European Research Studies Journal
Volume XXIV, Special Issue 3, 2021

pp. 334-350

A Model for Measuring the International Competitiveness of Furniture Industry in the European Union Countries

Submitted 21/07/21, 1st revision 04/08/21, 2nd revision 21/08/21, accepted 15/09/21

Katarzyna Łukiewska[1], Agnieszka Brelik[2]

Abstract:

Purpose: *The main aim of the research was to assess the international competitiveness of the furniture industry in the EU Member States. The article deals with the interpretation and methods of measuring competitiveness at this level of economic analysis.*
Design/Methodology/Approach: *The study used the measurement model of the international competitiveness of an industry - the proposed methodology allowed for a broad assessment of competitive potential and competitive position. A set of competitiveness indicators and a multidimensional statistical analysis were presented.*
Findings: *The international competitiveness of the EU furniture industry is diversified. The furniture industries in Poland, Italy, and Germany had the most significant competitive advantage by far. These countries have exceptionally high production potential and big export share.*
Practical Implications: *The research can inform furniture manufacturers about the factors that contribute to increase competitiveness. Some strengths and areas for improvement in the operation of the furniture industry from various countries were identified. These may be relevant for building a lasting competitive advantage in the international market.*
Originality/Value: *Competitiveness is a category that is relatively rarely studied at the sector level. The present study performs a broad assessment of the furniture industry's competitiveness, considering both the factor and the result dimensions. The empirical research presented herein has both theoretical and practical value. The employed methodology is universal and can be used to assess various industries and sectors of the economy.*

Keywords: *Competitiveness, industry, competitive potential, competitive performance.*

JEL codes: *L68, F1, J24, O3.*

Paper Type: *Research article.*

[1]*University of Warmia and Mazury in Olsztyn, Poland, katarzyna.lukiewska@uwm.edu.pl;*
[2]*West Pomeranian University of Technology in Szczecin, Poland, agnieszka.brelik@zut.edu;*

1. Introduction

Competitiveness is one of the leading research issues in economic sciences. Research conducted on this topic has been related primarily to the processes of globalization, which is associated with more open markets and intense changes in market rules at all levels (Vega *et al.*, 2019). The economic and social changes in the world, technical progress, and growing customer requirements mean that the critical challenge of modern businesses is to maintain and increase competitiveness. This issue was emphasized in many studies, incl. in the development strategies of the European Union (EU), including the Lisbon Strategy and its continuation, the Europe 2020 strategy (Balcerzak, 2015).

The high importance of competitiveness in the functioning of businesses makes it a current and relatively often used category. Due to its multidimensionality and complexity and constantly changing environmental conditions, the issue of competitiveness remains insufficiently researched and open. Various aspects of competitiveness are taken up in the scientific discourse. The most commonly adopted is the microeconomic perspective referring to increasing the company's efficiency, market share, providing value to stakeholders, and being profitable (Dwyer and Kim, 2003; Lombana, 2006), and the macroeconomic perspective, in which the focus falls on domestic productivity, commercial results and increasing the citizens' standard of living (Priedea and Neuert, 2015; Ruzekova, Kittova, and Steinhauser, 2020). On the other hand, less attention is paid to the study of the competitiveness of industries.

Meanwhile, competitiveness at this level is essential, not only from the point of view of individual enterprises but also, as Porter (1996) stated, building the competitiveness of nations. Zhang and London (2013) emphasize that in the context of economic globalization in the international market, each country tries to generate a competitive advantage in various sectors to improve the international competitiveness of their products and increase market share. The present article measures competitiveness at this economic analysis level and assesses an important sector of the EU industry, i.e., the furniture industry. It comprises 120 thousand enterprises and 950 thousand employees within the EU. The annual production value is over 105 billion euros (Eurostat, 2021).

Moreover, Sujová, Hlaváčková, and Marcineková (2015) indicate that the furniture manufacturing industry provides economic, environmental and social contributions based on the utilization of renewable resources. Wood-based products are recyclable, reusable in new products, or as a source of energy. The EU has put particular emphasis on economic development based on renewable resources. For this reason, one of the interests of the EU is to make this sector highly competitive.

The aim of the research was thus to assess the international competitiveness of the furniture industry in the EU Member States. The proposed methodology made it possible to assess the international competitiveness of the industry comprehensively

broadly. The present article attempts to supplement the literature in this area and fill the existing theoretical and methodological research gaps.

2. Literature Review

Competitiveness is a complex, multidimensional and abstract category, related to various economic theories and considered about various economic entities (Sanli and Ates, 2018; Charles and Sei, 2019; Янтонь-Дроздовска, 2020). This causes difficulties in its understanding and interpretation and, consequently, also in measurement. At each level of economic analysis, different definitions of competitiveness and assessment methods are developed (Buckley, Pass, and Prescott, 1988). At the sectoral level, competitiveness is primarily related to the theory of economic growth and international trade. Definitions emphasize competing in the domestic and international market in a sustainable, profitable, and effective manner.

Various authors take the competitiveness of the industry as: "the ability to profitably gain and maintain market share in domestic and foreign markets" (Martin, Westgren, Duren, and Van, 1991; Pitts and Lagnevik, 1998; Fischer and Schoenberg, 2007a). Zhao and Wen (2004) indicate that this is the ability to "provide the need to meet product demand to the international market and gain profits continuously, by its more advanced capacity and production efficiency compared with other countries in the free trade international market." In the concept formulated by Timing (2011), the competitiveness of industry means "the ability to earn profits through the ability to penetrate product markets relative to the same industries from other countries and to attract the factor of production relative to the other industries within the same country or industries from other countries." The present study adopts the definition proposed by Wijnands and Verhoog (2016), according to which the competitiveness of an industry is the "sustained ability to achieve profitable gain and market share in domestic and export markets in which the industry is active."

The assessment of a sector's competitiveness should be based on an analysis of the strengths and weaknesses of the given industry in a given country in international markets compared to the same industry in other countries (Kuberska *et al.*, 2020). In empirical studies of competitiveness at this level, various indicators can be classified according to different criteria, e.g., cost-price and non-price competitiveness or ex-post and ex-ante competitiveness.

However, the most frequently used measures are divided into two groups: competitive position and competitive potential (Dieter and Englert 2007). In the first case, analyses are conducted mainly relating to the results in foreign trade, including export market share (EMS), comparative advantages (RXA - relative export advantage, RMA - relative import advantage, RCA - revealed comparative advantage), the relation of import and export (NEI - net export index, TC - trade coverage) and intra-industry trade (GL - Grubel-Lloyd index). Research in this area was carried out, among others, by Drabik and Bartova (2008), Török and Jambor (2013), Carraresi and Banterle

(2015), Vitunskiene and Serva (2015), Łukiewska (2020), Juchniewicz and Łukiewska (2020). Buturac, Lovrinčević, and Mikulić (2018) and Souza, Angelo, Almeida, and Paula (2018) used the constant market share (CMS) method to explain the increase in the export market share of a country's industry based on the competitive, product, geographic and residual effects.

About the industry's competitiveness potential, efficiency indicators of production factors are used. The most popular is the labor productivity index (Zhang and London, 2013), which was used in research, for example, by Łukiewska and Juchniewicz (2019) and Pawlak and Poczta (2020). Only a few studies have used analytical schemes or evaluation models. This approach was presented, among others, by Fischer and Schoenberg (2007b), who used a synthetic index composed of three partial indices, i.e., profitability, labor productivity, and production growth, to assess the competitiveness of the meat sector. Wijands and Verhoog's (2016) study of the food industry, in turn, used a synthetic indicator created based on increased export share, trade advantage, real added value, and actual labor productivity.

The evaluation of the furniture industry was dealt with, among others, by Lihra, Buehlmann, and Beauregard (2008), Han, Wen, and Kant (2009), Sujová, Hlaváčková, and Marcineková (2015), Grzegorzewska and Więckowska (2016), Augustyniak and Mińska-Struzik (2018), Grzegorzewska (2020). The research used single indicators related to commercial performance, most often RCA and EMS. They show that the global production of furniture is characterized by a relatively high concentration level, mainly in China, the USA, and some EU countries. It also indicates gradual changes in trade directions. Part of the research on the furniture industry also relates to individual sources of competitive advantage. In this context, among others, innovation, labor productivity, and mass customization were analyzed. However, the studies conducted so far have not focused on a broad assessment of the furniture industry in the EU market using multidimensional assessment models that consider many aspects of the industry's competitiveness.

3. Research Methodology

Based on a literature review, two research hypotheses were formulated:

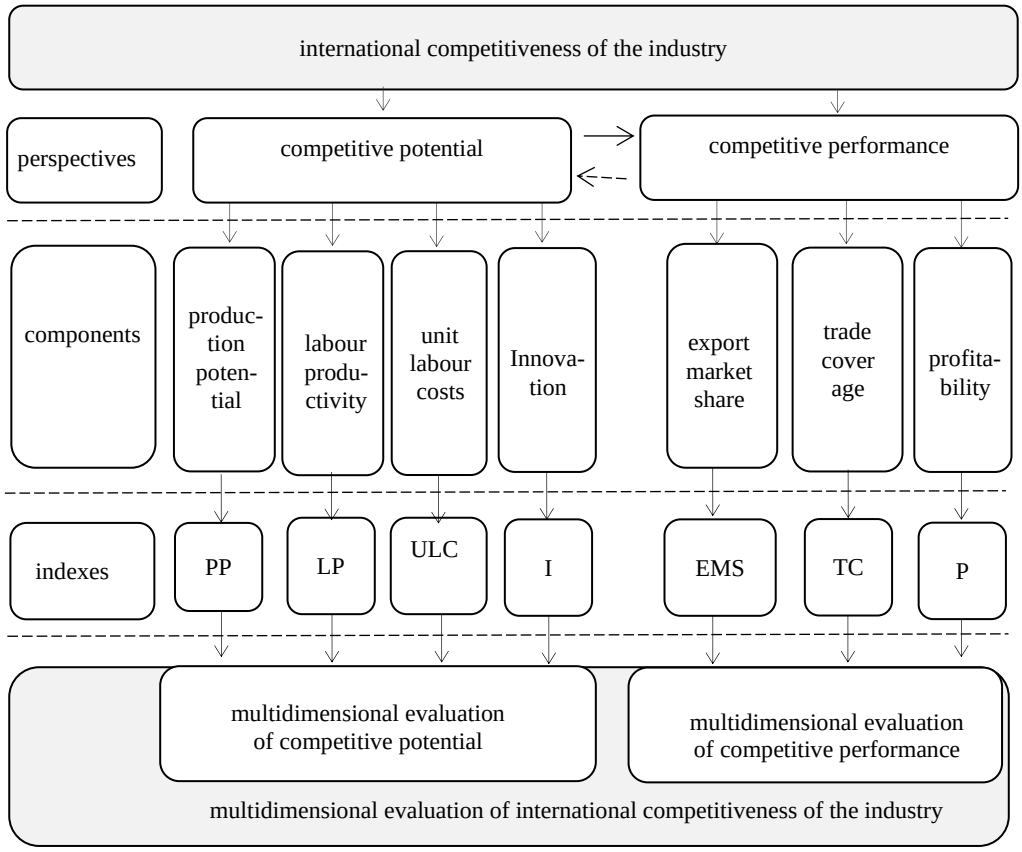
H1: *The international competitiveness of the furniture industry in the EU Member States is characterized by great diversity.*
H2: *EU countries with a high competitive potential of the furniture industry are also characterized by a highly competitive position in this industry.*

The study uses the model for assessing the international competitiveness of an industry (Figure 1), which has been previously used to assess the food industry (Łukiewska, 2019). The basis for building the model was the operationalization of the concept of the international competitiveness of the industry into competitive potential, which is a contribution to the competitive processes and the competitive position that

determines their result (Buckley, Pass, and Prescott, 1988). Subsequently, based on the adopted definition of competitiveness, extensive literature review, and available databases, seven components and corresponding indicators describing the potential and competitive performance are presented, given in Table 1.

The model assumes the possibility of using multidimensional statistical analysis to assess an industry's competitiveness, described by the various indicators presented. This enables the transformation of the multidimensional space of diagnostic variables and ordering it into a one-dimensional space. To assess competitiveness understood in this way, taxonomic methods can be used, both those enabling the study of the similarity of objects (countries) within the framework of non-linear ordering and those enabling the ordering of objects (countries) within a linear framework. This article carried out linear ordering based on a synthetic index constructed using the Helwig (1968) method. The hierarchy of the analyzed countries was established in terms of furniture industry competitiveness

Figure 1. *Measurement model of international competitiveness of the industry*



Source: *Łukiewska, 2019.*

Before the commencement of data aggregation, the indicators were formally verified. The coefficient of variation was calculated, which in each case exceeded 10%. This means that the features show sufficient spatial variability and differentiate the analyzed countries. The possibility of duplicating the information carried by individual variables based on the correlation coefficient was also examined. In the analyzed case, it was not higher than 0.6, except for EMS and LP. After Kukuła (2000), it was assumed that the substantive criterion has priority in data aggregation. Accordingly, to make it possible to compare and aggregate the partial indicators, they were unified using the classical standardization:

Table 1. *Indicators of the potential and competitive position of an industry*

Indexes	Description	Formula
Industry competitive potential indicators		
Production potential (PP)	The index measures a country's share of the number of companies in the industry across the EU. The concentration of units in a given country may lead to the development of related and supporting industries, cooperation, the creation of synergy effects, as well as an increase in competitiveness (Jankowska 2009: 116-120).	$PP_i = \frac{E_{it}}{\sum_{i=1}^{n} E_{it}}$ E − number of enterprises in the sector, n − number of analysed countries, i − country, t − period.
Labour productivity (LP)	The index determines how part of the production value is attributed to the employee and indicates the existence of efficiency advantages. Theoretical relationships between productivity and competitiveness can be found in the model developed by Melitz (2003).	$LP_{it} = \frac{V_{it}}{Z_{it}}$ V − value of sold production in the industry, Z − average employment in the industry, i − country, t − period.
Unit labour costs (ULC)	The index determines the value of labour costs necessary to produce a production unit and is a measure of price competitiveness. In theoretical terms, the use of unit labour costs in measuring competitiveness refers to Ricardo's theory of comparative costs (Olczyk and Kordalska, 2015: 13)	$ULC_{it} = \frac{LC_{it}}{V_{it}}$ LC− labour costs in the industry, i − country, t − period.
Innovation (I)	The index determines the share of innovation-active enterprises in the industry. The theoretical basis for the application of innovation in the assessment of competitiveness is the theory of the technological gap (Posner, 1961).	$I_{it} = \frac{E_{Iit}}{E_{it}}$ E_I − the number of enterprises in the industry that introduced innovations, E − the number of enterprises in the industry, i − country, t − period.
Indexes of the competitive position of the industry		
Export market share (EMS)	The index determines the acquisition of shares in foreign markets. In the literature on the subject, it is treated as the most important measure of competitive position (e.g. Banterle, 2005: 3, Wijnands and Verhoog, 2016: 13)	$EMS_{it} = \frac{E_{it}}{\sum_{i=1}^{n} E_{it}}$ E − industry export value, n − number of analysed countries, i − country, t − period.
Trade coverage index (TC)	The index determines the relationship between the value of exports and imports, i.e. the trade balance (Ambroziak, 2014: 56). A level above 1 means a trade surplus and an advantage of a given country over others in the domestic market.	$TC_{it} = \frac{E_{it}}{Im_{it}}$ E − industry export value, Im − industry import value, i − country, t − period.

Profitability index (P).	The index is the relationship between gross operating surplus and industry turnover (Fischer and Schornberg, 2007a). It determines the profitability of the industry, which, according to the adopted definition, is an element of competitiveness.	$P_{it} = \frac{GOS_{it}}{T_{it}}$ *GOS* − gross operating surplus, *T* − turnover, *i* − country, *t* − period.

Source: *Own study based on: Łukiewska (2019), Łukiewska and Juchniewicz (2019).*

$$z_{ij} = \frac{x_{ij} - \overline{x_j}}{S(x_j)}, i = 1,2,\dots,n, j = 1,2,\dots,m. \tag{1}$$

z_{ij} - standardised value of attribute *j* in country *i*, x_{ij} - value of attribute *j* in country *i*, $\overline{x_j}$ - arithmetic mean of attribute *j*, $S(x_j)$ - standard deviation of attribute *j*, *n* - number of analysed countries, *m* - number of analysed variables.

Hellwig's method assumes the creation of an ideal standard, i.e., in the analysed case, a hypothetical country characterised by the best competitive features. The standard was created based on a vector of standardised values of the analysed variables (Wysocki and Lira, 2003):

$$z = (z_{01}, z_{02}, .., z_{0m}) \tag{2}$$

$$z_{0j} = \begin{cases} \max\limits_{i} \{z_{ij}\}, if\ variable\ Z_{ij}\ is\ a\ stimulant, \\ \min\limits_{i} \{z_{ij}\}, if\ variable\ Z_{ij}\ is\ a\ destimulant. \end{cases}$$

In the study, all variables describing the industry's competitiveness were considered as stimulants, except for the unit labour cost index, which is a destimulant. Then, using the Euclidean metric (d_{i0}), the distance of each country from the standard was calculated and, on this basis, the synthetic index S_C was constructed (Wysocki and Lira, 2003; Łukiewska, 2019):

$$S_C = 1 - \frac{d_{i0}}{d_0}$$
$$d_{i0} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{0j})^2} \tag{3}$$
$$d_0 = \overline{d_0} + 2S_{s0}$$

d_{i0} - Euclidean distance of a country *i* from the standard object, d_0 - critical distance between the entity and the standard, $\overline{d_0}$ - arithmetic average of taxonomic distances, S_{s0} - standard deviation of taxonomic distances, z_{ij} - standardised value of attribute *j*. The synthetic index was used three times to establish country rankings for the competitive potential, competitive position, and international competitiveness of the industry.

Next, based on the arithmetic mean $(\bar{s})$ and the standard deviation (S_s), four groups of countries with high, medium, low and very low level of these categories were distinguished (Lira and Wysocki, 2003): $s_i \geq \bar{s} + S_s$ - high level, $\bar{s} \leq s_i < \bar{s} + S_s$ -

medium level, $\bar{s} - S_s \leq s_i < \bar{s}$ - low level, $s_i < \bar{s} - S_s$ - very low level. For each of the synthetic and partial indicators, the coefficient of variation was also calculated.

The furniture industry, which is the subject of the article, was defined based on the NACE Rev. 2, division C31 - Manufacture of furniture, and SITC Rev.3 classification, division 82 - Furniture and parts thereof. The source of the data was Eurostat. The time scope of the research covered the years 2014-2018.

4. Results

The conducted research shows that there were clear disproportions in the categories describing the competitiveness of the furniture industry in the EU Member States in the analyzed years. The highest differentiation occurred in terms of production potential, share in the export market, and trade coverage indexes, for which the volatility indexes exceeded 100%. The average differentiation was noted in terms of labor productivity, innovation, and profitability (coefficient of variation at the level of 40-60%), and the lowest was noted in terms of unit labor costs (coefficient of variation 21.1%) (Table 2).

Table 2. *Indexes of the potential and competitive position of the furniture industry in EU countries in 2014-2018*

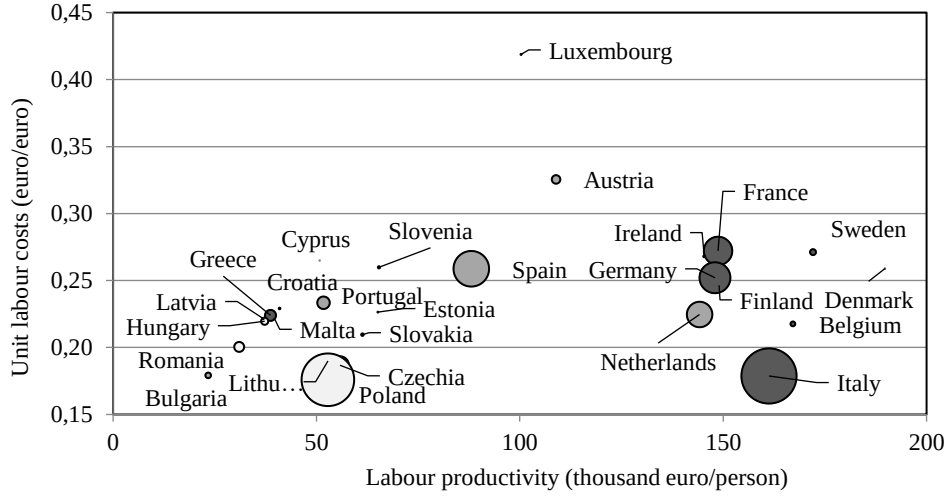
Country	Competitive potential indexes								Competitive performance indexes					
	PP		LP		ULC		PP		LP		TC		PP	
	%	R	thous euro/os	%	R	R	%	R	%	%	R	R	%	R
Austria	2.7	11	108.9	10	0.33	26	48.0	13	2.2	16	0.5	20	11.2	9
Belgium	1.7	16	167.1	3	0.22	8	82.5	1	3.2	8	0.7	17	8.6	17
Bulgaria	1.9	14	23.4	27	0.18	3	39.7	20	0.9	19	3.9	5	12.3	4
Croatia	0.8	20	40.9	21	0.23	15	69.5	4	0.7	20	1.5	11	10.1	10
Cyprus	0.3	26	50.8	20	0.26	22	62.9	7	0.0	26	0.0	26	13.6	3
Czechia	5.3	7	55.8	16	0.19	4	50.7	11	7.5	4	1.7	10	11.3	8
Denmark	0.5	24	189.8	1	0.26	20	45.6	17	3.0	11	1.3	13	11.4	7
Estonia	0.6	23	65.1	14	0.23	14	55.4	10	1.0	18	4.1	4	6.6	21
Finland	0.7	21	149.0	5	0.25	17	65.3	5	0.2	23	0.1	24	6.5	22
France	8.2	5	148.7	6	0.27	25	70.4	3	3.3	7	0.3	23	3.8	26
Germany	8.9	4	148.0	7	0.25	18	80.4	2	17.9	2	0.8	16	8.6	15
Greece	3.4	9	38.7	23	0.22	12	61.9	8	0.1	24	0.3	22	5.3	24
Hungary	2.3	12	37.3	24	0.22	9	20.0	25	2.3	15	1.7	9	8.6	16
Ireland	0.9	19	145.3	8	0.27	23	49.4	12	0.3	22	0.5	21	17.3	2
Italy	15.5	1	161.3	4	0.18	2	63.1	6	12.3	3	3.7	6	9.4	13
Latvia	0.7	22	36.9	25	0.22	10	43.1	19	0.4	21	1.4	12	8.3	18
Lithuania	1.8	15	52.8	17	0.19	5	48.0	13	2.6	12	5.1	2	9.6	12
Luxembourg	0.0	27	100.3	11	0.42	27	0.0	27	0.0	25	0.0	25	3.9	25
Malta	0.4	25	39.6	22	0.22	11	36.8	21	0.0	27	0.0	27	19.5	1
Netherlands	7.4	6	144.2	9	0.22	13	48.0	13	4.5	5	0.9	15	12.2	5
Poland	14.9	2	52.8	18	0.18	1	18.7	26	20.5	1	6.9	1	11.5	6
Portugal	3.8	8	51.7	19	0.23	16	43.2	18	3.2	9	1.9	8	9.6	11
Romania	3.1	10	31.0	26	0.20	6	26.1	24	4.4	6	4.8	3	7.0	20
Slovakia	1.1	17	61.3	15	0.21	7	30.8	22	2.5	13	0.9	14	3.8	27
Slovenia	1.0	18	65.4	13	0.26	21	48.0	13	1.7	17	3.2	7	9.3	14
Spain	10.2	3	88.1	12	0.26	19	29.9	23	3.1	10	0.7	18	7.5	19

Sweden	2.0	13	172.1	2	0.27	24	58.7	9	2.3	14	0.7	19	6.5	23
co. of var. (%)	117.4	-	59.6	-	21.1	-	40.1	-	139.8	-	104.6	-	39.8	-

Note: ** R - ranking.*
Source: *Own calculations based on Eurostat (2021).*

The leader in the ranking of competitive potential was Italy (Figure 4), whose advantage resulted mainly from the highest production potential in the entire EU. More than 15.5% of the furniture manufacturing companies in the EU were located in Italy. The country was also distinguished by meager unit labor costs of EUR 0.18 / EUR (2nd position in the ranking) and labor productivity of EUR 161.3 thousand / person (4th position in the ranking) (Table 2, Figure 2). The second position in the ranking was Germany, which recorded the highest innovation in the industry, after Belgium. Over 80.4% of furniture-producing enterprises introduced innovations in the analyzed period. The furniture industry in Germany was also characterized by high labor productivity (EUR 148.0 thousand / person), high production potential (8.9%), and average unit labor costs (EUR 0.25 / EUR). A high synthetic index of the industry's competitive potential was also recorded in France and the Netherlands. Both countries had relatively high labor productivity, amounting to EUR 148.7 thousand / person and EUR 144.2 thousand / person (9th and sixth position in the ranking). Moreover, the Netherlands was distinguished by relatively low labor costs (0.22 EUR / EUR), and France by high production potential (8.2%) and share of innovative enterprises (70.4%).

Figure 2. *The level of indicators of labour productivity, labour costs, production potential (circle size), innovation (circle colour) in the furniture industry in EU countries in 2014-2018*



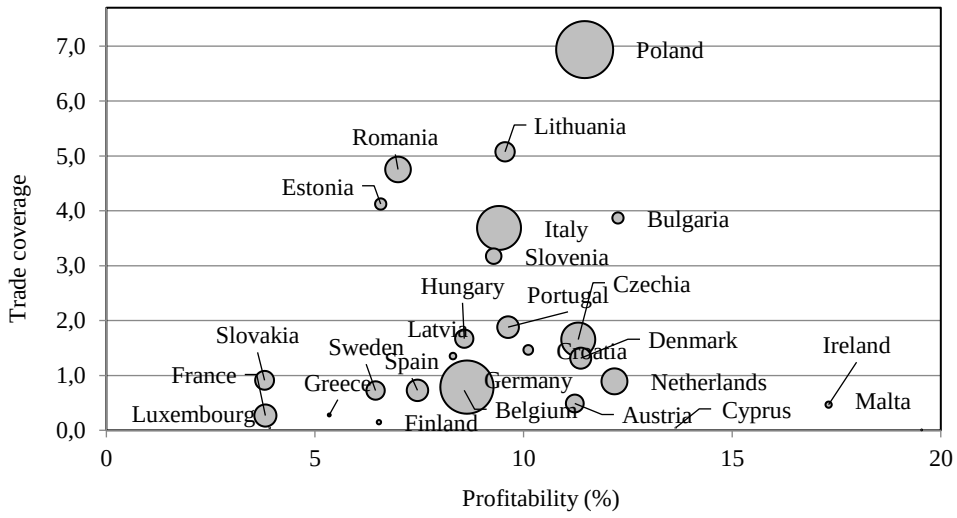
Source: *Own calculations based on Eurostat (2021).*

The next positions in the ranking were taken by Belgium, Czechia, Finland, Sweden, Spain, and Greece. In these countries, the level of competitive potential can be

considered average. Belgium was characterized by the highest share of innovative enterprises (82.5%), high labor productivity (167.1 thousand EUR / person), low labor costs (0.22 EUR / EUR), and low production potential (1.7%). Czechia was distinguished by meager unit labor costs (EUR 0.19 / EUR, fourth position in the ranking). At the same time, this country recorded low labor productivity and average production potential and innovation. Finland and Sweden had high labour productivity (EUR 149.0-172.1 thousand / person), average results in terms of unit labour costs (EUR 0.25-0.27 / EUR) and innovation (58.7%-65.3%), and low production potential (0.7%-2.0%). In Greece and Spain, labor productivity was low. Moreover, Greece has low production potential, low labor costs, and average innovation, and Spain - high production potential, average labor costs, and low innovation.

In the other Member States, i.e., Ireland, Poland, Denmark, Portugal, Lithuania, Estonia, Croatia, Slovenia, Cyprus, Austria, Bulgaria, Slovakia, Latvia, Romania, Malta, and Hungary, the competitive potential of the furniture industry was low and in the case of Luxembourg - very low. These countries had a small role in creating the production potential of the EU furniture industry, except Poland, where 14.9% of the EU furniture industry enterprises were located. Relatively high labor productivity was recorded only in Austria, Ireland, Denmark, and Luxembourg. In other countries, the average annual production value per employee did not exceed EUR 65.4 thousand. Less than half of the enterprises in this group implemented innovations (except for Estonia, Croatia, and Cyprus). Unit labor costs, on the other hand, varied: high costs were recorded in Austria and Luxembourg, medium - in Denmark, Ireland, Slovenia, and Cyprus, low - in Lithuania, Portugal, Estonia, Romania, Croatia, Malta, Latvia, Hungary, Slovakia, and very low - in Bulgaria.

Figure 3. *The level of trade coverage, profitability, export market share (circle size) indexes in the furniture industry in EU countries in 2014-2018*



Source: *Own calculations based on Eurostat (2021).*

Poland and Italy were the leaders; their advantage was mainly due to their importance in the foreign and domestic market (Figure 4). Poland's share in EU exports was 20.5%, and Italy's 12.3%. In Poland, the value of exports was almost 6.9 times, and in Italy, 3.7 times higher than the value of furniture imports (Table 2, Figure 3). The industry's profitability in these countries was average (11.5% and 9.4%, respectively). The following rankings and average synthetic index of competitive position were recorded in Czechia, Germany, Lithuania, Bulgaria, Romania, the Netherlands, Slovenia, Denmark, and Portugal. Czechia was characterized by an above-average share in exports (7.5%) and profitability (11.3%), as well as a clear advantage of exports over imports of furniture (TC = 1.7). Germany was second, after Poland, in terms of share in exports at 17.9%.

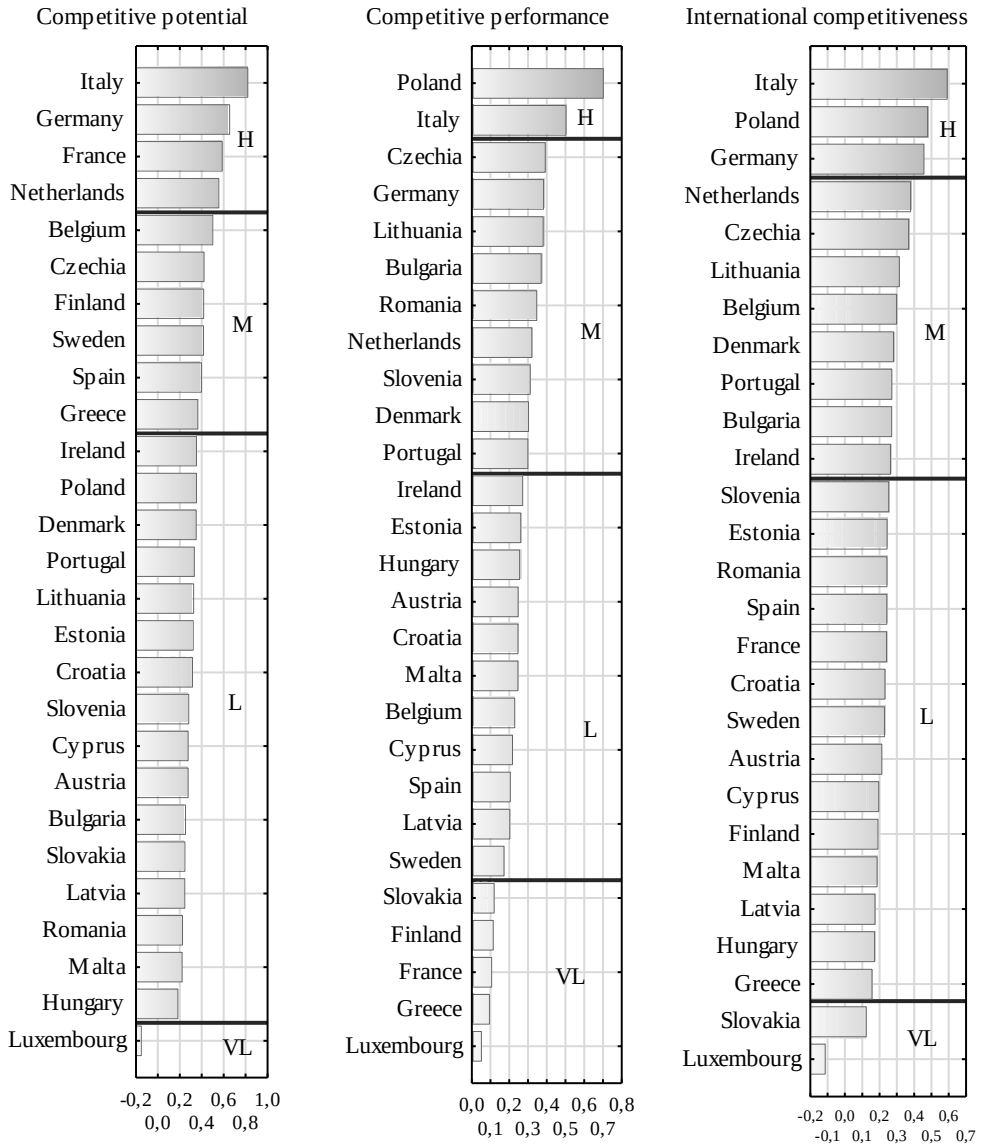
However, it was characterized by relatively low profitability (8.6%) and a negative trade balance in furniture (TC = 0.8). In Lithuania, Bulgaria, Romania, and Slovenia, a high surplus of exports over imports (more than three times) was recorded. The profitability of the furniture industry was above average in the Netherlands, Denmark, Portugal, and Bulgaria.

Different ranks in the industry's competitive position were occupied, in order, by Ireland, Estonia, Hungary, Austria, Croatia, Malta, Belgium, Cyprus, Spain, Latvia, and Sweden, for which the synthetic index was relatively low. A low share in exports characterized these countries, not exceeding 3.5%, and low profitability (except Ireland, Malta, and Cyprus). Ireland, Austria, Malta, Belgium, Cyprus, Spain, and Sweden were also net importers of furniture. The lowest synthetic index and low partial indexes of the competitive position of the furniture industry were recorded in Slovakia, Finland, France, Greece, and Luxembourg.

Next, all indicators describing the furniture industry's position and international competitiveness potential were summarised (Figure 4-5). The synthetic index created on this basis indicated that Italy, Poland, and Germany stood out with the highest international competitiveness of the furniture industry in the EU. These countries were distinguished primarily by their production potential and share in exports. Moreover, in Italy and Germany, high labor productivity was recorded; in Italy and Poland - low unit labor costs and a high level of import-export coverage; and in Germany - high innovation.

The following places in the ranking were taken (in order) by the Netherlands, Czechia, Lithuania, Belgium, Denmark, Portugal, Bulgaria, and Ireland, where the level of the synthetic indicator can be considered average. The strengths of the Netherlands were labor productivity, labor costs, and market share, Czechia - labor costs and market share, Lithuania and Bulgaria - labor costs and import-export coverage, Denmark and Ireland - labor costs and profitability, Portugal - labor costs, and Belgium - labor costs, labor productivity, and innovation.

Figure 4. *The level of synthetic indexes: competitive potential, competitive performance, and international competitiveness of the furniture industry in EU countries in 2014-2018*

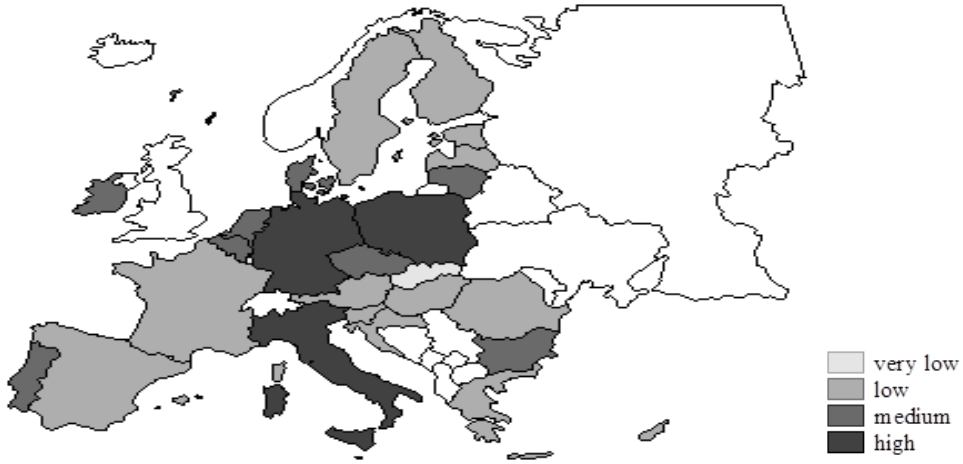


Note: ** H - high, M - medium, L - low, VL - very low*
Source: *Own calculations based on Eurostat (2021).*

Different positions in the ranking were taken by countries where the synthetic index of international competitiveness of the furniture industry was low or very low, i.e., Slovenia, Estonia, Romania, Spain, France, Croatia, Sweden, Austria, Cyprus, Finland, Malta, Latvia, Hungary, Greece, as well as Slovenia and Luxembourg. The

production potential was low (except for Spain and France), and labor productivity did not exceed the EU average (except for France, Sweden, Austria, and Finland). In most of these countries, the share in exports was low (except for Romania), and the value of furniture imports was higher than the value of exports (except for Slovenia, Estonia, Romania, Croatia, Latvia, and Hungary). On the other hand, unit labor costs were below the EU average in many countries of this group, such as Estonia, Romania, Croatia, Malta, Latvia, Hungary, and Greece.

Figure 5. *The level of international competitiveness of the furniture industry in EU countries in 2014-2018*



Source: *Own calculations based on Eurostat (2021).*

5. Conclusion

Based on the synthetic index, it can be concluded that Poland, Germany, and Italy stood out with the highest international competitiveness of the furniture industry on the intra-EU market. The research carried out by Han, Wen, and Kant (2009) confirmed that these countries also showed a relatively good competitive position in the world market, next to China, the USA, and Vietnam. In addition, the research by Renda, Pelkmans, Schrefler, Luchetta, Simonelli, Mustilli, Wieczorkiewicz, and Busse (2014: 219) shows that the furniture industry in Poland and Italy also exhibited comparative advantages. This means that the importance of the furniture industry in the total exports of these countries was more significant than the EU average.

The average international competitiveness of the furniture industry was exhibited by countries such as The Netherlands, Czechia, Lithuania, Belgium, Denmark, Portugal, Bulgaria, and Ireland. The competitiveness of the industry in other countries was much lower. The research also shows that there are considerable disproportions between individual countries. The top results regarding the analyzed aspects of competitiveness were more favorable than the EU average. The sizeable spatial

differentiation of individual indexes describing competitiveness was also confirmed based on the coefficient of variation (especially in terms of production potential, share in exports, and import-export coverage). Therefore, the first hypothesis was positively verified.

As Buckley, Pass, and Prescott (1988) point out, competitive potential leads to achieving specific results in competition. The research shows that in most countries, the diagnosed level of the synthetic index of competitive potential was accompanied by an analogous, or only one-degree different, synthetic assessment of the competitive position. Apparent discrepancies occurred in France, where a high competitive potential characterized the furniture industry. Meanwhile, its competitive results in the international arena were meager compared to other countries. A similar situation (medium potential and meager results) occurred in Finland and Greece. In these countries, the industry's potential has not been brought to bear in the competitive processes.

On the other hand, the furniture industry in Poland, despite its low potential (resulting from low innovation and labor productivity), has achieved a high position on the international market (especially in terms of market share and relative trade balance). Thus, the second hypothesis was rejected. Moderate dependencies between the components of the competitive potential and competitive results at the industry level were also presented in research by Juchniewicz (2015).

In future analyses, it is worth analyzing aspects describing the competitive potential and competitive position and using alternative methods of multidimensional data aggregation. The analysis could use Perkal's synthetic indicator to determine the weights of individual variables or use agglomeration methods to group countries according to their similarity with, for example, Ward's method, nearest neighbor, or intergroup mean. It is worth extending the study of the furniture industry to include an analysis of the relationship between position and potential competitiveness using correlation coefficients and regression models.

References:

Ambroziak, Ł. 2014. Ocena pozycji konkurencyjnej Polski w handlu zagranicznym produktami rolno-spożywczymi na podstawie wybranych wskaźników[Assessment of Poland's competitive position in foreign trade in agri-food products on the basis of selected indicators]. In: Szczepaniak, I. (Ed.). Monitoring i ocena konkurencyjności polskich producentów żywności (5) Synteza[Monitoring and evaluation of the competitiveness of Polish food producers (5) Synthesis]. Seria „Monografie Programu Wieloletniego 2012-2014", IERiGŻ-PIB, Warszawa.

Augustyniak, D., Mińska-Struzik, E. 2018. The competitiveness of polish furniture exports. Drewno, 61(202), 21-38.

Balcerzak, A.P. 2015. Europe 2020 Strategy and Structural Diversity Between Old and New Member States. Application of Zero Unitarization Method for Dynamic Analysis in the Years 2004-2013. Economics and Sociology, 8(2), 190-210.

Banterle, A. 2005. Competitiveness and agri-food trade: an empirical analysis in the European Union, 11th Congress of the EAAE. The Future of Rural Europe in the Global Agri-Food System, Copenhagen, 24-27 August 2005. Retrieved from: http://ageconsearch.umn.edu/ handle/24692.

Buckley, P.J., Pass, C.L., Prescott, K. 1988. Measures of international competitiveness: A critical survey. Journal of Marketing Management, 2, 175-200.

Buturac, G., Lovrinčević, Z., Mikulić, D. 2018. Export competitiveness of the Croatian food industry. Argumenta Oeconomica, 2(41), 135-155.

Carraresi, L., Banterle, A. 2015. Agri-food Competitive Performance in EU Countries: A Fifteen-Year Retrospective. International Food and Agribusiness Management Review, 18(2), 37-62.

Charles, V., Sei, T. 2019. A two-stage OGI approach to compute the regional competitiveness index. Competitiveness Review: An International Business Journal, 29(2), 78-75.

Dieter, M., Englert, H. 2007. Competitiveness in the Global Forest Industry Sector: An Empirical Study with Special Emphasis on Germany. European Journal of Forest Research, 12(3), 401-412.

Drabik, D., Bartova, L. 2008. Agri-food Trade Specialisation Pattern in the New EU Member States. International Congress, 26-29 August 2008, No 44124 Ghent, Belgium, 1-5.

Dwyer, L., Kim, C. 2003. Destination Competitiveness: Determinants and Indicators. Current Issues in Tourism, 5, 369-414.

Eurostat. 2021. Retrieved from: https://ec.europa.eu/eurostat/web/main/data/database.

Fischer, C., Schornberg, S. 2007a. The competitiveness situation of the EU meat processing and beverage manufacturing sectors. Acta Agriculturae Scandinavica Section C - Economy, 4(3), 1-20.

Fisher, C., Schornberg, S. 2007b. Assesing the competitiveness situation of EU food and drink manufacturing inustres: an index - based approach. Agribusiness, 23(4), 473-495.

Grzegorzewska, E. 2020. The importance of large enterprises for the development of the furniture industry in the selected EU countries. Annals of Warsaw University of Life Sciences - SGGW Forestry and Wood Technology, 109, 116-125.

Grzegorzewska, E., Więckowska, M. 2016. Selected aspects of innovation in the furniture industry - empirical research findings. Drewno, 59(198), 147-161.

Han, X., Wen, Y., Kant, S. 2009 The global competitiveness of the Chinese wooden furniture industry. Forest Policy and Economics, 11, 561-569.

Hellwig, Z. 1968. Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę wykwalifikowanych kadr[Application of the taxonomic method to the typological division of countries according to the level of their development as well as the resources and structure of qualified personnel]. Przegląd Statystyczny, 4, 307-327.

Jankowska, B. 2009. Konkurencyjność w ujęciu mezoekonomicznym [Competitiveness in terms of mesoeconomics]. In: Kompedium wiedzy o konkurencyjności[A compendium of knowledge about competitiveness]. Gorynia, M., Łaźniewska, E. (Eds.). Warszawa, 100-125.

Juchniewicz, M. 2015. Potencjał a pozycja konkurencyjna przemysłu spożywczego w krajach Unii Europejskiej [Potential and the competitive position of the food industry in the European Union countries]. Zeszyty Naukowe SGGW w Warszawie Problemy Rolnictwa Światowego, 15(3), 40-48.

Juchniewicz, M., Łukiewska, K. 2020. Diversity of the international competitive performance of the food industry of the European Union member states. Agribusiness. An International Journal. Retrieved form: https://onlinelibrary.wiley.com/doi/10.1002/ agr.21669.

Kuberska, D., Grzybowska-Brzezinska, M., Brelik, A. 2020. Shaping Competitiveness Through Policy: The Case of the Organic Food Market. European Research Studies Journal, 23(4), 1334-1354.

Kukuła, K. 2000. Metoda unitaryzacji zerowanej, Wydawnictwo Naukowe PWN, Warszawa.

Lihra, T., Buehlmann, U., Beauregard, R. 2008. Mass customisation of wood furniture as a competitive strategy. International Journal of Mass Customisation, 2(3), 200-215.

Lombana, J.E. 2006. Competitiveness and Trade Policy Problems in Agricultural Export. University of Gotingen. Göttingen.

Łukiewska, K. 2019. Metodologiczne aspekty pomiaru międzynarodowej konkurencyjności branży na przykładzie przemysłu spożywczego[Methodological aspects of measuring the international competitiveness of the industry on the example of the food industry]. Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego w Olsztynie.

Łukiewska, K. 2020. Diversification of competitive results of the food industry of the "old" and "new" EU countries. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, 64(4), 115-126.

Łukiewska, K., Juchniewicz, M. 2019. Factors of International Competitiveness of EU Member States' Food Industries. Economia agro-alimentare, 21(3), 659-676.

Martin, L., Westgren, R., Duren, Van, E. 1991. Agribusiness Competitiveness across National Boundaries. American Journal of Agricultural Economic, 73, 1456-1464.

Melitz, M. 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. Econometrica, 71(6), 1695-1725.

Olczyk, M., Kordalska, A. 2015. Identyfikacja konkurencyjności sektorów przemysłu przetwórczego i ich wpływu na międzynarodową konkurencyjność gospodarki polskiej - analiza panelowa w modelu ECM [Identification of the competitiveness of the processing industry sectors and their impact on the international competitiveness of the Polish economy - panel analysis in the ECM model]. Materiały i Studia, 311, Instytut Ekonomiczny, Warszawa.

Pawlak, K., Poczta, W. 2020. Agricultural Resources and their Productivity: A Transatlantic Perspective. European Research Studies, 23, 18-49.

Pitts, E., Lagnevik, M. 1998. What determines food industry competitiveness? In: Traill, W.B., Pitts, E. (Eds). Competitiveness in the food industry. Blackie Academic and Professional, 1-34.

Porter, M.E. 1996. Strategia konkurencji. Metody analizy sektorów i konkurentów, PWE Warszawa.

Posner, M.V. 1961. International trade and technical change. Oxford Economic Paper, 13(3), 323-341.

Priedea, J., Neuertb, J. 2015. Competitiveness Gap of the European Union Member Countries in the Context of Europe 2020 Strategy. Procedia - Social and Behavioral Sciences, 207, 690-699.

Renda, A., Pelkmans, J., Schrefler, L., Luchetta, G., Simonelli, F., Mustilli, F., Wieczorkiewicz, J., Busse, M. 2014. The EU furniture market situation and a possible furniture products initiative Final report. European Commission Brussels.

Ruzekova, V., Kittova, Z., Steinhauser, D. 2020. Export Performance as a Measurement of Competitiveness. Journal of Competitiveness, 12(1), 145-160.

Sanli, O., Ates, I. 2018. Global competition index and Turkey; a comparison with the most competitive countries. Annals of Faculty of Economics, 1(1), 352-362.

Souza, S.N., Angelo, H., Almeida, A.N., Paula, M.F. 2018. Competitiveness of Brazilian Tropical Wood on the International Market. Floresta Ambient. Forest management, 25(1), 2-8.

Sujová, A., Hlaváčková, P., Marcineková, K. 2015. The trade competitiveness of furniture products Drewno, 58(195), 101-115.

Toming, K. 2011. The Impact of Integration with the European Union on the International Competitiveness of the Food Processing Industry in Estonia. Ph.D. Dissertation, Tartu University Press, Estonia.

Török, A., Jambor, A. 2013. Agri-food Trade of the New Member States since the EU Accession. Agricultural Economics - Czech, 59(3), 101-112.

Vega, J.C.S., Azorín, J.D.B., Segura, A.C.F., Yago, M.E. 2019. A new measure of regional competitiveness. Applied Economic Analysis, 27(80), 108-126.

Vitunskiene, A., Serva, E. 2015. Shifts in Lithuania's agri-food industry export competitiveness: a comparative analysis versus high- and medium-high technology manufacturing industries. Oeconomia Copernicana, 6(1), 7-31.

Wijnands, J.H.M., Verhoog, D. 2016. Competitiveness of the EU food industry; Ex-post assessment of trade performance embedded in international economic theory. Wageningen, LEI Wageningen UR (University & Research centre), LEI Report 2016-2018.

Wysocki, F., Lira, J. 2003. Statystyka opisowa. Wydawnictwo Akademii Rolniczej im. Augusta Cieszkowskiego w Poznaniu, Poznań.

Zhang, P., London, K. 2013. Towards an internationalized sustainable industrial competitiveness model. Competitiveness Review AnInternational Business Journal incorporating Journal of Global Competitiveness, 23(2), 95-113.

Zhao, J.W., Wen, Y.J. 2004. Chinese Industrial Competitiveness Index System and Evaluation. Dongbei University of Finance and Economics, Harbin.

Янтонь-Дроздовска, Е. 2020. International competitiveness of the enterprise. The actual problems of regional economy development, 2(16).