EU27 countries
Rys. 8. Zależność pomiędzy liczbą certyfikatów ISO 9001 a odsetkiem zatrudnionych w sektorze średnich przedsiębiorstw w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

The studies did not show statistically significant relation between the number of certificates, the unemployment, the labour productivity, the minimum wage, the difference in earnings of women and men or the average wage.

SUMMARY

The results of analysis presented above, show that there is a relation between the number of certified enterprises and some indicators attesting to the condition of economies of the countries of the EU27. This means that the better the economic position of

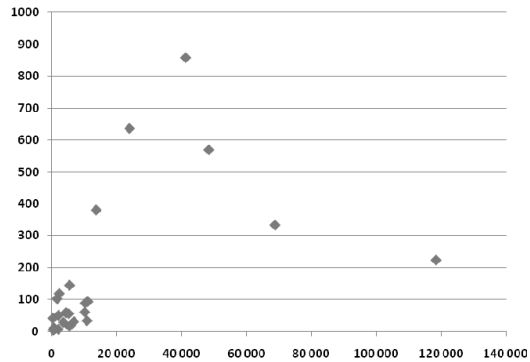

Fig. 9. The relation between the number of the ISO 9001 certificates and foreign investments in the EU27 countries
Rys. 9. Zależność pomiędzy liczbą certyfikatów ISO 9001 a napływem inwestycji zagranicznych w krajach UE27
Source: own elaboration
Źródło: opracowanie własne

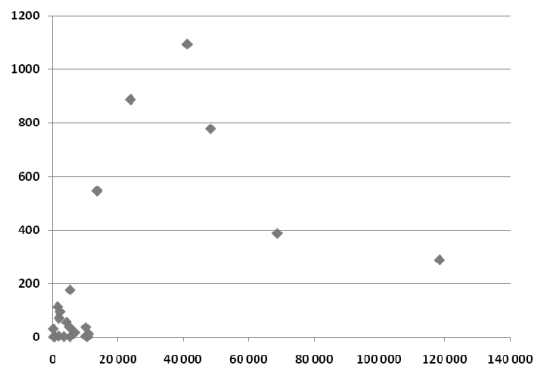

Fig. 10. The relation between the number of the ISO 9001 certificates and investments outside of the EU27 countries
Rys. 10. Zależność pomiędzy liczbą certyfikatów ISO 9001 a inwestycjami za granicą w krajach
Source: own elaboration
Źródło: opracowanie własne

analysed countries is, the more certified enterprises exist. It is worthwhile to monitor the strength of the relation between examined characteristics or conduct studies with separation for "old" and "new" countries of the UE.

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MAKROEKONOMICZNY WYMIAR EFEKTYWNOŚCI SYSTEMOWEGO PODEJŚCIA DO ZARZĄDZANIA

Streszczenie. Powyższe opracowanie stanowi przedstawienie wyników analizy zależności pomiędzy liczbą przyznanych certyfikatów systemów zarządzania, wybranymi danymi makroekonomicznymi, wskaźnikami charakteryzującymi państwa członkowskie UE27. Najsilniejsze korelacje dostrzeżone zostały pomiędzy liczbą certyfikatów a zatrudnieniem w średnich przedsiębiorstwach, wartością wymiany handlowej i wartością inwestycji zagranicznych, powierzchnią, liczbą ludności i dostrzeżono słaby związek z inflacją. O ile problem wpływu certyfikacji na mikroekonomiczną skalę działalności został dość szczegółowo opisany w literaturze, to do chwili obecnej nie można znaleźć wielu opracowań, w których próbuje się znaleźć powiązania pomiędzy liczbą certyfikowanych organizacji w danym kraju a jego kondycją makroekonomiczną.

Słowa kluczowe: systemy zarządzania, certyfikacja ISO, makroekonomia

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