DIGITALISATION AND CIRCULAR ECONOMY:
forestry and forestry based industry implications

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A CASE STUDY OF THE POTENTIAL OF THE FURNITURE INDUSTRY IN POLAND BASED ON ITS SPATIAL DIVERSITY

Leszek Wanat

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The idea of research

- The study discusses the problems of spatial diversity of the furniture industry in Poland. An attempt was made to identify the potential of furniture making as an important sector of the economy.
- The main question was asked about divergence trends in this sector. The analysis used linear ordering methods, statistical verification and comparative analysis.
- Based on the indications of the proposed synthetic measure, the regional variation of the measurements of the furniture industry potential in Poland was verified.
- The recommendations were also formulated, in particular for furniture industry.

Scenario of the research

- The aim of the study was to investigate the regional diversification of the potential of the furniture industry in Poland according to the administrative structure of voivodships (corresponding to the classification of regions).
- A hypothesis was adopted for verification, in which it was assumed that the regional potential of the furniture industry is strongly differentiated regionally.
- The scope of the research includes enterprises classified in the Polish Classification of Activities (PKD 2007), in section 31 "Manufacture of furniture". All companies grouped in subclasses are included:

31 – production of furniture – 149 companies;

31.01 – production of office and shop furniture – 221 companies;

31.02 – production of kitchen furniture – 84 companies;

31.03 – production of mattresses (lounge and bedroom furniture) – 26 companies;

31.09 – production of other furniture – 425 companies.

Methods

- The population (and sample) selected for analysis was 905 economic entities (as of 30.06.2019). A targeted selection of companies was made: first according to the substantive criterion (furniture production) and then according to the amount of annual sales revenues (at least one million EURO per year).
- The regional development potential of furniture industry enterprises was examined in the scope of the subject matter, based on the administrative division of Poland into 16 voivodships.
- The temporal scope of the research covered 2018 (in terms of data on sawmill industry enterprises) and additionally 2017 (in terms of data of Polish public statistics).
- The development of the research scenario was based on both a qualitative analysis (according to substantive criteria), followed by a quantitative approach and a method (Hwang and Yoon, 1981) of variable standardization (zero unitarization).
- To measure the potential of the sawmill industry in Poland, the method of linear TOPSIS was used (Technique for Order Preference by Similarity to an Ideal Solution).

Results (1)

- In order to identify the regional potential of the furniture industry in Poland, factors describing the industry from the mesoeconomic perspective were selected (wood harvesting in the regions, value of investment outlays in the forest sector, consumption of wood-based panels: chipboards and fibreboards in the production process) and microeconomic perspective (sales revenues per company and profit per one employee).
- The potential of the furniture industry, aggregating data by region for enterprises located in particular voivodships of Poland, was determined on the basis of 6 deliberately selected factors (F1, …, F6) - quantitative measures:

F1: Average annual sales in the sector (value of sales per company) [in thous. of EUROS];

F2: Average annual profit in the sector (profit per employee) [in thousands of EUROS];

F3: Total investment in the forest-and wood based sector [in thousands of EUROS];

F4: Logging (per year) in m^3 per 100 ha of forest area in 2017;

F5: Annual consumption of fibreboard in million m^2 (consumption) in 2017;

F6: Annual consumption of particle board in thousands m^3 (consumption) in 2017.

Table 1. Selected aggregated measures of the furniture industry potential in Poland

Voivodship (Region)	Average sales value (sales / number of companies) [in thousands of EUROS]	Average profit value (profit / 1 employee) [thousands of EUROS]	Total investment outlays in forestry [thousands of EUROS]	Logging [m^3/100 ha]	Fibreboard consumption [mln. m^2]	Particle board consumption [thousand. m^3]
Dolnośląskie	15 562	2,64	17 490	558	2,69	238,73
Kujawsko-Pomorskie	11 719	2,82	7 607	601	1,32	136,72
Lubelskie	21 786	0,42	9 013	329	11,23	190,61
Lubelskie	25 689	0,45	14 180	504	43,06	643,72
Łódzkie	7 723	2,57	9 177	336	1,96	172,84
Małopolskie	5 511	4,57	8 060	310	1,15	100,58
Mazowieckie	8 390	4,13	14 416	288	13,51	410,10
Opolskie	6 566	2,81	3 737	561	3,77	88,61
Podkarpackie	11 472	2,66	12 525	381	3,64	393,10
Podlaskie	7 553	5,18	8 681	352	4,99	103,08
Pomorskie	8 739	1,45	16 854	726	4,48	287,98
Śląskie	7319	2,67	8 718	472	6,76	191,27
Świętokrzyskie	3090	5,75	7 651	404	0,25	51,86
Warmińsko-Mazurskie	15 531	4,24	9 475	495	7,63	941,79
Wielkopolskie	17 436	5,14	15 068	492	16,78	1 092,01
Zachodniopomorskie	55 172	2,55	17 131	565	25,11	1 319,63

Results (2)

- In order to examine the potential of the furniture sector, normalization of variables was carried out using the zero uniformization method. In the next step the following values were determined: euclidean distances and synthetic meter values. Then the ranking positions, corresponding to the strength of the development potential of the furniture industry for particular regions of Poland, were verified.
- The calculated values of the arithmetic mean and standard deviation were grouped into classes. Each of the four classes corresponds to a category of furniture development potential in the regions. The limit values were respectively as follows:

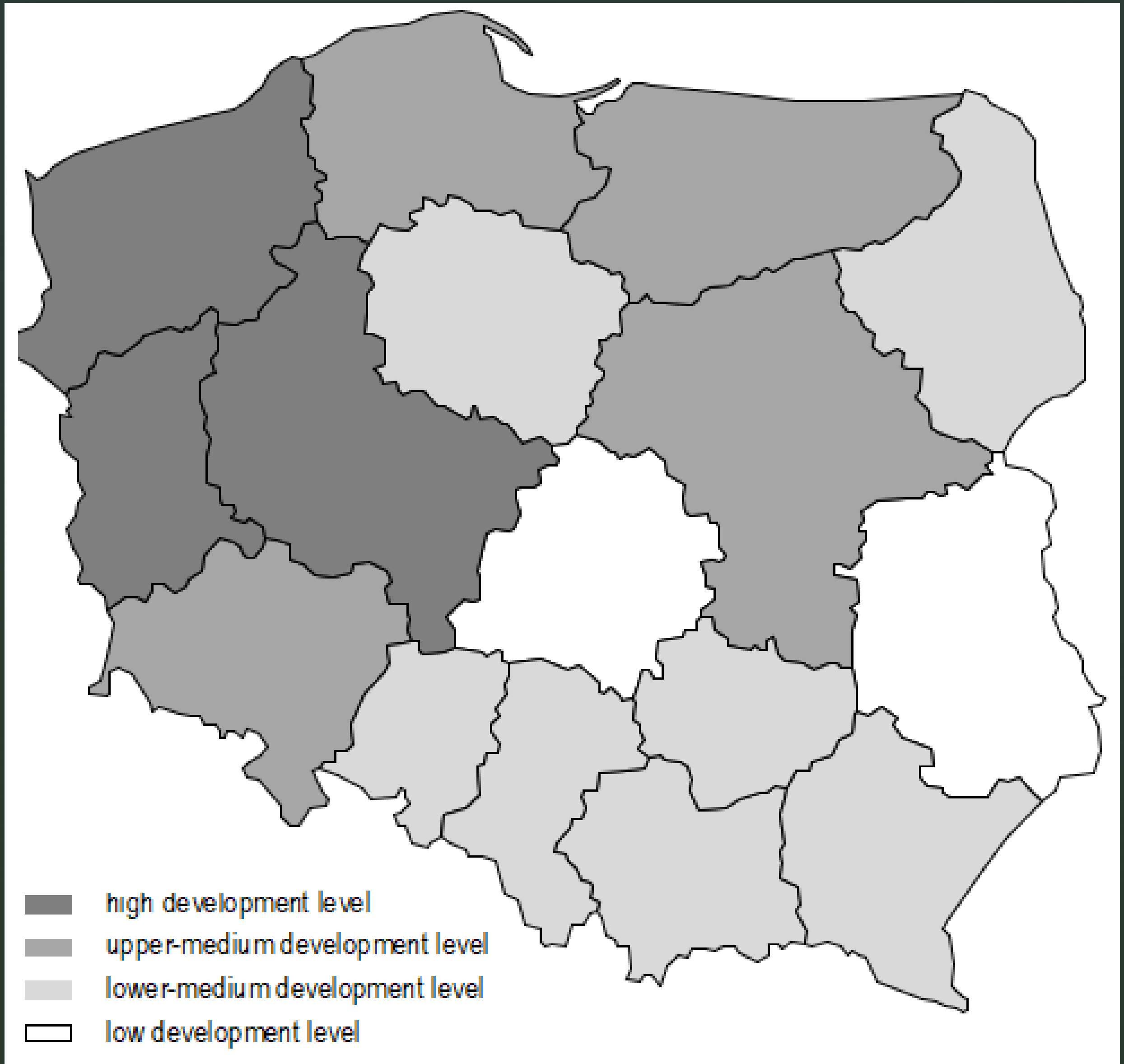
  Class I: high development level: $1 \geq S_\mathrm{i} > 0{,}52$.

  Class II: upper-medium development level: $0{,}52 \geq S_\mathrm{i} > 0{,}39$.

  Class III: lower-medium development level: $0{,}39 \geq S_i > 0{,}26$

  Class IV: low development level: $0{,}26 \geq S_i > 0$

Figure 1. The regional differentiation of the main potential classes of the furniture industry in Poland



Conclusions (1)

Based on the analysis of the results, the following conclusions were drawn:

- 1) The largest potential of the furniture industry in Poland was identified in north-western voivodships (strong regions). The regional competitive potential in these cases is based on the strong competitiveness of the furniture industry in terms of resources.
- 2) The difference in indications of synthetic measurement between the leader of the ranking (Zachodniopomorskie region) and outsiders (Łódzkie and Lubelskie regions) proves that there is a regional variation in the potential of furniture production. This means that there are no grounds for rejecting the hypothesis assumed at the beginning. Moreover, it was noted that the degree of diversification (divergence) of regional potential is well reflected in the identified four classes. However, within the classes one can indicate tendencies to convergence and economic symbiosis.

Conclusions (2)

- 3) The regional leader of the ranking for the furniture industry in Poland can be indicated. Zachodniopomorskie Voivodeship is the leader. At the same time, the leader is accompanied by the regions of northern and central Poland, which potential encourages the search for development opportunities through cooperation between local governments (financing development) and between sectors (development of the furniture industry, cooperation and coopetition).
- 4) Provided for regions with the lowest identified industry potential, another specialisation can be sought or the furniture industry can be supported through intersectoral cooperation with neighbouring regions along with strong potential.

- Благодаря за вниманието!
- Thank you for Your attention!

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