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ECONOMIC INFRASTRUCTURE AS FACTOR OF THE REGION'S COMPETITIVENESS

Abstract

The paper presents results of an evaluation on Polish regions' spatially-diversified competitiveness, and their associated economic infrastructure. On this base, an interdependence between the regions' competitiveness and their infrastructure development was analyzed. For the analyis, taxonomical measures were used, calculated by the Z. Hellwig method, based on diagnostic variables, and depicting various aspects of the competitiveness and state of the economic infrastructure of each region.

JEL Classification Code: **R11, C15**.

Keywords: economic infrastructure, regions' competitiveness, Z. Hellwig method.

Introduction

A region's competitiveness is its ability to achieve positive results both in economic growth and social welfare levels as compared to other regions. To create the regions' competitiveness scales, the most important factors are the endogenous potential elements (Alarcón 2004, p. 73), including the economic infrastructure, ranging from devices and objects used for transportation communications, energy, irrigation, and land reclamation services (Wojewódzka-Król, 2002, p. 13). They are confirmed by domestic and international analyses (Calderón, Servén 2004; Gardiner, Martin, Tyler 2004; Ratajczak 1999). The economic infrastructure is a factor affecting labor productivity and capital. Its development leads to the reallocation of the economic

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activity. Infrastructure investments are necessary due to the insufficient condition of capital inflow. Regions' activation strategies using economic infrastructure development, mainly transportation, lead to increasing the openness of regions and can contribute into the competitive product inflow from other areas (Rossert 2000, p. 130). In the evaluation of regions' competitiveness, it is possible to exploit a wide set of measures (cf. e.g. Herb 2005). GDP per capita, and value added, are synthetic measures of the competitiveness which reflect the result of actions in many models of a region's competitiveness included i.e. in the Pyramid of Competitiveness (Gardiner, Martin, Tyler 2004) and that of the Competitiveness (Martin, 2003). Considering presented premises, an evaluation of the interdependence between the Polish regions' competitiveness and their economic infrastructure equipment was accepted as the fundamental purpose of the article. Methodological evaluation and its results are presented in the next sections of the article.

1. Methodological evaluation of regions' competitiveness and their economic infrastructure equipment

The assessment of the regions' competitiveness and their economic infrastructure equipment was conducted using the Z. Hellwig method (Hellwig 1968) which enables constructing the synthetic index according to a fragmentary variables diagnostic, reflecting various aspects of analyzed facets.

Next stages of the analysis included:
- creating the preliminary list of diagnostic denominators,
- creating the final set of diagnostic denominators,
- standardization of diagnostic denominators,
- constructing the fragmentary, synthetic and general taxonomical indexes,
- distinguishing groups of competitiveness levels (Kolenda 2006; Panek 2009).

The preliminary list of diagnostic denominators included all indicators, available in public statistics, referring to various aspects of the regions' competitiveness. In creating the final set of diagnostic indicators based on this list, variables - characterized by a relatively high diversity - were selected. Variables were determined according to the classical variation coefficient. They assumed that weak diagnostic properties are those denominators, for which the classical variation coefficient based on the standard deviation, is smaller than the threshold value of 10%. As a result of the elimination of unimportant indicators -for which the variation coefficient was smaller than 10%- , a final set of diagnostic indicators was received. It is a base for the further analysis, and a basis for the calculation for every variable of the synthetic index.

The diagnostic variable set of the region's competitiveness and economic infrastructure equipment evaluation is described in Table 1. The variables' values were assumed according to data collected under the public statistics and disclosed by

the Central Statistical Office. Accepting such a source ensured the comparability of statistical data and their relatively high credibility. A quality system existing in GUS guarantees these statistical denominators (GUS 2014).

Table 1. The diagnostic variable set of the region's competitiveness and economic infrastructure equipment evaluation

Taxonomical Index		Diagnostic Variables	
Symbol	Name	Symbol	Name
Region's Competitiveness Evaluation Indexes			
x_1	Macroeconomic Indexes	$x_{1.1}$	GDP per capita [PLN]
		$x_{1.2}$	Total value added [PLN]
Economic Infrastructure Equipment Indexes			
x_2	Transport Infrastructure	$x_{2.1}$	density of regional, commune province roads with a hard surface [km/100 km^2]
		$x_{2.2}$	density of regional, commune province roads with a hard improved surface [km/100 km^2]
x_3	Water Supply Infrastructure	$x_{3.1}$	density of a waterworks distribution network [km/100 km^2]
		$x_{3.2}$	number of waterworks combinations connected with residential buildings and collective settling per 1 km^2
		$x_{3.3}$	consuming water from the water supply system per 1 resident
x_4	Sewerage infrastructure	$x_{4.1}$	density of the sewer distribution network [km/100 km^2]
		$x_{4.2}$	number of sewer combinations connected with residential buildings and collective settling per 1 km^2
		$x_{4.3}$	sewers seen off to 1 resident
x_5	Gas Infrastructure	$x_{5.1}$	density of an active gas network [km/100 km^2]
		$x_{5.2}$	active combinations connected with residential buildings and collective settling per 1 km^2
		$x_{5.3}$	residential buildings and collective settling per 1 km^2
x_6	Energy Infrastructure	$x_{6.1}$	electricity consumption per 1 resident
		$x_{6.2}$	density of the heat distribution network [km/100 km^2]
		$x_{6.3}$	sale of the thermal energy [GJ/1000 people]

Source: Own study.

The necessary condition to set the synthetic index of the regions' competitiveness and their economic infrastructure equipment correctly is their denominators standardization, in which the variables will be comparable and their character standardized by transforming de-stimulants into stimulants (Grabiński, Wydymus, Zeliaś 1989, p. 27).

In the regions' competitiveness evaluation, the denominators standardization was done by conducting the standardization *j*-th variable in *i*-th region. The calculations were done using following formulas:
– for stimulants:

$$t_{ij} = \frac{x_{ij} - \bar{x}}{S_j}$$

– for de-stimulants:

$$t_{ij} = -\frac{x_{ij} - \bar{x}}{S_j}$$

where:
t_{ij} – standardized value of *j*-th index in *i*-th subdivision,
x_{ij} – value of *j*-th denominator in *i*-th subdivision,
$\bar{x}$ – the arithmetic mean of *j*-denominator value,
S_j – standard deviation in x_j denominator distribution.

Using the final set of diagnostic indicators after the standardization, values of Hellwig taxonomical indexes of development were calculated for each region, i.e. synthetic indexed were calculated for each of distinguished variables and fragmentary indexes - for aspects distinguished under individual areas.

In the Hellwig method, according to the matrix of standardized variables, a model object of following coordinates was set:

$$O = [x_{0j}]$$

where:
$x_{0j} = max_i \{t_{ij}\}$ – for stimulants,
$x_{0j} = min_i \{t_{ij}\}$ – for de-stimulants,
t_{ij} – standardized value of *j*-th index in *i*-th subdivision.

Calculating the synthetic index of the regions competitiveness only the formula for stimulants was used, because amongst the denominators admitted to the evaluation there weren't any de-stimulants.

The next step was to set the Euclidean distance from the model object:

$$d_{i0} = \sqrt{\sum_{j=1}^{m} (t_{ij} - x_{0j})^2}$$

where:
d_{i0} – Euclidean distance between i-th and the model object,
t_{ij} – standardized value of *j*-th index in *i*-th subdivision,
$i = 1, 2, \ldots, n$,
$j = 1, 2, \ldots, m$.

Considering presented assumptions it is possible to calculate the synthetic index from the following formula:

$$S_i = 1 - \frac{d_{i0}}{d_0}$$

where:
d_{i0} – Euclidean distance between i-th and the model object,
d_0 – the unit critical distance from the model:

$$d_0 = \bar{d}_{i0} + 2 \cdot S_0$$

$\bar{d}_{i0}$ – arithmetic mean of taxonomical distances between the object i-th and the model object:

$$\bar{d}_0 = \frac{1}{n} \cdot \sum_{i=1}^{n} d_{i0}$$

S_0 – standard deviation of taxonomical distances between i-th and the model object:

$$S_0 = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(d_{i0} - \bar{d}_0)^2}$$

In the above model, the synthetic index of the regions competitiveness and their equipping with the economic infrastructure the Si assumes values from the period [0.1]. Maximum value of the Si index (1) reflects the so-called model, i.e. the region, in which all analyzed variables accept the maximum values.

In the adopted method, along with increasing the value of the synthetic index, both the region's competitiveness or a level of equipping it with the infrastructure also increase. Differences between indexes show a distance in the development of individual regions.

2. Spatial diversity of a region's competitiveness

In the evaluation of a region's competitiveness, the following indicators (Table 2) were taken into account:
– GDP per capita,
– total gross value added.

GDP per capita of mazowieckie region is about 80% higher than the average in Poland and about 44% higher than in the second in turn dolnośląskie region. A gross value added is also much higher. In consequence this region is characterized by the

highest competitiveness. Relatively maximum values of the competitiveness synthetic index were reached śląskie, wielkopolskie and dolnośląskie regions.

Table 2. Calculating the synthetic index of the regions competitiveness

Region	Variable Value		Standardized Variable Value		Euclidean Distance	Synthetic Index
	$x_{5.51}$	$x_{5.52}$	$t_{5.51}$	$t_{5.52}$	$d_{5.5}$	$S_{5.5}$
Dolnośląskie	44 961.00	115 163	0.958	0.440	3.34	0.53
Kujawsko-pomorskie	32 596.00	60 077	-0.342	-0.336	4.79	0.33
Lubelskie	26 919.00	51 428	-0.939	-0.457	5.31	0.25
Lubuskie	32 795.00	29 474	-0.321	-0.767	5.09	0.28
Łódzkie	36 750.00	81 919	0.095	-0.028	4.26	0.40
Małopolskie	34 107.00	100 098	-0.183	0.228	4.28	0.40
Mazowieckie	64 790.00	300 184	3.044	3.047	0.00	1.00
Opolskie	31 771.00	28 344	-0.429	-0.783	5.17	0.27
Podkarpackie	26 801.00	50 096	-0.952	-0.476	5.33	0.25
Podlaskie	28 485.00	30 077	-0.774	-0.758	5.39	0.24
Pomorskie	37 822.00	75 727	0.207	-0.115	4.25	0.40
Śląskie	42 830.00	174 198	0.734	1.272	2.91	0.59
Świętokrzyskie	29 552.00	33 233	-0.662	-0.714	5.28	0.26
Warmińsko-mazurskie	28 635.00	36 551	-0.759	-0.667	5.32	0.25
Wielkopolskie	41 285.00	125131	0.572	0.581	3.49	0.51
Zachodniopomorskie	33 485.00	50685	-0.249	-0.468	4.82	0.32
Arithmetic mean	35 849.00	83 899.06	0.00	0.00	4.31	0.39
Standard Deviation	9 508.90	70 976.77	1.00	1.00	1.39	0.20
Variation Coefficient	27%	85%			32%	50%
Max	64 790.00	300 184	3.04	3.05	5.39	1.00
Min	26 801	28 344	-0.95	-0.78	0.00	0.24

Source: Own study, based on GUS data.

3. Spatial diversity of a region's economic infrastructure equipment

Transportation infrastructure

Analysis of transportation infrastructure spatial diversity was based on the density of regional, commune, province roads with a hard surface and density of railway lines (Tab. 3.). The calculated synthetic index of the infrastructure development is characterized by the highest level of the changeability (the variation coefficient is 50%), and span between the region with the highest and the lowest equipment level is – 5,4.

Śląskie region is characterized by the highest synthetic index value. The density of roads in this region is 179.6 km/100 km^2 and is almost two times higher than the average in Poland, and over three times higher than in the region with the lowest transport

infrastructure equipment (Warmińsko-mazurskie region). Śląskie region also has the best developed rail grid. The density of the rail line is 2.5 - times higher than the average in Poland, and 3.5 – times higher than in the region with the lowest density.

Table 3. Calculating the taxonomical index of a regions' transport infrastructure equipment

Region	Variable value		Standardized variable value		Euclidean distance	Synthetic index
	$x_{6.11}$	$x_{6.12}$	$t_{6.11}$	$t_{6.12}$	$d_{6.1}$	$S_{6.1}$
Dolnośląskie	94.37	8.9	0.030	0.612	3.63	0.46
Kujawsko-pomorskie	89.61	7.0	-0.107	0.012	4.18	0.38
Lubelskie	84.89	4.1	-0.243	-0.904	5.01	0.26
Lubuskie	59.23	6.9	-0.981	-0.020	4.79	0.29
Łódzkie	108.54	5.8	0.438	-0.367	4.19	0.38
Małopolskie	157.82	7.4	1.856	0.138	3.22	0.52
Mazowieckie	97.27	4.8	0.113	-0.683	4.63	0.31
Opolskie	90.04	9.2	-0.095	0.706	3.65	0.46
Podkarpackie	84.89	5.7	-0.243	-0.398	4.59	0.32
Podlaskie	61.03	3.8	-0.930	-0.998	5.48	0.19
Pomorskie	67.68	6.8	-0.738	-0.051	4.64	0.31
Śląskie	179.58	17.4	2.482	3.295	0.00	1.00
Świętokrzyskie	114.72	6.2	0.616	-0.241	4.00	0.41
Warmińsko-mazurskie	53.27	5.1	-1.153	-0.588	5.32	0.21
Wielkopolskie	91.17	7.0	-0.062	0.012	4.15	0.38
Zachodniopomorskie	59.19	5.3	-0.983	-0.525	5.16	0.23
Arithmetic mean	93.33	6.96	0.00	0.00	4.17	0.38
Standard Deviation	34.75	3.17	1.00	1.00	1.28	0.19
Variation Coefficient	37%	46%			31%	50%
Max	179.58	17.40	2.48	3.29	5.48	1.00
Min	53.27	3.8	-1.15	-1.00	0.00	0.19

Source: Own study, based on GUS data.

Water supply infrastructure

In the aspect of water supply infrastructure, three diagnostic denominators were used to construct the fragmentary index (Tab. 4), where two denominators describe a region's water supply infrastructure equipment, and the third one shows its use level, i.e.

- density of the waterworks distribution network [km/100 km^2],
- number of waterworks combinations connected with residential buildings and collective settling per 1 km^2.
- consuming water from the water supply system per 1 resident.

Table 4. Calculating the taxonomical index of a region's water supply infrastructure equipment

Region	Variable value			Standardized variable value			Euclidean distance	Synthetic index
	$x_{6.21}$	$x_{6.22}$	$x_{6.23}$	$t_{6.21}$	$t_{6.22}$	$t_{6.23}$	$d_{6.2}$	$S_{6.2}$
Dolnośląskie	72	43	31.5	-0.554	0.758	0.256	3.47	0.41
Kujawsko-pomorskie	123	21	32.1	1.015	-1.263	0.416	3.96	0.33
Lubelskie	79	44	26.6	-0.338	0.849	-1.048	3.97	0.33
Lubuskie	47	27	30.0	-1.323	-0.712	-0.143	4.99	0.16
Łódzkie	121	31	34.5	0.954	-0.344	1.054	3.01	0.49
Małopolskie	117	36	26.6	0.831	0.115	-1.048	3.71	0.37
Mazowieckie	116	60	36.5	0.800	2.319	1.587	1.45	0.75
Opolskie	74	22	29.0	-0.492	-1.171	-0.409	4.86	0.18
Podkarpackie	75	40	22.2	-0.461	0.482	-2.219	5.02	0.15
Podlaskie	62	29	30.9	-0.861	-0.528	0.096	4.47	0.24
Pomorskie	78	32	32.9	-0.369	-0.253	0.629	3.79	0.36
Śląskie	163	35	29.8	2.245	0.023	-0.196	2.91	0.51
Świętokrzyskie	109	21	26.6	0.584	-1.263	-1.048	4.75	0.20
Warmińsko-mazurskie	60	27	30.6	-0.923	-0.712	0.017	4.66	0.21
Wielkopolskie	99	50	35.5	0.277	1.400	1.321	2.19	0.63
Zachodniopomorskie	45	38	33.3	-1.384	0.298	0.735	4.24	0.28
Arithmetic mean	90.00	34.75	30.54	0.00	0.00	0.00	3.84	0.35
Standard Deviation	32.51	10.89	3.76	1.00	1.00	1.00	1.03	0.17
Variation Coefficient	36%%	31%	12%				27%	50%
Max	163.00	60.00	36.50	2.25	2.32	1.59	5.02	0.75
Min	45.00	21.00	22.20	-1.38	-1.26	-2.22	1.45	0.15

Source: Own study, based on GUS data.

Calculated synthetic indexes show the high diversity in the regions' water supply infrastructure equipment. The variation coefficient is about 50%, and the span between the region with the highest and the lowest infrastructure development level is 5.

Mazowieckie region contains the highest level of water supply infrastructure equipment. The value of the taxonomical index in this region was 0.75. In the group with the highest development level of the water supply infrastructure are the Wielkopolskie (0.63) and Sląskie (0.51) regions.

Sewerage infrastructure

Region's sewer infrastructures are described by three diagnostic variables (Tab. 5). Much like with the water supply system, the first two denominators described regions' sewer infrastructure equipment, the third reflects its use level:

– density of the sewer distribution network [km/100 km^2],

– sewers seen off to 1 resident,
– number of sewer combinations connected with residential buildings and collective settling per 1 km^2.

Table 5. Calculating the taxonomical index of a regions' sewerage infrastructure equipment

Region	Variable value			Standardized variable value			Euclidean distance	Synthetic index
	$x_{6.31}$	$x_{6.32}$	$x_{6.33}$	$t_{6.31}$	$t_{6.32}$	$t_{6.33}$	$d_{6.3}$	$S_{6.3}$
Dolnośląskie	43.8	42	50.6	0.146	0.003	0.038	4.09	0.31
Kujawsko-pomorskie	38.7	35	51.6	-0.075	-0.381	0.218	4.38	0.26
Lubelskie	19.3	55	47.1	-0.915	0.717	-0.591	4.79	0.19
Lubuskie	21.4	28	46.2	-0.824	-0.765	-0.753	5.55	0.06
Łódzkie	28.4	43	57.7	-0.521	0.058	1.314	4.03	0.32
Małopolskie	70.1	33	58.1	1.285	-0.491	1.386	3.37	0.43
Mazowieckie	31.8	88	62.5	-0.374	2.529	2.177	2.92	0.50
Opolskie	35.3	23	48.6	-0.222	-1.040	-0.321	5.16	0.12
Podkarpackie	77.2	30	43.2	1.593	-0.655	-1.292	4.81	0.18
Podlaskie	14.2	55	45.6	-1.136	0.717	-0.860	5.11	0.13
Pomorskie	45.3	37	45.5	0.211	-0.271	-0.878	4.76	0.19
Śląskie	99.3	29	45.3	2.550	-0.710	-0.914	4.48	0.24
Świętokrzyskie	36.3	23	51.4	-0.179	-1.040	0.182	4.92	0.17
Warmińsko-mazurskie	22.2	36	47.2	-0.790	-0.326	-0.573	5.18	0.12
Wielkopolskie	34.9	75	49.3	-0.240	1.815	-0.195	3.73	0.37
Zachodniopomorskie	28.7	39	56.3	-0.508	-0.161	1.063	4.22	0.28
Arithmetic mean	40.43	41.94	50.39	0.00	0.00	0.00	4.47	0.24
Standard Deviation	23.09	18.21	5.56	1.00	1.00	1.00	0.71	0.12
Variation Coefficient	57.10%	43.43%	11.04%				15.96%	50.00%
Max	99.30	88.00	62.50	2.55	2.53	2.18	5.55	0.50
Min	14.20	23.00	43.20	-1.14	-1.04	-1.29	2.92	0.06

Source: Own study, based on GUS data.

Calculated synthetic indexes show a high diversity in the regions' sewerage infrastructure equipment. The variation coefficient is about 50%, and the span between the region with the highest and the lowest infrastructure development level is 8.

Mazowieckie region, as noted with water supply infrastructure, has the highest level of sewer infrastructure equipment. The value of taxonomical index in this region was 0.5. In the group with the highest development level of the sewerage infrastructure are Małopolskie (0.42) and Wielkopolskie (0.37) regions.

Gas infrastructure

In the aspect of gas infrastructure, three diagnostic denominators were used to construct the fragmentary index, i.e.:

- active combinations connected with residential buildings and collective settling per 1 km^2,
- residential buildings and collective settling per 1 km^2,
- density of the active gas network [km/100 km^2].

Mazowieckie region, as with the water supply and sewerage infrastructure, has the highest level of gas infrastructure equipment. The value of taxonomical index in this region was 0.5. In the group with the highest development level of the gas infrastructure is also Wielkopolskie (0,45) and Podkarpackie (0,4) regions. The span between the region with the highest and the lowest infrastructure development level is almost 6.

Table 6. Calculating the taxonomical index of a regions' gas infrastructure equipment

Region	Variable value			Standardized variable value			Euclidean distance	Synthetic index
	$x_{6.41}$	$x_{6.42}$	$x_{6.43}$	$t_{6.41}$	$t_{6.42}$	$t_{6.43}$	$d_{6.4}$	$S_{6.4}$
Dolnośląskie	31.4	46	112.3	-0.217	0.149	0.616	4.08	0.34
Kujawsko-pomorskie	14.6	45	59.9	-0.641	0.096	-0.965	5.02	0.19
Lubelskie	28.4	47	70.7	-0.293	0.202	-0.639	4.58	0.26
Lubuskie	20.5	25	124.7	-0.492	-0.963	0.991	5.02	0.19
Łódzkie	17.8	37	55.9	-0.560	-0.327	-1.086	5.30	0.15
Małopolskie	136.9	30	117.5	2.440	-0.698	0.773	3.86	0.38
Mazowieckie	35.9	101	147.0	-0.104	3.060	1.664	2.54	0.59
Opolskie	16.1	25	70.9	-0.603	-0.963	-0.633	5.54	0.11
Podkarpackie	93.5	37	114.9	1.347	-0.327	0.695	3.69	0.41
Podlaskie	5.0	48	36.4	-0.883	0.255	-1.675	5.48	0.12
Pomorskie	25.8	40	91.2	-0.359	-0.169	-0.021	4.59	0.26
Śląskie	118.5	28	94.2	1.977	-0.804	0.070	4.21	0.32
Świętokrzyskie	29.1	23	61.5	-0.275	-1.068	-0.917	5.57	0.10
Warmińsko-mazurskie	7.8	54	59.8	-0.812	0.572	-0.968	4.87	0.22
Wielkopolskie	36.9	60	119.8	-0.079	0.890	0.843	3.42	0.45
Zachodniopomorskie	22.3	45	133.4	-0.447	0.096	1.253	4.16	0.33
Arithmetic mean	40.03	43.19	91.88	0.00	0.00	0.00	4.50	0.28
Standard Deviation	39.69	18.89	33.13	1.00	1.00	1.00	0.86	0.14
Variation Coefficient	99%	44%	36%				19%	50%
Max	136.90	101.00	147.00	2.44	3.06	1.66	5.57	0.59
Min	5.00	23.00	36.40	-0.88	-1.07	-1.67	2.54	0.10

Source: Own study, based on GUS data.

Energy infrastructure

Calculation of the energy infrastructure development level was based on three variables, referring to the infrastructure of the electric power transmission and heating (Tab. 7), i.e.:

– electricity consumption per 1 resident,
– sale of the thermal energy [GJ/1000 ludności],
– density of the heat distribution network [km/100 km^2].

Śląskie and Mazowieckie are the two regions with the most developed energy infrastructure. In these regions, the synthetic index is over 0.8, and is over 30% higher than the next region below it. The span of the synthetic index for regions with the highest and the lowest infrastructure equipment is almost 6.

Table 7. Calculating the taxonomical index of a regions' energy infrastructure equipment

Region	Variable value			Standardized variable value			Euclidean distance	Synthetic index
	$x_{6.51}$	$x_{6.52}$	$x_{6.53}$	$t_{6.51}$	$t_{6.52}$	$t_{6.53}$	$d_{6.5}$	$S_{6.5}$
Dolnośląskie	741.1	12.25	5.57	-0.004	0.405	0.119	3.40	0.49
Kujawsko-pomorskie	724.9	8.72	5.67	-0.196	-0.172	0.187	3.85	0.42
Lubelskie	663.1	7.38	4.65	-0.929	-0.391	-0.502	4.75	0.29
Lubuskie	730.8	3.20	3.63	-0.126	-1.073	-1.190	5.23	0.22
Łódzkie	786.0	11.10	7.11	0.528	0.217	1.159	2.81	0.58
Małopolskie	811.6	14.79	3.78	0.831	0.819	-1.089	3.72	0.44
Mazowieckie	888.3	20.49	8.43	1.740	1.750	2.050	0.84	0.87
Opolskie	836.2	5.08	4.92	1.122	-0.766	-0.319	4.16	0.38
Podkarpackie	573.1	7.84	3.88	-1.995	-0.315	-1.021	5.64	0.16
Podlaskie	739.5	4.84	6.10	-0.023	-0.805	0.477	4.14	0.38
Pomorskie	820.2	10.52	6.83	0.933	0.122	0.970	2.81	0.58
Śląskie	793.6	25.64	7.57	0.618	2.591	1.469	1.26	0.81
Świętokrzyskie	597.1	3.86	3.46	-1.710	-0.965	-1.305	5.98	0.10
Warmińsko-mazurskie	690.5	5.69	5.08	-0.604	-0.667	-0.211	4.61	0.31
Wielkopolskie	766.0	7.62	4.67	0.291	-0.351	-0.488	4.15	0.38
Zachodniopomorskie	701.6	7.33	4.94	-0.472	-0.399	-0.306	4.40	0.34
Arithmetic mean	741.48	9.77	5.39	0.00	0.00	0.00	3.86	0.42
Standard Deviation	84.41	6.12	1.48	1.00	1.00	1.00	1.41	0.21
Variation Coefficient	11%	63%	27%				36%	50%
Max	888.30	25.64	8.43	1.74	2.59	2.05	5.98	0.87
Min	573.10	3.20	3.46	-1.99	-1.07	-1.30	0.84	0.10

Source: Own study, based on GUS data.

Synthetic evaluation of spatial diversity in infrastructure development

Taking into account the variables diagnostic -used for the evaluation of the development of individual types of the infrastructure- a synthetic index of the regions' economic infrastructure equipment was calculated. In those calculations, like in appointing fragmentary indexes identical methodological, assumptions were applied, i.e.:
- all diagnostic variables were compared in one matrix,
- a standardization of diagnostic variables was conducted,
- indexes of the infrastructure development were calculated for every region,
- regions were classified according to the index of the infrastructure development value.

Results of the calculations are compared in Table 8. Synthetic index values of a regions' economic infrastructure equipment were characterized by a high diversity – the variation coefficient was 50%. Spans between the region's with the highest development of infrastructure level (Małopolskie) and the lowest (Lubuskie) was 6.7.

Table 8. Synthetic index of the regions' development according to the criterion of the economic infrastructure in 2011

Region	Infrastructure development index	Position	Concurrency Level
Mazowieckie	0.51	1	very high
Śląskie	0.46	2	
Małopolskie	0.37	3	
Wielkopolskie	0.37	4	
Dolnośląskie	0.34	5	high
Łódzkie	0.30	6	
Pomorskie	0.26	7	
Kujawsko-pomorskie	0.24	8	low
Zachodniopomorskie	0.22	9	
Lubelskie	0.19	10	
Opolskie	0.17	11	
Podkarpackie	0.16	12	very low
Warmińsko-Mazurskie	0.13	13	
Podlaskie	0.13	14	
Świętokrzyskie	0.11	15	
Lubuskie	0.10	16	

Source: Own study.

The Mazowieckie, Śląskie, Wielkopolskie, and Małopolskie regions possess the highest level of economic infrastructure development. Slightly lower indexes of economic infrastructure development can be found in Dolnooślaskie, Pomorskie and Lódzkie regions. These six regions consist of relatively high level of urbanization, and

also have urban agglomerations, including a high level of saturation with different types of infrastructure.

Evaluation of Relations Between the Economic Infrastructure Development and a Region's Competitiveness

In analyzing the interdependence between the level of infrastructure development and a region's competitiveness, a coefficient of Pearson linear correlation was calculated between the competitiveness synthetic index, and the economic infrastructure development synthetic index (Tab. 9). Moreover, correlation coefficients were calculated between competitiveness synthetic index, and the economic infrastructure synthetic index of individual types of the economic infrastructure. Such an approach allowed not only for the statement, whether a relation between the infrastructure development and a region's competitiveness exists, but also enabled to check whether the relation exists between the development of individual types of the infrastructure and the region's competitiveness.

Table 9. Relation between the infrastructure development and region's competitiveness

Region	Economic infrastructure development index						Region's competitiveness index
	Transport	Water supply	Sewerage	Gas	Energy	Total	
Dolnośląski	0.46	0.41	0.31	0.34	0.49	0.34	0.53
Kujawsko-Pomorski	0.38	0.33	0.26	0.19	0.42	0.24	0.33
Lubelski	0.26	0.33	0.19	0.26	0.29	0.19	0.25
Lubuski	0.29	0.16	0.06	0.19	0.22	0.10	0.28
Łódzki	0.38	0.49	0.32	0.15	0.58	0.30	0.40
Małopolski	0.52	0.37	0.43	0.38	0.44	0.37	0.40
Mazowiecki	0.31	0.75	0.50	0.59	0.87	0.51	1.00
Opolski	0.46	0.18	0.12	0.11	0.38	0.17	0.27
Podkarpacki	0.32	0.15	0.18	0.41	0.16	0.16	0.25
Podlaski	0.19	0.24	0.13	0.12	0.38	0.13	0.24
Pomorski	0.31	0.36	0.19	0.26	0.58	0.26	0.40
Śląski	1.00	0.51	0.24	0.32	0.81	0.46	0.59
Świętokrzyski	0.41	0.20	0.17	0.10	0.10	0.11	0.26
Warmińsko-Mazurski	0.21	0.21	0.12	0.22	0.31	0.13	0.25
Wielkopolski	0.38	0.63	0.37	0.45	0.38	0.37	0.51
Zachodniopomorski	0.23	0.28	0.28	0.33	0.34	0.22	0.32
A coefficient of Pearson linear correlation between the competitiveness synthetic index, and the economic infrastructure development synthetic index	0.32	0.89	0.77	0.74	0.83	0.89	

Source: Own study.

The coefficient of Pearson linear correlation confirm the thesis of relations between the level of infrastructure development and a region's competitiveness. Maximum indexes of a coefficient of Pearson linear correlation were achieved for the waterworks and energy infrastructure. The interdependence in these two types of the infrastructure is very strong. The relation for the gas and sewer infrastructure is also strong. A relation is relatively weak between the competitiveness of regions, the level of infrastructure development.

Conclusions

Presented analyses indicate the significant diversity existing in Poland in the level of infrastructure development and the competitiveness of regions. Calculated indexes confirm occurrence of the interdependence between the competitiveness of regions, the level of infrastructure development.

Considering meaning of the economic infrastructure in creating the competitiveness of regions, regions' governments should intensify activities aimed to improve the state and structures of the economic infrastructure in the region. Investments should be carried out particularly in areas with the low level of infrastructure equipment. Insufficient equipping the region with the economic infrastructure is a barrier of its development. As a result individual areas diversifying is deepening, leading into large social groups exclusion, mainly the young people.

Financing the infrastructure investments from the EU funds is a chance to improve the equipping Polish regions with the economic infrastructure. In financial perspectives 2007-2013 in all regions numerous investments including different types of the economic infrastructure were carried out. However their scope was too low to make up the long-term negligence and considerably improve the state of the depreciated infrastructure. It was also insufficient in order to make up the developmental distance towards EU regions of the European Union with the highest level of competitiveness.

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CLASSIFYING OCCUPATIONAL THREATS POSED TO KNOWLEDGE WORKERS AS A RESPONSE TO ONE OF THE SOCIAL ASPECTS OF SUSTAINABLE DEVELOPMENT CONCERNING OCCUPATIONAL HEALTH AND SAFETY

Abstract

The goal of this study was to discover, weather using different multidimensional exploratory techniques in self-assessing occupational threats by knowledge workers brings logical classification of variables and if obtained classifications are similar.

In a theoretical part of the study, on a basis of literature studies peculiarity of knowledge-based work and specific occupational threats were identified. Then, in the empirical part of the study, they were examined as observable variables with the use of a questionnaire method on a sample of 500 knowledge workers. Variables were classified using two multidimensional exploratory techniques: factor analysis and cluster analysis. The obtained results were compared. It turned out, that the results achieved with the use of the two techniques are similar, yet they differ in detail.

The implications are of both cognitive and utilitarian character. In first case – the analysis revealed and explained the structure of perception of knowledge workers' occupational threats, in second – the classification of variables allows to measure perception of occupational threats and use the results e. g. when designing trainings on occupational health and safety and to better fit them to this group of employees.

The paper's contribution are novel ways of quantifying and measuring occupational threats posed to knowledge workers as well as a comparison of the proposed methods.

JEL Classification Code: **C38, I15, J28**.

Keywords: knowledge workers, occupational threats, assessment, multidimensional exploratory techniques, factor analysis, cluster analysis.

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Introduction

Knowledge is the source of competences, improvement of efficiency and effectiveness of management and productivity (Drucker 2007, Handy 1996, Skrzypek 2002, Sońta 2010). Knowledge workers deal with creating, processing, applying and disseminating knowledge and information. They constitute a group educated in a formal way, however they understand the wide context of work, creative thinking, creativity, openness to changes and challenges as well as exercise treatment of work. They are responsible for creation and implementation of new ideas thanks to which organizations can better adapt to the rapid changes taking place in the surrounding environment. In contemporary economy, this particular group is becoming even more numerous. Specification of work based on knowledge triggers new occupational threats. Advantage of psycho-sociological threats over physical threats is a characteristic phenomenon (Lotko 2012).

Proper relations in the human-technique-environment system constitute a necessary condition to provide safety and well-being of a worker in the working process. Still, performance of every work is strictly connected with the occurrence of various type of threats. Occupational threats constitute potential events which by virtue of their appearance, i.e. occurrence in practice, exert a negative impact on the working environment or psychophysical condition of the workers. Such events may cause accidents at work or occupational diseases. Every factor and/or situation which may cause such accident or disease constitutes a threat in the working environment.

Today, at the microeconomic level, the realization of the demands of sustainable development is achieved by the enterprises by means of application of the rule of Corporate Social Responsibility (CSR). The aim of the social responsibility of an organization should be the contribution to the practical realization of the idea of sustainable development. One of the key elements of the sense of social responsibility is the occupational safety and health. Safety of the labour force is one of the aspects used in the measurement of general progress of the companies in this field (Segal *et al*. 2003). Managing occupational health and safety is a challenge here.

The goal of this study was to discover, weather using different methods of classifying variables in self-assessing occupational threats by knowledge workers brings logical classification of variables and if obtained classifications are similar. Such a classification of perception of occupational threats could help managing occupational health and safety in a more conscious way.

From such defined a goal, the following research hypotheses were drawn:

H1: latent variables measuring self-assessing of occupational threats by knowledge workers can be grouped into few logical items.

H2: applying different data classification methods to self-assessing occupational threats by knowledge workers leads to similar results.

To verify hypotheses two multidimensional exploratory techniques were used:
1. Factor analysis.
2. Cluster analysis.

The obtained results were compared.

1. The state of the art

Professions and knowledge workers

Issues concerning knowledge workers are mainly discussed by the following foreign authors: T. Davenport (2007), P. Drucker (1995), W. Cortada (1998), D. Jemielniak (2012), J. Patalas-Maliszewska (2013), J. Evetts (2003), M. Roell (2004), M. Granitzer and S. Linsteadt (2010), D. Kleinmann and S. Vallas (2001), and in Poland: E. Skrzypek (2002; 2009), M. Morawski (2003; 2009), G. Filipowicz (2008), T. Kawka (2009), D. Makowski (2008), D. Jemielniak (2008), M. Staniewski (2008) and K. Łysik (2011). Authors conducting research in this topic define the term of knowledge workers (W. Cortada, D. Jemielniak, D. Makowski, T. Kawka), they also present the results of research concerning their creativity (E. Skrzypek), productivity (M. Granitzer and S. Linsteadt (2010); E. Matson and L. Prusak (2010)) and effectiveness (G. Filipowicz), as well as group work (K. Lewis (2004)), motivation (D. Jemielniak (2012)), communicating (D. Straub and E. Karahanna (1998)) acquisition (B. Mikuła (2004)) and sharing knowledge (M. Roell (2004), K. Czop and D. Mietlicka (2011)), specification of work based on knowledge (D. Jemielniak (2008)) as well as methods of managing knowledge workers (T. Davenport, J. Patalas-Maliszewska, M. Morawski, M. Staniewski), management models (J. Patalas-Maliszewska) and challenges (K. Łysik) in this area. However there are no analyses available concerning self-awareness and self-assessment of work's character conducted by particular knowledge workers. Consequently we can observe a research gap which we tried to eliminate at least partly by means of this study.

Complexity of the management of knowledge in organizations and the lack of applicable definition of the knowledge worker result in the establishment of a number of various classification schedules connected with the processing of knowledge. Thus Ch. Handy divides workers into three categories (Handy 1996):
- routine workers – employed in order to operate shop cash desks or to enter data on floppy disks,
- suppliers of external services,
- analytics who work with numbers, ideas and words – journalists, financial analytics, consultants, architects, managers, etc.

M. Morawski claims that a knowledge worker is perceived in the context of formal education often exceeding the average level, He combines knowledge with different disciplines and at the same time he possesses deepened specialist knowledge and particular solid and practical skills based on the specialist knowledge, which are

very often beyond the access of others (Morawski 2002). Whereas T. Davenport acknowledges that knowledge workers are distinct from office workers as they not only process data by means of process of thinking but they also analyse them, understand them and create new knowledge in terms of its quality (Davenport 2007, s. 25). At the same time „they do not like to receive instructions, the mode of their work is difficult to be organized and foreseen, the best results are achieved when working with others in the contact nets".

A good example of knowledge workers constitute representatives of independent professions such as: doctors, attorneys, chartered accountants or architects (Łysik 2011). E. Skrzypek maintains that knowledge workers are professionals processing symbols, paid for the effectiveness (Skrzypek 2009). They have professional skills, interpersonal competences and unique competences the use of which creates an added value included in modern products and technologies; they create, keep, apply and disseminate knowledge. According to C. Sikorski (Sikorski 1997) the most important workers existing in modern economy, are psychologically ready for frequent changes at work, are not afraid of these changes, are flexible and they eagerly take risk, are not focused on a long-lasting career in one organization and are oriented towards the result – they have a strong need for achievements supported by a pursuit of continuous learning and a will to exert impact on the environment being subject to a minimized control.

An interesting and wide review of definitions and features of knowledge workers are among other discussed by: T. Davenport (2007), P. Drucker (2007,), A. Kidd (1994), D. Kleinmann and S. Vallas (2001), M. Strojny (2004), T. Kowalski (2011), A. Fazlagić (2001) or J. Szaban (2001).

Role of managing occupational health and safety in sustainable development

Sustainable development is a process aiming to satisfy development aspirations of current generation in a way enabling realization of the same pursuits by the generations to come (Brundtland 1987). The above definition, nowadays commonly applied, was formulated in the Report of the World Commission on Environment and Development of 1987. The vision of development included in this definition takes into account the human population, the world of animals and plants, ecosystems, natural resources of the Earth. It also considers the most important challenges of the contemporary world such as the battle with poverty, equality between sexes, human rights and safety, commonly accessible education, health and intercultural dialogue in an integrated way (UNESCO 2014).

Comprehensive attitude towards sustainable development considers various impacts and interactions such as (Kołodko 2008):

– economic policy,
– rules of the game of the functioning of economy,

– culture of organization,
– confessed values,
– social relations, applied techniques and technologies,
– risk of undertakings,
– environment reactions,
– ways of management.

At present, the term of sustainable development is beginning to be perceived in the world as the type of development balanced by common social, economic and environmental interests. Thus sustainable development may be defined as the development satisfying fundamental needs of all people with simultaneous care for protection, preservation and renewal of health as well as the integrity of ecological systems without the risk that the needs of future generations could not be satisfied and the limits of endurance of the planet would be exceeded (Żuchowski 2009). The balance of the functioning of an organization in the conditions of sustainable development is connected with the process of effective production of goods and services with the simultaneous restriction of the use of the resources of the nature and natural environment, ensuring the satisfaction of stakeholders both external (contractors, clients, members of local society) and internal (employees).

At the microeconomic level, the realization of the demands of sustainable development is achieved by the enterprises by means of application of the rule of Corporate Social Responsibility (CSR). The aim of the social responsibility of an organization should be the contribution to the practical realization of the idea of sustainable development. Corporate social responsibility is defined as a concept of voluntary inclusion of social and environmental aspects by the enterprises as well as contacts with external stakeholders in the economic activity. Social responsibility means going beyond legal requirements by way of increased investment in the human capital, environment protection and relations with contractors. Its integral part is among others the assurance of safe working conditions and care for a good state of health and morale of the employees which are covered by the corporate social responsibilities (EABiZwP 2006).

With the use of CSR, the enterprises integrate social and environmental aspects in their day-to-day business activity as well as in the mutual relations with external clients on a voluntary basis (Żemigała 2007). It should be noted that this is not merely about the observance of legal provisions or applicable rules, but about the investing in the assurance of appropriate working conditions for the employees and restriction of interference into the natural environment. An organization should engage in the CSR depending on its competences, resources, contractors, cultural traditions, social and ecological situation of the area of its functioning. There are three aspects of social dimension of CSR (Żemigała 2007):

– internal – management of human resources, ethics, occupational safety and health, adjustment to the changes, management of the impacts on natural environment and resources,

– local external – local societies, trade partners, local non-governmental organizations,
– global external – suppliers and consumers, investors, human rights, global problems within the scope of the environment protection, global non-governmental organizations.

Corporate social responsibility does not have to constitute an additional cost factor in the organization, but becoming an organization management strategy it should at the same time be an effective mechanism creating an added value by stimulating innovativeness and constructing a competition advantage (Odpowiedzialna Firma 2014). It should contribute to the harmonious development of the entire economy with the consideration of the relations between business and ethics, natural environment and respect for the community of human units.

One of the key elements of the sense of social responsibility is the occupational safety and health. Safety of the labour force is one of the aspects used in the measurement of general progress of the companies in this field (Segal *et al*. 2003). These aspects include:
– safety and health of the labour force and a healthy product,
– work norms and working conditions, human rights,
– equal possibilities and access to employment.

Occupational safety and health means the state of conditions and organization of work assuring the required level of protection of health and life from threats existing in the work environment (Borysiewicz 2001). Management of occupational safety and health covers conscious activities oriented towards the reduction of the risk of the loss of life or health in the work environment to the acceptable borderline level and subsequently towards the maintenance of the said level at the same or lower level (Krzemień 2003). Occupational safety and health is considered to be one of the key elements of company's ethics strictly connected with the feeling of social responsibility as it introduces ethic values in business into the CSR activity program (Fisscher 2003). However, a good combination of occupational safety and health with social responsibility requires the fulfilment of certain conditions. Above all, this responsibility should be considered to be a positive feature. Fair and open behaviour towards workers and external clients is extremely important, as it enables the development of moral competences on the basis of dialogue with the employees (Fisscher 2003).

Threats posed to knowledge workers in terms of sustainable development

Contemporary environmental and professional threats require a wider and deeper study (Greenberg 2007, Frumkin 1999, Brown 2002). The World health Organization (WHO) promotes the strategy of health and safety at work (WHO 1994), and the International Labour Organization (ILO) promotes the safety of work in the „green economy" of sustained development, which brings new and unknown threats to the workers (ILO 2012). Attention is also paid to the specific nature of occupation-

al threats in the information society (Lotko 2014). A threat is a potential source of a damage i.e. of an injury or other kind of deterioration of health (PN-EN-ISO 12100-1:2005). A dangerous situation is a situation in which a given person is exposed to at least one danger. Such exposure may cause damage immediately or after some time.

The interest of the empirical part of this study is the assessment of occupational threats of the knowledge workers. The author discussed this issue in her previous works (Lotko 2011, Lotko 2012, Lotko and Żuchowski 2014). The awareness within the scope of occupational threats is particularly significant as the most frequent cause of accidents at work constitute the consequences of improper conduct of a worker (CIOP 2007). On the other hand studies in the way the workers perceive their organization, concentrate on three different aspects of its functioning and culture: as the environment to solve problems and as the environment of self-;development (Cox 1990). Within the first of the aspects mentioned above, one of the stress-causing factors constitutes the role served by a worker in a given organization. This threat mainly relates to the problems connected with the conflict of the roles in organization and responsibility for other people as well as to the possibility to receive support from the management and co-workers (Landy 1992). Uncertainty connected with the development of the professional career of a knowledge worker and uncertainty regarding the employment are both perceived as a serious threat. Threats resulting from the work itself include working environment, project of the task, pace of work and work schedule. Monotonous repeatability of tasks, insufficient use of worker's skills, incompatibility of duties and capabilities of a worker and a high level of uncertainty, these are the kind of stress-causing threats connected with a particular type of work performed by a knowledge worker. Significant threats resulting from the work itself include work schedule and pace of work leading to overwork (Hiyama, Yoshikara 2008, Dembe, Ericsson, Delbos, Banks 2005). Threats listed above have a psychological background.

Another group of threats are threats resulting from improper organization of work. Factors limiting occupational threats of organizational character include breaks during work, possibility to perform various tasks, freedom of decisions concerning the manner of performance of the entrusted work, attainable deadlines for the performance of duties (CIOP 2007).

When considering technical threats we should take into account the peculiarity of a given workplace. Workers perform the majority of their duties using office electronic equipment. Work stations should have an access to the day light and electric light. Work with a computer monitor, minimisation of personal computers including the monitors results in sight disorders. Moderate temperature and quietness are important elements for conceptual work. On the other hand non-ergonomic position at work results in disorders of musculoskeletal system and spine injuries. Seemingly not dangerous, but the effect of such disorders and injuries is cumulating for years what causes chronic illnesses which very often require a long-term treatment (Lotko 2011).

The last group of threats to the working environment of knowledge workers includes safety threats concerning the „material" of which the knowledge is made of, i.e. data and information processed in an organization, especially in the environment of computer networks. Basic attributes defining safety of information are confidentiality, integrity and accessibility (PN-ISO/EIC 27001:2007). Threats to these attributes are of psycho-sociological and stress-causing character.

2. Remarks on research methodology

Sampling was purposive – among working students of the University of Technology and Humanities in Radom 500 persons were selected, who specified the nature of their work as a „knowledge worker". The adopted methodology provided the veracity of one of the qualification criteria of the knowledge workers concerning the possession of formally documented specialist knowledge – they had at least a bachelor or engineer title.

A questionnaire method was applied to collect statistical material whereas the author designed a special tool, i.e. a questionnaire form. Examined knowledge workers filled in the questionnaire composed of 28 questions. The first five questions were in the form of a certificate, the next 7 questions evaluated the self-awareness of the knowledge workers and the last 16 concerned the assessment of occupational threats (placed in Table no. 3). Observable variables concerning the self-assessment of worker's knowledge and the assessment of occupational threats was described on the five-point Likert scales which measure the compatibility degree of a given respondent with a particular statement. The aim was to determine the set of the features (factors) which are used by the knowledge workers in the process of perception of occupational threats and consequently to build a factor model. For the purpose of the study of statistical material, a questionnaire method was used, whereas the author designed a special tool in the form of a questionnaire. Because of the assumed scales, where each item is described by a positive statement, low value of a variable means perceiving threat as a weak one, as high value of a variable means perceiving threat as a strong one. Such an approach allowed to treat occupational threats as „hidden" ones, not expressed in an explicit manner, hence not dictated to the surveyed employees.

In the paper we compared two multidimensional exploratory techniques: factor analysis and cluster analysis.

The concept of factor analysis was established and developed in the Anglo-Saxon psychology. For the first time it was described in 1994 by C. Spearman. However theoretical basics and possibilities of practical solutions were elaborated by L. Thurstone (Thurstone 1947, Mynarski 1992). The factor analysis was formulated as a formal statistical model by D. Lawley and A. Maxwell (1963) and as a model of confirmative factor analysis by K. Jöreskog (1971). It constitutes a set of statistical methods and procedures which allow for the reduction of a great number of examined variables

to a smaller number of mutually independent (uncorrelated) factors. Its basic scope of application includes the reduction of the number of variables and detection of the structure in the relations between the variables (Kaczmarczyk 2002). Selected factors reach a deeper level of studied reality (e.g. attitudes, values) and are the causes underlying observable variables. The most significant and classic works within the scope of the procedures of factor analysis include the following studies: J. Stevens (Stevens 2009), W. Cooley and P. Lohnes (1971), D. Lawley and A. Maxwell (1963), and within the scope of its application in psychometry: J. Nunnally (1978). However the factor analysis has much broader applications, from the measurement of satisfaction and loyalty of the clients (Sagan 2003) to the estimation of the value of a given real estate (Jasińska 2008).

Cluster analysis was used during this study. The term cluster analysis was introduced by R. Tryon (1939) and then developed by R. Cattell (1944). The use of cluster methods has increased dramatically in the last 30 years (Gore 2000). Cluster analysis encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories. The objective of cluster analysis is to group objects into clusters such that objects within one cluster share more in common with one another than they do with the objects of other clusters. Thus, the purpose of the analysis is to arrange objects into relatively homogeneous groups based on multivariate observations. Cluster methods are used to group people (or other objects) together based on their scores across a set of variables (Gore 2000). A concise and relevant review of the development, applications, methods and problems of cluster analysis is provided by P. Gore (2000). Interesting and classical examples of cluster analysis applications are discussed by T. Hastie, R. Tibshirani and J. Friedman (2009) as well as P. Guidici and S. Figini (2009). Also, an excellent summary of the many published studies reporting the results of cluster analyses is provided by J. Hartigan (1975).

In this study, as it comes to cluster analysis, grouping variables by columns was performed. It is an example of hierarchical methods, which lead to creating a hierarchical tree-like structure of the elements of the analyzed set, which in its horizontal version is called a tree plot, and in its vertical version - an icicle plot. So, the effects of the algorithm can be presented as a tree, which shows the next steps of the performed analyses (Migut 2009). This way a final segmentation can be obtained, which means an orderly combination of a breakdown into segments. Different methods can be used here. Owing to the efficiency of reproducing the real data structure, the Ward method is recommendable. It uses the rule of minimizing variation (Migut 2009). This method do not require an earlier assumption on the number of clusters – a plot can be „cut off" on a proper height in the end of an analysis and then interpreted.

Finally, the results of the use of both methods were compared. In general, cluster analysis and factor analysis have different objectives. The usual objective of factor analysis is to explain correlation in a set of data and relate variables to each other, while the objective of cluster analysis is to address heterogeneity in each set of data.

Still, it can also be used as a method of data reduction. In spirit, cluster analysis is a form of categorization, whereas factor analysis is a form of simplification. Even though the solutions to both factor analysis and cluster analysis problems are subjective to some degree, factor analysis allows a researcher to yield a „best" solution, in the sense that the researcher can optimize a certain aspect of the solution. This is not so for cluster analysis, since all algorithms that could possibly yield a best cluster analysis solution are computationally inefficient.

Factor analysis and cluster analysis also differ in how they are applied to real data. Because factor analysis has the ability to reduce a unwieldy set of variables to a much smaller set of factors, it is suitable for simplifying complex models. Factor analysis also has a confirmatory use, in which the researcher can develop a set of hypotheses regarding how variables in the data are related, which is not for cluster analysis. The researcher can then run factor analysis on the data set to confirm or deny these hypotheses. Cluster analysis, on the other hand, is suitable for classifying objects according to certain criteria (http://www.ehow.com).

Interesting studies comparing those two methods on a practical basis are available (Krebs, Berger, Ferligoj 2000). The authors claim, that comparing factor analysis with cluster analysis means to approach a data set from two complementary perspectives. The underlying logic of both procedures is classification. Classification in either approach is based on homogeneity. Homogeneity with respect to cluster analysis means that research units, located in the rows of the data matrix, either individuals or groups of individuals, are classified into clusters with respect to their similarity on variables. Clusters are ideally characterized by within homogeneity of objects and between heterogeneity of objects. Factor analysis, in contrast, concentrates on the homogeneity of variables resulting from the similarity of values assigned to variables by respondents. Which of the two approaches better fits the data is an empirical question to which an answer can be: one of them, both or none (Bacher 1996).

3. Discussion of the results

Factor analysis

On the basis of the results of the study, we firstly managed to construct a factor model using a multidimensional scale. It was constructed with the use of one of the methods of multi-criteria exploratory analysis – factor analysis, in particular an analysis of principal components which consists in the use of linear model of orthogonal set transformation of initial n variables into a new set of mutually uncorrelated m variables. This is a typical variables classification (data reduction) method. An advantage of a factor analysis is the possibility to discover an optimal number of latent variables which explain mutual connections between observable variables.

The results of factor analysis for the solution with two factors are presented in Table 1 (Eigenvalues) and Table 2 (factor loadings).

Table 1. Eigenvalues matrix for dimensions of occupational threats – solution with five factors

Factor	Eigenvalue	% Variance	Cumulated Eigenvalue	% Cumulated
1	3,549410	22,18381	3,549410	22,18381
2	2,164391	13,52744	5,713801	35,71125
3	1,345420	8,40887	7,059221	44,12013
4	1,224078	7,65048	8,283298	51,77061
5	1,089146	6,80716	9,372444	58,57778

Source: authors' own study

A 5-factor solution was adopted, which explains 58,57% of the whole of the variations. The first factor has a high Eigenvalue – 3,55 and explains 22,18% of total variations. The second factor has the Eigenvalue amounting to 2,16 and explains 13,52% of variations, whereas the consecutive factors have the Eigenvalue greater than 1 - 1,35, 1,22 and 1,09 respectively and consecutively explain 8,41%, 7,65% and 6,81% of the whole of the variations. The next factor has the Eigenvalue lower 1 and consequently it is rejected.

Table 2 presents loadings of the highest correlations – being the components of the subscale of a given factor.

Table 2. Factor loadings matrix – four factor solution

Value number	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1	0,516332	0,134074	0,228619	0,098782	-0,169477
2	-0,019698	0,060606	0,745174	-0,156155	0,144498
3	0,205091	0,073781	0,817375	-0,027467	-0,074390
4	0,241242	0,116043	0,657900	0,207601	0,178619
5	-0,140193	-0,020452	0,121311	0,648489	-0,239987
6	0,344730	-0,046594	0,399303	-0,307456	0,123663
7	0,009237	0,164109	0,275083	-0,061339	0,756729
8	0,199916	0,037913	-0,001188	0,137762	0,679458
9	0,671149	0,256030	0,079729	-0,006920	0,119955
10	0,800203	0,102523	0,054665	-0,051432	0,096914
11	0,698717	-0,006983	0,120474	-0,109721	0,193540
12	0,071741	0,111194	-0,059046	0,768187	0,148138
13	-0,027805	0,146618	-0,127329	0,708774	0,157668
14	0,087991	0,853327	0,082417	0,049307	0,049235
15	0,130758	0,851623	0,077159	0,112159	-0,020804
16	0,143455	0,682120	0,041566	0,085922	0,171058

Source: authors' own study.

The analysis of Table 2 suggests that variables no. 1 and 6 should be rejected as none of them has the factor loading at the level or above the level equal to 0,6. The analysis of observable variables loading each of the factors indicates the possibility of a reasonable interpretation of relations.

Since the scale includes the variables of the highest correlation with a given factor, table 2 presents that:

- the first factor is loaded by 3 variables of the following numbers 9, 10, 11,
- the second factor is loaded by 3 variables of the following numbers 14, 15, 16,
- the third factor is loaded by 3 variables of the following numbers 2, 3, 4,
- the fourth factor is loaded by 3 variables of the following numbers 5, 12, 13,
- the fifth factor is loaded by 2 variables of the following numbers 7 and 8.

Therefore we obtained a set of data reduced to the factors loaded by observable variables. Naming of the dimensions of occupational threats results from the following interpretation of factors:

- „physical conditions" (F) at work station including lighting, temperature and possibility to concentrate at a given work station,
- „data security" (D) covering the criteria of confidentiality, integrity and accessibility of data used during the performance of work,
- „psycho-sociology" (S) covering optimism and high self-estimate, resulting in comfortable and certain mood satisfaction of work, optimistic evaluation of future career and application of skills,
- „physiology" (P) covering the time pressure and physical ailments of an organism caused by the performance of work,
- „autonomy" (A) covering the possibility to choose the manner of the performance of work and diversity of tasks.

Subsequently the reliability of scales was examined. One of the most frequently applied techniques of scale reliability measurement is the α-Cronbach coefficient. It assumes values from the range <0,1>, while it is assumed that the minimum reliability of scale means coefficient value greater than 0,6 (Sagan 2003). The analysis of reliability scale was carried out separately for each distinguished dimension.

Finally it turned out that the deletion of variable no. 5 contributes to the increase of Cronbach's α to 0,66, i.e. it is worth to delete this variable in order to achieve a significant increase of the factor „physiology" subscale reliability. Other subscales are reliable. Only for the factor „autonomy", the Cronbach's α value of 0,41 is assumed. Therefore only in this one case, we may have some reservations about the reliability of the measurement.

So the final specification of the model covers 5 factors loaded by 13 variables. Mapping of values to factors is given in Table 3, placed further in the text.

Cluster analysis

Then cluster analysis was used. Grouping variables by columns was performed. It is an example of hierarchical methods, which lead to creating a hierarchical tree-like structure of the elements of the analyzed set. The aim was to examine whether occupational threats posed to knowledge workers can be grouped into few logical items. A vertical tree graph (icicle plot) drawn in Figure 1 shows clusters for occupational threats obtained in another steps.

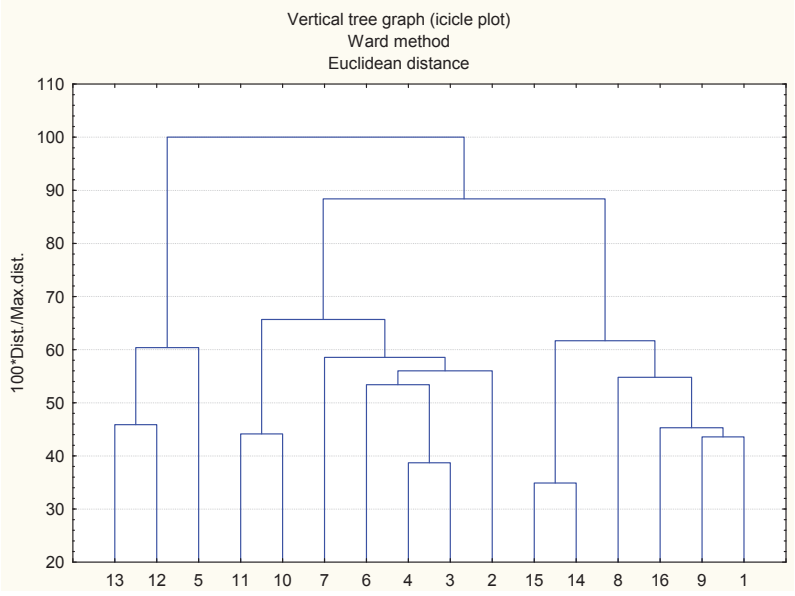

Figure 1. Icicle plot for occupational threats cluster analysis

Source: authors' own study.

From Figure 1 it can be seen that cutting a plot off at a standardized linkage distance e. g. 62, 4 clusters are obtained at the distinct increase in linkage distance appear in 7th and 14th of 15 steps of analysis. Interpretation of the obtained clusters is as follows (the order of linking variables was preserved, hence they are not sorted) (Lotko and Lotko 2015):

1. Cluster 1 – „physiology" (P), links variables 13, 12, 5, linking mainly physiological threats (threats to sight and musculoskeletal system) and the pressure of time.
2. Cluster 2 – „physical conditions" (F), links variables 11, 10, linking physical conditions at a workplace (temperature, noise, ability to concentrate).
3. Cluster 3 – „psycho-sociology" (S), links variables 7, 6, 4, 3, 2, linking psycho-sociological threats – ability to decide about the way of performing work, ability to relax, proper use of worker's abilities, estimation of the future and salary satisfaction.

4. Cluster 4 – „data and autonomy" (D), links 15, 14, 8, 16, 9, 1, linking threats posed to data security (confidentiality, integrity, availability), illumination of a workplace, diversity of tasks at work and support in performing them.

Analysis shows, that it is hard to logically interpret joining variables to clusters in 2 cases: variable 5 (pressure of time) to the cluster 1 and variable 9 (illumination of a workplace) to the cluster 4. Mapping variables describing occupational threats to clusters is given in Table 3.

Comparison of the results

Factor analysis and cluster analysis are two statistical exploratory methods of data analysis. These two forms of analysis are heavily used in the natural and behavior sciences. Both factor analysis and cluster analysis allow to group parts of the data into „factors" or „clusters", depending on the type of analysis.

Putting together results of the use of the two techniques, mapping variables to factors and clusters was done, shown in Table 3.

Table 3. Mapping variables (a) to factors (b) to clusters (shadow indicates a difference in mapping)

Var. no.	Statement	Mapping to a factor	Mapping to a cluster
1	I can count for the support in solving problems encountered at work.	-	D
2	I am satisfied with the remuneration that I receive.	S	S
3	I perceive the future of my career optimistically.	S	S
4	My skills are properly used in organization.	S	S
5	I work under time pressure.	-	P
6	Breaks at work allow me to relax.	-	S
7	I make the decisions concerning the manner in which I perform the work by myself.	A	S
8	Performed tasks are diversified.	A	D
9	My work station has appropriate lighting.	F	D
10	At my work station, the temperature is at a comfortable level.	F	F
11	Surrounding of my work station allows for concentration.	F	F
12	During the work my eyesight can rest.	P	P
13	During the work I have comfortable and ergonomic position.	P	P
14	Data and information used at work are at the disposal of authorised persons only.	D	D
15	Data and information used at work are protected from unauthorised modification.	D	D
16	Data and information used at work are available when necessary.	D	D

Source: authors' own study.

From Table 3 it can be concluded, that the results obtained using the both methods are quite similar. Although when using factor analysis 5 factors were discovered and when using cluster analysis 4 clusters where identified, in general they are similar, and of easy to interpretation character. The only differences implying from comparison of the two methods are visible in Table 3 and are as follows:

1. First variable, describing an ability of receiving support in solving problems at work, in factor approach was rejected as not having factor loading high enough for any of the factors, while in cluster approach it is joined to cluster „data and autonomy" (D),
2. Fifth variable, describing pressure of time, in factor approach was rejected as the variable lowering the reliability of factor „physiology" subscale (P), while in cluster approach it is joined to cluster „physiology" (P).
3. Sixth variable, describing an ability of relaxing in a workplace, in factor approach was also rejected as not having factor loading high enough for any of the factors, while in cluster approach it is joined to cluster „psycho-sociology" (S).
4. Seventh variable, describing ability to decide about the way of performing work, in factor approach loads factor „autonomy" (A), while in cluster approach it is joined to cluster „psycho-sociology" (S). Both situations seem possible to be logically interpreted.
5. Eighth variable, describing the diversity of tasks at work, in factor approach loads factor „autonomy" (A), while in cluster approach it is joined to cluster „data and autonomy" (D). Here also both situations seem possible to be logically interpreted.
6. At last, ninth variable, describing illumination at a workplace, in factor approach loads factor „physical conditions" (F) at a work station, while in cluster approach it is joined to cluster „data and autonomy" (D). The second situation is rather illogical and hard to interpret.

In table 4 similarities between factors and clusters are given. They are calculated as the number of common variables divided by the total number of unique variables for the two items. The value belongs to the range from 0 (no similarity) to 1 (identity).

Table 4. Similarities between factors and clusters

		Factors				
		Physical conditions (F)	Data security (D)	Psycho-sociology (S)	Physiology (P)	Autonomy (A)
Clusters	Physiology (P)	0,00	0,00	0,00	**0,67**	0,00
	Physical conditions (F)	**0,67**	0,00	0,00	0,00	0,00
	Psycho-sociology (S)	0,00	0,00	**0,40**	0,00	**0,17**
	Data and autonomy (D)	**0,13**	**0,50**	0,00	0,00	**0,14**

Source: authors' own study.

Data in table 4 confirms that similarities between factors and clusters are logical. The only illogical values seems the ones between factor „physical conditions" (F) and cluster „data and autonomy" (D) (value too high) and between factor „autonomy" (A) and cluster „data and autonomy" (D) (value too low).

Summing up, both of the obtained results are sensible, logical and easy to be interpreted. Also the revealed differences can be easily explained on a basis of logic.

At least, the comparison of results of assessment of occupational threats by the knowledge workers, grouped with the use of the two methods is presented. Firstly, there come results obtained with the use of factor analysis. The profile of occupational threats assessment is shown in Figure 2. Because of the assumed scales, where each item is described by a positive statement, low value of a variable means perceiving threat as a weak one, as high value of a variable means perceiving threat as a strong one.

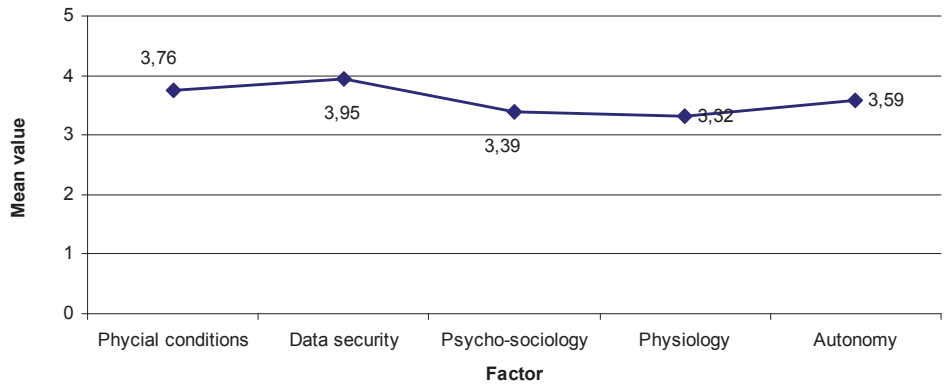

Figure 2. Assessment of occupational threats factors (mean values)

Source: authors' own study.

From figure 2 it can be read that knowledge workers' perception covers mostly psycho-sociological and physiological factors, as well as from the lack of autonomy (which is also of psycho-sociological character) – here are were low values of positive statements. Examined employees perceive threats to data security and implying from physical conditions at a workplace as relatively weak (here there are high values of positive statements).

Secondly, there comes results obtained with the use of cluster analysis. The profile of occupational threats assessment is shown in Figure 3.

From Figure 3 it can be read that knowledge workers' perception covers mostly threats coming from physiology and psycho-sociology (there are low values of positive statements). Threats concerning physical conditions and threats to data security and lack of autonomy are perceived as relatively weak.

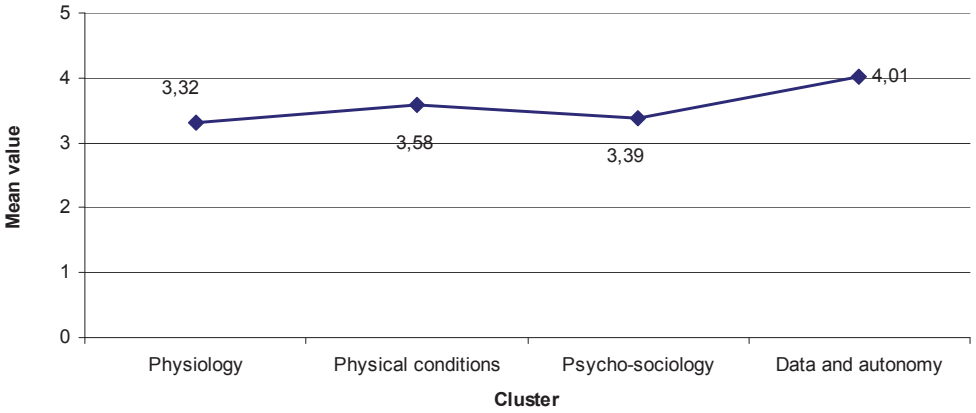

Figure 3. Assessment of occupational threats clusters (mean values)
Source: authors' own study.

Conclusions discovered from the comparison are as follows:

1. In both cases it was assessed that knowledge workers' perception covers mostly threats coming from psycho-sociological and physiological factors (3,39 and 3,32 accordingly; the results are identical for both methods).
2. Factor analysis explains threats concerning physical conditions on a workplace as a bit weaker than cluster analysis (3,76 vs. 3,58).
3. It is hard to compare threats to data security and autonomy, as for factor analysis there are two different factors (assessed 3,95 and 3,59 accordingly), while for cluster analysis there is one cluster assessed 4,01. Drawing mean value from the two factors gives 3,77, which is lower than in case of using cluster analysis. This allows to claim in some degree, that factor analysis explains this group of threats as stronger (lower mean value of a positive statement) than cluster analysis.

Conclusion

Conduct of empirical studies of the self-assessment of occupational threats ant the character of work by the knowledge workers by means of observable variables and application of two of multidimensional exploratory techniques, factor analysis and cluster analysis, allowed to establish the following:

1. Specification of the factor model of occupational threats perceived by knowledge workers covers 5 factors loaded by 13 variables. The revealed factors are: „physical conditions", „data security" , „psycho-sociology", „physiology" and „autonomy".
2. Threats perceived by knowledge workers can be grouped into 4 clusters: „physiology", „physical conditions", „psycho-sociology" and „data and autonomy".

3. Mapping variables to clusters and factors revealed, that the results obtained with the use of the two techniques are similar, yet they differ in details. Among minor differences in ascribing variables to items (factors or clusters), the main difference is that in factor analysis approach „data security" and „autonomy" are different factors, while in cluster analysis approach they form one cluster. Hence the first (factor) approach seems more sensible. Still it should be remembered, that three variables were removed from this model as not having enough factor loadings values (2 cases) or lowering the reliability of a factor subscale (1 case).
4. Concerning results of empirical measurement, in both cases it was assessed, that surveyed workers' perception covers mostly threats coming from psycho-sociological and physiological factors (the results are identical for both methods). Factor analysis explains threats concerning physical conditions on a workplace as a bit weaker than cluster analysis. It is hard to compare threats to data security and autonomy, as for factor analysis there are two different factors, while for cluster analysis there is one cluster. However, calculating a mean value from the two factors allows to claim in some degree, that factor analysis explains this group of threats as stronger (lower mean value of a positive statement) than cluster analysis.

The conclusions are of both cognitive and utilitarian character. In first case – the analysis revealed and explained the structure of perception of knowledge workers' occupational threats and the character of knowledge-based work, in second – the classification of variables allows to measure perception of occupational threats and use the results e. g. when designing trainings on occupational health and safety and to better fit them to this group of employees. It turned out, that the results achieved with the use of the two techniques are similar, yet they differ in detail.

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Katarzyna Głąbicka[1]

THE ROLE OF SOCIAL SERVICES IN THE 21st CENTURY

Abstract

The aim of the article is to examine all issues related to social services - definition, theoretical approaches, historical development, institutional and legal instruments, as well as the presentation of the particular areas of social services and their increasing role in the implementation of active social policy. Popularization of this topic seems to be very current at opportunity of many ongoing discussions about the condition of the welfare state, social policy reforms, the search for new paradigms in science and social practice.

The aim of the publication is to demonstrate the increasing role and importance of social services to satisfy the needs of individuals and groups in different areas of socio-economic development.

JEL Classification Code: **M14**.

Keywords: social services, social policy, labour market, social needs.

Introduction

Popularization of this topic seems to be very current at opportunity of many ongoing discussions about the condition of the welfare state, social policy reforms, the search for new paradigms in science and social practice.

The aim of the article is to demonstrate the increasing role and importance of social services to satisfy the needs of individuals and groups in different areas of socio-economic development.

The development of social services

The development of social services in the twenty-first century due to the dynamic progress of the investment and activating policy. The society of the 21st century is

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a society of services as most of the work places are created in the service sector (public and community). This means that at least 50% of working people reach incomes from working in services. Thus, on the one hand, more and more people are employed in services, on the other hand, more and more services are consumed by households. Its characteristic feature is the principle of 'una actu' which means the production and consumption take place at the same time and place as a result of the same action (Evers, Heinze, Olka, 2013, p. 15):

This diversity of services may be included into four major functional clusters (Evers, Heinze, Olka, 2013, p. 42):

a) services directed at people (healthcare, welfare, education and teaching, accommodation services);
b) services directed at businesses (real property, renting, business support);
c) communication services and markets (trade, credit and insurance industry, communication and information);
d) provision of public infrastructure and administrative (public administration, defence, social security).

A characteristic feature of the service sector is the fact that it is based mainly on employed women who accept work with family life. This requires flexible working hours, different forms of employment regulations.

The social services is undoubtedly bound up with the needs and social problems, thus generate the growing preference for new services which shall be construed as 'a part of social policy, designed to improve the status and capabilities of modern society'. In addition, thy are an instrument acting against crises resulting from social processes of modernization and their development is seen as a response to demographic changes, individualization, migration and globalization (more in Evers, Heinze, Olka, 2013, p. 16).

Social services can be defined as an essential form of social assistance from one private individual to another, referring to difficult situation, and to criteria and method means of leading a satisfying life.

The current state of knowledge indicates that all the definitions of „services" are linked to the activities to satisfy human needs while they are not related to the direct production of items.

In this context, services feature is **immaterial** (no sensuous, which cannot be displayed or stored) **supply and consumption connection** by the limited time availability of the service, whether the limitations in increasing the scale of services, **the non-uniformity** (a specific form of service depends on who is doing the passes), **instability** (services cannot be stored, the offer of services is dependent on the current capacity of the servicing entity) and the inability to buy the services of their own. What are social services?

The first proposal makes interpretive exhibit in the definition of social services perspective needs. Social services should then be treated as a multi-dimensional

and multi-sectoral offers awaken, control and/or satisfaction (or support in satisfying) the needs of „higher" and „lower" row on individuals and groups. It should be recognized that this is a way of interpreting the essence of social services, based on the essence of social policy defined by the concept of „needs" and advocated by V. Schubert, J. Szczepanski, or J. Supińska (Granosik, 2007, p. 8).

The definition is based on the view of Richard Szarfenberg, which states that „[a] well-being and social security, and human rights is difficult to think without (...) human needs." Social services – a key term for social policy – it is difficult to be understood in isolation from the needs of individuals and groups. In this spirit, the literature points to the following characteristics of social services (Junczyk, Thiessen, 2013, p. 377):

- are actions taken directly to satisfy human needs and not rely on the production of material goods,
- serve to satisfy the needs of individuals and families, but their quality and availability have an impact on the functioning of the broader community and social groups,
- may be financed, organized and delivered by both public and private,
- derived not equivalent, partly or full payment.

Firstly, commenting on the mentioned features, it is a direct, independent or interdependent with the beneficiaries of services, creation of material goods by the service provider, but with some exceptions – such as social housing, distribution of free drugs through corporate foundation in the pharmaceutical industry. Secondly, we would recognize that it is important to expect the same impact on the wider community as a basis for action, which in itself does not determine the action that focuses on the individual as the content of social services. Thirdly, it is worth emphasizing that today interdependence between private and public sector with emphasis on the role of civil society, which is often intertwined measures and organizes the service.

Staying within the meaning of social services from the perspective of „needs" B. Szatur-Jaworska acknowledges that the real division of social services are (Grewinski, Skrzypczak, 2011, p. 15):

1) economic functions:
   - reproductive function (improving the quality of human capital as a factor of production),
   - motivating function (consumption of social services to improve the quality of work, as it increases consumer aspirations);
2) social and humane functions:
   - keeping a human in good health conditions,
   - expansion of his knowledge and skills,
   - stimulation of spatial mobility and social mobility of individuals,
   - shaping and dissemination of new needs,
   - influence the value systems of people, their motivations and behaviours.

It should be noted that in modern Poland potential problems can be observed and diagnose many concerns about the quality of social services. Identified a number of problems in this area concerns:

1. Reading the stuff (challenges) of activation of the society as a framework for the creation of social services.
2. Definition of the purposes of the services (the primacy of the administrative and institutional goals over the substantive in the implementation of social services – this applies across sectors).
3. Multidimensional deception activities of services (similar levels of analysis, as indicated by Dobroniega Trawkowska in the context of social work).
4. Disputes about the responsibility – the citizens of the state versus the concurrent deficits in a model of cooperation within and between public sector bodies, private and civil.
5. Discussing the problem of efficiency versus effectiveness of social services (efficiency „economic" and „social") – particularly important for social policy.

Finally, **the second proposal of the social services interpretation makes them involved in social prevention and treatment as a base for social policy**. Social services in this regard is a multisectoral offer enables individuals and groups to increase opportunities for additional resources, very commonly contact with the institutions of social life and realigning the opportunities to enjoy the rights. If, therefore, we find the threat of „deep" poverty (understood objectively and measured in an absolute way) and/or social exclusion are the main problems, advisable definition captures the essence of social services for the first of the identified problems (here are important services that increase resources) and the second problem (resources + participation + rights). As outlined issues in the above definitions:

1) creation, control and satisfy the needs and
2) increasing the resources available to the institutions and the possibility of exercising rights in practice lead to a transformation based on responsibility, which we consider to be the essence of the subject which offer social services (Gagacka, Głąbicka, 2009, p. 28).

The organization of social services is subject to the subsidiarity principle and is derived from the fundamental principle of „help for self-help." It is characterized by priority to assist the individual in the family, and if the family members cannot help to each other, different non-governmental organizations and local bodies implementing social policy are considered.

Researchers of the social services issue indicate different approach of social services „division". Based on the two possible sides of social services, it can be concluded that these services are divided into: 1/stimulation and control of needs; 2/satisfy the needs (and help in satisfy the needs) and are realized in the following areas (fields) (more in: Evers, Heinze, Olka, 2013):

– social security (social services – including public and social housing services),

– upbringing/education/ professionalism (educational services – including rehabilitation, training services),
– protection and promotion of health (health services and health education, sanitation and treatment – including psychological, psychiatric and rehabilitation),
– culture (culture services),
– sport and leisure (leisure services).

A. J. Kahn and S. Kamerman offer two ranges of social services (social services):

– **Range 1**/ services, which due to the large scale and complexity granted autonomy, and therefore are not often considered as part of social services (education, health, public housing construction),
– **Range 2**/ other social services, is an area with smooth borders and covering both programs „independent" (public childcare, family support) as well as those located in other institutions (schools, social work, social work in health care, social services housing programs, assistance programs in the workplace, etc.)

The social services include:

– service Activation,
– social and professional reintegration,
– services of the social economy,
– nursing services,
– health care services.

On the basis of the prior current state of art presented on the theory of social services art presented, the project will focus on practical terms, the importance and the role of social services in the twenty-first century. Social policy has a double meaning: as a science (theory) and practice (activity). The aim of the project is to show the social policy in the practical sense as an activity undertaken by the state, local governments and civil and commercial entities (to some extent), aimed at transferring to the public about the specific needs of social services. This assumption is illustrated by the following table (Głąbicka, 2014):

AREAS	SOCIAL SERVICES
Disease	Health care, public health, safety and hygiene, nursing and care
Disability	Rehabilitation: vocational, social, pedagogical, psychological and home care
Old age	Help with daily functioning, nursing and care
Family member's death	Holding a funeral, psychological help
Family, children	Education, family counselling, foster family, nursing and care
Unemployment	Job intermediary, career counselling, training, education
Housing	Providing shelter for the homeless, cut rents
Social exclusion	Social work, rehabilitation

Nowadays, bodies implementing social policy often benefit from the support of a civil society (NGOs – non-governmental organizations) and the market for the production and delivery of social services.

They should be primarily used in the areas and sectors of the labour market, family policy, early childhood education and care, social work, care for the elderly, people with disabilities, social services aimed at the public and in the household. The project aims to prove that the social services sector will be the largest area of job creation, and will be in great public demand for such services.

Conclusion

In the current literature and incremental research social services were not seen as a category of social policy, but as a sector of the economy. An important novelty is to prove that the development of social services is becoming a new paradigm in the active social policy. This is due to the fact that the development of activation services, social and professional reintegration, social economy of care, nursing, changing the traditional perception of social policy as the activities in the redistribution of financial transfers for the benefit of social services (from passive to active and activating social policy) (Rymsza, 2013).

In this issue, a new approach to the classification of the subjects of social policy become established to which, apart from state institutions (local and central government), will join civil society and market subjects.

Nowadays, bodies implementing social policy often benefit from the support of a civil society (NGOs – non-governmental organizations) and the market for the production and delivery of social services. They should be primarily used in the areas and sectors of the labour market, family policy, early childhood education and care, social work, care for the elderly, people with disabilities, social services aimed at the public and in the household.

In the future the social services sector will be the largest area of creating new work places and in great public demand for such services. They are responsible not only for marginalized people, but also for the growing middle class that is able to contribute to the received costs of social services (eg. child care, elderly or health and support a healthy lifestyle).

The society of the twenty-first century is a society of services, who primarily works in the broad sense services and provides multiple services. This public service will require various types of social services, responding to new problems and needs. long to demonstrate that there will be a new growing demand for social services in the twenty-first century.

For the last decades the socio-economic alternation generate a great demand for new services. Firstly, they are associated with the progressive demographic processes (decrease in the number of birth and a simultaneous increase in life expectancy), leading to an increasing participation of older people in the population, changes in family structure, the increase in women's activity in the labour market create a de-

mand for care services for children and the elderly. Secondly, the process of globalization, migration, pluralization of lifestyles, but also social problems, increasing social inequality, the existing unemployment pose new challenges for social policy and social service needs in the field of social inclusion and social work support activation measures on the labour market, human and social capital investment.

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Katarzyna Brożek[1]

FINANCIAL STANDING OF POLISH ENTERPRISES

Abstract

Analysis of financial results and selected indicators of enterprises in sixteen Polish voivodeships is the key element of this paper. The figures are obtained from publications by the National Office for Statistics – Local Data Bank – and a report by the Polish Agency of Enterprise Development.

The objective of this article is to present the financial condition of enterprises operating in the Polish market.

The analysis implies the position of Polish enterprises continues to indicate a satisfactory financial standing of such entities. In respect of territorial divisions, the Mazovian voivodeship has been an undoubted leader for several years, followed by Silesian and Greater Poland regions. Enterprises active in less urbanised voivodeships: Opole, Podlaskie, and Lubusz, rank lowest in this regard.

JEL Classification Code: **F30**.

Keywords: analysis, finances, enterprises.

Introduction

A contemporary entrepreneur must take environment fluctuations into consideration. Awareness and ongoing monitoring of asset and finance positions are extremely important factors in efficient running and management of businesses. They provide a range of relevant information on both the past and current asset and finance positions of an enterprise, prospects of its development and possible threats. Lack of appropriate identification or clear response to changes in environment of an enterprise may result in making wrong or delayed decisions which can severely aggravate financial standing of a business or, in the worst case scenario, lead to interruption of its operations.

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Share of SMEs in generation of GNP

The systemic price of cyclic fluctuations of an economy is as a rule illustrated with changes of the macroeconomic indicator of gross national product, that is, the value of goods and services produced for purposes of final consumption and investment in a given period of time, adjusted with the balance of exports and imports (Bień, 2009, pp. 23-24).

Based on figures published by the National Office for Statistics, enterprises in Poland can be said to generate approximately three quarters of the Polish gross national product. The 2011 result of 71.8% (after a minor drop of the share in 2010) may be a sign of returning to the growth trend experienced between 2006 and 2009 (inclusive). Analysing the structure of enterprises' share in the GNP, it can be concluded that small and medium-sized enterprises generate every second zloty (47.3%) while the largest firms earn almost every third penny (29.4%). The share of medium-sized businesses is three times lower (10.1%) and of small firms four times lower (7.8%) than of micro-firms. The share of the largest businesses in GNP generation had risen in 2011 since the year before, with the share of micro and medium-sized enterprises dwindling and that of small businesses remaining on a comparable level.

Chart 1 and Table 1 below present shares of enterprises, divided according to numbers of workers, in generation of the GNP (PARP, 2013, p. 16).

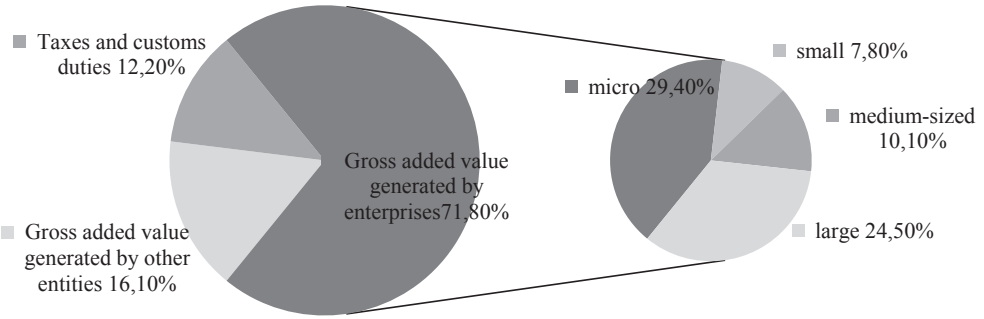

Chart 1. Shares of enterprise groups as per numbers of workers in generation of the GNP in 2011

Source: *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2011-2012*, PARP, Warsaw 2013, p. 16.

A dramatic reduction of the foreign trade deficit was the factor that nonetheless provided for a positive growth of the GNP by imports declining faster than exports in 2009. The marked decline of imports was a result of a high dependence of Polish exports on imports, weakening domestic demand and depreciation of the Polish currency's exchange rate, among other factors (PARP, 2010, p. 13).

Table 1. Shares of enterprise groupings, according to numbers of workers, in generation of the Polish GNP in 2004-2011

Year	GNP (PLN m)	Gross added value generated by enterprises (%)						Gross added value by other entities (%)	Customs duties and taxes (%)
		total	SME				large		
			total	micro	small	medium-sized			
2004	923 248	70.5	48.6	31.0	7.6	10.0	21.9	18.3	11.1
2005	983 302	70.3	47.8	31.5	7.4	8.9	22.5	17.8	11.9
2006	1 060 031	70.7	47.8	31.0	7.4	9.3	22.9	17.2	12.2
2007	1 176 737	70.8	47.3	30.4	7.2	9.8	23.5	16.7	12.5
2008	1275 432	71.1	47.2	29.9	7.4	9.9	23.9	16.5	12.5
2009	1 343 366	72.3	48.4	30.4	7.9	10.1	23.9	16.5	11.1
2010	1 416 447	71.6	47.6	29.6	7.7	10.4	24.0	16.5	11.9
2011	1 528 127	71.8	47.3	29.4	7.8	10.1	24.5	16.1	12.2

Source: *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2011-2012*, PARP, Warsaw 2013, p. 16.

Number of entities active in the enterprise sector

Numbers of small and medium-sized enterprises in Poland heave steadily increased since the early 1990s. The rate of this growth has been markedly declining since the beginning of the current decade, particularly in the private sector, however. Both the systematic rise in numbers of businesses removed from records over subsequent years and falling numbers of newly registered entities have been the contributing factors (Chmiel, 2005, p. 17).

An examination of the enterprise sector should take into account the total number of enterprises and their structure in the individual voivodeships in 2003-2012 (Table 2). Numbers of enterprises decreased by 3%, namely, 49761 entities in 2003-2005 (from 1726536 in 2003 to 1676775 in 2005), to climb by 8% in 2006-2008. To be precise, 1714915 businesses functioned in 2006 and 1862462 in 2008, producing an increment of 147547 entities. Their number dwindled by 188935 in 2009, though, to rise steadily since 2010 and reach the maximum level of 1794943 in 2012 (with the exception of 2008, when numbers of enterprises were the highest during the ten periods under study).

In regional terms, the maximum average number of businesses operated in: Mazovian, Silesian and Lesser Poland voivodeships, the reverse being true for the following provinces: Opole, Podlaskie, Lubusz, and Świętokrzyskie.

Table 2. Numbers of enterprises in Poland and the particular voivodeships in 2003-2012

Territorial units	Enterprises in total									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	–	–	–	–	–	–	–	–	–	–
POLAND	**1726536**	**1714983**	**1676775**	**1714915**	**1777076**	**1862462**	**1673527**	**1726663**	**1784603**	**1794943**
Łódź	121127	120076	119943	116521	121462	129259	109139	115988	119348	121334
Mazovian	272931	270802	277386	278756	300840	294582	277593	285398	294064	305998
Lesser Poland	149319	147267	139817	150244	159591	168555	148358	157841	165107	163176
Silesian	219876	218428	214169	209137	192679	236932	198827	201392	207947	210639
Lublin	72597	74074	74301	74163	77670	71141	70663	73267	76448	76196
Subcarpathian	68103	64485	65344	66968	69770	75202	63312	68812	74163	70430
Podlaskie	44415	41531	40135	42345	45558	47732	40202	41733	44572	43197
Świętokrzyskie	48051	47728	41697	46117	46603	49643	45455	47305	50101	47492
Lubusz	44518	44093	43151	46645	47797	44800	43651	44503	46101	45142
Greater Poland	169043	173112	165652	169516	178344	189334	171831	175102	181408	183667
West Pomeranian	96845	97731	95821	98166	96333	106176	90329	90177	90428	89943
Lower Silesian	135586	134306	119246	129370	140895	135901	130688	135821	138449	145106
Opole	37107	36054	36612	37215	39253	39844	37128	36748	37541	36548
Kuyavian-Pomeranian	84009	78937	79632	80715	88676	84043	81795	85520	85682	87043
Pomeranian	111268	116104	108110	110711	114993	129740	110577	111509	119362	116185
Warmian-Masurian	51741	50255	55758	58327	56613	59579	53980	55548	53882	52847

Source: the author's own compilation based on the Local Data Group, sub-group: Enterprises and workers categorised by entity size.

Numbers of workers in enterprises in 2003-2012

This part of statistical research focussed on numbers of enterprise workers both in total and divided into the sixteen voivodeships (Table 3). The growing number of personnel in enterprises is a fact (Wolak-Tuzimek, 2010, p. 124). It was rising steadily between 2003 and 2009, to decline from 9494002 in 2008 to 8829934 in 2009, which amounted to a drop by 7% or 664068 individuals. It was rising again since 2010 (by 29119 over 2009 and by 169483 from 2010), though, to fall by 91183 employees in 2012.

In 2012, most enterprise workers were recorded in the Mazovian (almost 2 million) and Silesian (a little more than a million) voivodeships, with fewest enterprise staff in: Opole, Podlaskie and Lubusz regions.

Table 3. Total numbers of enterprise employees in 2003-2012 as split into individual voivodeships

Territorial unit	Total workers									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	persons	persons	persons	persons	persons	persons	persons	persons	persons	persons
POLAND	**8139235**	**8160688**	**8287502**	**8556132**	**8969302**	**9494002**	**8829934**	**8859053**	**9028536**	**8937353**
Łódź	526159	516508	531930	525909	564568	585298	542268	552001	560723	547169
Mazovian	1692936	1715009	1780538	1859794	1953613	2120162	1896184	1895997	1926637	1918311
Lesser Poland	650829	652432	662193	683207	717307	773362	734360	754356	770876	746753
Silesian	1135948	1140961	1133706	1140685	1138397	1261021	1180358	1167474	1189420	1180319
Lublin	297043	296537	307152	309766	316022	326124	319579	329184	338463	329815
Subcarpathian	336133	331309	335496	345843	366361	390695	352206	360483	366411	354206
Podlaskie	176220	169592	169798	171760	182317	189857	171362	171151	178224	174721
Świętokrzyskie	201712	196625	192129	198126	214210	220982	206662	206516	213762	205886
Lubusz	186020	186556	184753	201929	209792	207487	197641	202258	200592	194575
Greater Poland	767326	790905	799009	831559	899366	940112	903558	910188	934532	950804
West Pomeranian	327515	312723	330564	346527	349462	368943	324727	322511	328816	326816
Lower Silesian	613945	641324	622864	661510	708471	702504	697903	692784	707544	718182
Opole	170346	168912	174901	171858	183419	185759	175826	172683	176915	167819
Kuyavian-Pomeranian	379728	366248	367213	376635	407264	413940	400691	396506	402806	399579
Pomeranian	448953	449372	459760	485556	511786	553520	491319	489222	498951	489464
Warmian-Masurian	228422	225675	235495	245468	246946	254237	235291	235740	233865	232932

Source: the author's own compilation based on the Local Data Group, sub-group: Enterprises and workers categorised by entity size.

Revenue generated by enterprises across Poland and in particular voivodeships in 2003-2012

With regard to another indicator, values of revenue earned by all enterprises and enterprises in individual areas (Table 4) were steadily increasing from the first period under analysis. The situation changed dramatically in 2009, however, since the revenue exceeded PLN 3 bn in 2008 and PLN 1.7 bn in 2009, tantamount to a fall by as much as 46% or PLN 1.4 bn. The revenue was rising gradually after 2009, nonetheless, it failed to even approximate the 2008 levels by 2012, when it reached more PLN 2bn.

A comparison of all the Polish voivodeships implies the highest revenue was generated by enterprises based in the Mazovian region, totalling nearly PLN 540 mld in 2012, followed by the Silesian region with a half lower result of around PLN 252 mld, and Greater Poland – more than PLN 214 mld. On the other hand, entrepreneurs operating in the following voivodeships: Opole – above PLN 40 mld, Lu-

busz – ca. PLN 41 mld, Świętokrzyskie - approx. PLN 44 mld, and Podlaskie – more than PLN 44 mld – cannot be satisfied with their revenue.

Table 4. Revenue attained by enterprises in Poland and the individual voivodeships in 2003-2012

Territorial units	Total revenue									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m
POLAND	**1951154**	**2193125**	**2264420**	**2558711**	**2887730**	**3213835**	**1773333**	**1857936**	**2050260**	**2084177**
Łódź	93680	99869	108808	117178	137641	143939	94219	102292	107839	111816
Mazovian	593079	662641	698167	802409	893876	1021960	457272	479738	529438	538166
Lesser Poland	148792	172239	173965	206516	221409	246405	134542	157936	173987	174033
Silesian	271162	304633	289038	312538	346530	401637	232878	225811	255208	252475
Lublin	54138	58523	62485	81518	86608	81594	58813	60110	71468	70969
Subcarpathian	60887	65882	70478	75211	86503	98554	59199	62064	70790	68974
Podlaskie	39847	44081	46865	47539	54273	57579	38295	40010	43302	44700
Świętokrzyskie	41857	47097	46199	50247	59761	66920	40046	43735	44370	44236
Lubusz	34205	38955	38329	43006	51753	52847	43737	36917	40391	41215
Greater Poland	184968	217823	216529	241411	289959	312221	175695	192669	203109	214106
West Pomeranian	57570	63494	70051	73939	84899	107602	67762	67602	74217	77488
Lower Silesian	122373	137425	146138	169465	197629	211905	114176	119917	133242	138004
Opole	34399	39355	40230	41059	49401	53880	33421	36619	40230	40917
Kuyavian-Pomeranian	73484	78826	82784	93736	107136	117444	75410	78807	87796	96834
Pomeranian	101310	118586	127934	151743	165657	181177	108712	113335	129576	124406
Warmian-Masurian	39403	43694	46418	51195	54694	58171	39155	40374	45296	45837

Source: the author's own compilation based on the Local Data Group, sub-group: Revenue and costs of small and medium-sized enterprises.

Costs incurred by enterprises across Poland and in particular voivodeships in 2003-2012

An analysis of revenue earned by enterprises simply must be followed by the other side of the coin, that is, the costs they incur. Statistics concerning the subject matter are collected in Table 5. Like revenue, costs were rising in each period under study till 2009, when they fell substantially. They had exceeded PLN 3 bn in 2008 to reach about PLN 1.6 bn the following year, which corresponds to a reduction of costs by appropriately PLN 1.4 bn or 45%. The trend of earlier years resumed in the subsequent periods: costs commenced to rise to range about PLN 1.9 bn in 2012, not extremely high if compared to cost levels in 2004-2008. The same applied to

voivodeships, parallel with the case of revenue. Namely, maximum costs were borne by entrepreneurs based in the Mazovian region (more than PLN 505 mld), followed by Silesian (ca. PLN 236 mld) and Greater Poland (about PLN 197 mld). Enterprise costs were lowest in: Lubusz (above PLN 34 mld), Opole (ca. PLN 38 mld) and finally in Świętokrzyskie (more than PLN 40 mld) voivodeships, on the other hand.

Table 5. Costs incurred by enterprises in Poland and the individual voivodeships in 2003-2012

Territorial unit	Total costs									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m
POLAND	**1855483**	**2040831**	**2113860**	**2381151**	**2660974**	**3002038**	**1633084**	**1687878**	**1904113**	**1934277**
Łódź	88437	93226	101793	108864	126661	132524	86888	91010	98904	102829
Mazovian	572397	617022	652002	751944	829323	972711	422730	437214	502789	505676
Lesser Poland	142361	162466	162091	193563	204945	229503	122487	138852	159312	160836
Silesian	252081	281089	269063	290811	318111	377826	216740	209672	238032	236788
Lublin	51497	54801	58729	74627	80068	75734	54235	53775	66824	65895
Subcarpathian	57981	61586	66711	70194	79622	92484	54720	57765	65286	64348
Podlaskie	37605	41644	44338	44569	50302	53677	35407	35757	39995	41461
Świętokrzyskie	39828	44589	43395	46182	54052	61020	36774	38246	40729	40329
Lubusz	32490	36114	35675	39833	47537	49653	40184	33601	36675	37417
Greater Poland	175650	203326	202944	224573	267576	292109	162173	177383	188724	197751
West Pomeranian	54528	59498	65762	68840	77927	87058	62110	61023	67775	70948
Lower Silesian	116011	126909	134946	154657	178989	195650	104457	108036	121525	128103
Opole	32880	35470	36858	37432	44532	47994	30679	33517	37129	38321
Kuyavian-Pomeranian	69543	72835	77605	86257	98834	109454	69356	72453	80733	88671
Pomeranian	95553	110144	119093	141573	152132	170740	98385	103024	118467	113051
Warmian-Masurian	36643	40113	42855	47232	50362	53902	35757	36549	41213	41854

Source: the author's own compilation based on the Local Data Group, sub-group: Revenue and costs of small and medium-sized enterprises.

Total investment spending in 2003-2012

The value of investment expenditure in Poland (Table 6), which increased regularly after 2003 (when it totalled PLN 77mld) to reach approx. PLN 160mld in 2008 – which means a growth by as much as 110% in that period - is another excellent characteristic of the businesses studied. The spending collapsed in the following year (2009), falling by more than PLN 16 (10%). 2010 saw another drop of these expenses, this time by around PLN 1.8 mld (2%). It was only in 2011 that the investment expenditure rose substantially to regain levels comparable to those in 2008, namely,

above PLN 161 mld. The declining trend recurred in the most recent period under analysis, 2012, however, when the spending amounted to ca. PLN 154 mld. 2011 witnessed maximum and 2003 minimum investment expenses during the decade under discussion.

As far as investment expenditure by Polish voivodeships is concerned, Mazovian region performed best (in 2012 – over PLN 44 mld), followed by Silesia (more than PLN 20 mld). Some other voivodeships gained satisfactory results, even though falling behind the two leaders: Greater Poland spent approximately PLN 15 and was followed by Lesser Poland (about PLN 12 mld) and Lower Silesia (above PLN 11 mld). On the other hand, the following voivodeships experienced the lowest values of investment spending in 2012: Lubusz (approx. PLN 2 mld), Warmian-Masurian (around PLN 2.3 mld), then Opole (around PLN 2.4 mld) and Podlaskie (ca. PLN 2.6 mld).

Gross fixed assets of enterprises in 2002-2012

The penultimate section of this analysis focuses on gross values of fixed assets in enterprises in 2002-2012 – as illustrated in Table 7. Values of fixed assets in Poland were rising from the first year under examination. For instance, they exceeded PLN 899 mld in 2002 to grow by 70% or above PLN 1.5 bn ten years later.

Enterprises in the Mazovian voivodeship noted the maximum value of fixed assets (around PLN 383 mld), followed by Silesian (approx. PLN 219 mld) and Greater Poland (nearly PLN 140 mld in 2012). Minimum values of fixed assets were observed in enterprises based in the following regions: Podlaskie (more than PLN 27 mld), Warmian-Masurian (ca. PLN 33 mld), Lubusz (above PLN 33 mld), and Opole (nearly PLN 35 mld).

Overall business revenue in 2005-2013

The final part of the survey of Polish entrepreneurs focuses on their overall business revenue earned in 2005-2013. Like with regard to the preceding indicator, this one rose with each period under analysis. Table 8 summarises overall business revenue of Polish enterprises. In 2005, for instance, it exceeded PLN 1.3 bn to nearly double in 2013 (almost PLN 2.4 bn), which constitutes an increase by 85% over 2005.

As far as the total business revenue for individual voivodeships in 2012 is concerned, Mazovian region is the unquestionable leader with a result of approx. PLN 823 mld, with Silesian voivodeship (more than PLN 281 mld), Greater Poland (above PLN 271 mld) and Lower Silesian voivodeship (above PLN 168 mld) following. Meanwhile, the minimum revenue was generated by enterprises operating in regions of Lubusz (with a result of about PLN 31 mld), Opole (more than PLN 31 mld) and Warmia-Masuria (almost PLN 32 mld).

Table 6. Total investment spending in 2003-2012

Territorial units	Total investment spending									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s
POLAND	**77397492**	**90391581**	**99972267**	**114339695**	**144279595**	**160539606**	**143750556**	**141938802**	**161240144**	**154852864**
Łódź	3465900	4714663	5652185	6269859	9508108	10844337	8893025	9327061	9606925	8942798
Mazovian	24649424	28400533	34097163	34522351	42321331	47792509	42671282	40932064	45960046	44743437
Lesser Poland	5632276	6098824	6597447	8604904	10351530	10962825	9298588	9564366	12228703	12075563
Silesian	9409322	9921174	10923776	13933583	18384344	18989402	17103017	15278009	20038048	20295087
Lublin	1897365	2022470	2227469	2491612	3138730	4005854	3983943	4873404	6000951	5410097
Subcarpathian	2438156	2928993	2975654	3315182	4291409	4816335	3943101	4212003	4996369	4733282
Podlaskie	1128282	1410980	1596402	2020104	2454595	2662534	2103275	2177875	3272900	2549259
Świętokrzyskie	1327903	1835567	1937603	1882145	2997615	4023382	3482799	3765811	3728262	3607745
Lubusz	1690354	1562103	1481950	1743292	2684725	2903414	2202072	2162726	2276308	2236330
Greater Poland	8850650	9957706	8639712	10338652	12373589	14448232	11881966	15110768	16935529	15241096
West Pomeranian	2200179	3505371	3318829	4207275	5211439	6020882	4367024	3832707	4107063	4676038
Lower Silesian	6017209	7455012	8345952	10500246	11932658	11551032	10221812	11233934	11711464	11751703
Opole	1411029	1595848	1539905	1470894	2152353	2161125	2335723	2414969	2529122	2342369
Kuyavian-Pomeranian	2576928	3120564	3231561	3723218	4964773	6192552	5540857	4860567	5037667	4404104
Pomeranian	3299059	4277348	5303053	6555414	8699510	10379467	13420441	9627276	10019706	9552403
Warmian-Masurian	1403456	1584425	2103606	2760964	2812886	2785724	2301631	2565262	2791081	2291553

Source: the author's own compilation based on the Local Data Group, sub-group: Investment expenditure categorised by enterprise size.

Table 7. Gross fixed assets in enterprises in 2002-2012

Territorial unit	Total value of fixed assets										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m
POLAND	**899429,5**	**933388,2**	**979284,5**	**1014378,6**	**1055019,7**	**1143537,6**	**1232331,9**	**1310583,5**	**1372637,5**	**1467706,3**	**1542128,4**
Łódź	49231,7	52285,4	55252,3	59346,7	63059,2	66752,4	72475,9	77118,0	74005,2	85591,4	91857,8
Mazovian	229237,8	241830,6	253870,2	264431,5	266594,9	288682,2	310677,8	331925,3	355165,4	376356,1	382910,1
Lesser Poland	61671,9	63305,7	65376,9	67484,0	68735,7	75515,3	82770,5	88032,9	91444,3	97027,8	103863,5
Silesian	136395,4	136987,7	140997,8	144290,9	153724,0	163850,1	174582,2	186164,3	193316,5	205999,1	219219,8
Lublin	28395,9	30113,2	31478,3	32271,9	33195,3	33741,0	36397,7	37296,1	39298,9	42413,0	46364,7
Subcarpathian	30870,8	31851,4	33513,8	34836,2	36556,9	41196,6	45024,9	46749,8	48532,5	51518,6	53462,3
Podlaskie	16764,5	17551,3	18576,6	19079,9	20041,9	21500,6	23200,6	24272,7	25034,6	26494,1	27589,0
Świętokrzyskie	22899,2	22124,9	22802,0	23081,9	23640,8	24080,5	26094,9	28078,4	28688,1	32169,6	36146,1
Lubusz	17549,4	18113,1	20508,1	21109,5	23013,4	27049,5	27523,1	29809,8	30473,3	32189,2	33099,1
Greater Poland	70291,7	77298,6	83986,4	87940,4	93624,3	100579,5	109116,5	116585,9	121427,3	128440,4	139692,9
West Pomeranian	34700,1	36503,5	37448,2	37522,6	39102,3	42405,9	44652,3	48729,7	50875,9	51036,2	53843,7
Lower Silesian	67041,3	71443,3	76250,2	81183,6	85520,6	96415,1	107944,7	113846,5	118199,3	124066,7	132235,4
Opole	25878,6	26564,8	26341,8	27018,4	27570,9	30315,7	29693,9	32419,7	35972,2	34887,4	34812,8
Kuyavian-Pomeranian	35907,5	37713,7	39376,4	38472,6	40560,5	43297,3	46959,3	51204,9	55520,3	64310,1	66385,7
Pomeranian	53586,2	49585,1	51973,2	53832,1	57493,8	63167,2	67297,4	70183,6	75078,1	83233,7	87615,5
Warmian-Masurian	19007,5	20115,9	21532,3	22476,4	22585,2	24988,7	27920,2	28165,9	29605,5	31972,9	33030,0

Source: the author's own compilation based on the Local Data Group, sub-group: Gross values of fixed assets in enterprises.

Table 8. Overall business revenue in 2005-2013

Territorial unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s	PLN '000s
POLAND	**1314630588**	**1497784563**	**1716629919**	**1905751830**	**1932978346**	**2029730829**	**2294301870**	**2383226666**	**2392594153**
Łódź	51263368	56821590	68681677	75504916	78755284	84085903	95864377	102495779	102641038
Mazovian	468086714	529327501	596488084	671611138	681708549	705160583	790813054	823987330	823481434
Lesser Poland	96319341	112689673	127789818	139729121	139378059	143437197	164626437	170359929	167164756
Silesian	173684131	194078722	221875374	240212366	239616861	252811567	289118172	287662919	281906807
Lublin	27235867	29655391	46220074	50886127	41355679	45426506	54757668	54846507	54946913
Subcarpathian	35138898	39997350	44323611	48751282	47641371	62431151	68734217	71964980	73048039
Podlaskie	22900463	24761722	29049001	30801762	32087519	29420526	31297123	31923953	33204316
Świętokrzyskie	26776214	30195938	34771261	38621417	36837407	37972906	39558452	39262613	38974957
Lubusz	17626146	19581070	22116577	23653448	27011465	29895795	31084429	30256068	31042620
Greater Poland	132336287	148305870	169300562	190809171	203954925	212268593	239361700	256357904	271571240
West Pomeranian	27147747	29571488	33655710	37161545	38567642	37725245	43256137	42811730	44972802
Lower Silesian	81312017	99254143	116382951	126991100	133671734	147175948	160622665	168701768	168599155
Opole	20810071	22899375	26204642	30338886	29063108	27082669	29800486	31544853	31309382
Kuyavian-Pomeranian	44839246	49974886	60441577	66299210	67301279	74877591	82081057	83508752	84430232
Pomeranian	69586551	88696698	93144366	106983482	109545288	112710340	142356946	156064242	153335565
Warmian-Masurian	19567527	21973146	26184634	27396859	26482176	27248309	30968950	31477339	31964897

Source: the author's own compilation based on the Local Data Group, sub-group: Financial performance as per PKD 2007 sections.

Conclusion

Enterprises play major roles in economies of highly developed countries. They provide substantial income to central and local budgets, contribute to gross national products, create new jobs, drive social and functional changes of their areas (regions, voivodeships, communities). Enterprises also have significant impact on emergence and development of economic innovations.

Growth of the Polish economy, reflected in falling unemployment, increasing international competitiveness and improving social mood, among other factors, is indissolubly linked to growth of the enterprise sector. Therefore, attitudes and policies of governments, which should aid enterprise development by e.g. simplifying legal regulations, changing of tax systems, improving access to sources of financing, supporting new technologies and e-business applications, are of key significance. Educational assistance, including all kinds of training on entrepreneurship and other areas required for effective and reasonable business management, is of paramount importance as well.

Recent years have been characterised by a number of fluctuations relative to development of the enterprise sector.

The US and Eurozone economies collapsed in 2009 in effect of a global financial crisis. The crash also slowed the rate of economic growth in Poland: the domestic demand and investments declined, unemployment rose, dynamics of household income stalled, which slowed private consumption as a result.

A survey of enterprises by the Polish Confederation Lewiatan indicates entrepreneurs have managed to survive the crash by: a distinct persistence, quality of their products and services, opening to foreign markets and cautious taking of credits.

Numbers or even the contribution of enterprises to the GNP indicate they build a solid core of the economy which does not guarantee spectacular development effects yet lays foundations for regular socio-economic growth.

It should be noted that enterprise rankings have been stable, without any decisive shifts, in respect of status of individual regions in recent years. Mazovia has clearly ranked top, though Greater Poland, Pomerania and Silesia have maintained their leading positions as well. The lowest ranges have also been in comparable circumstances, occupied by more poorly urbanised voivodeships: Subcarpathian, Lublin, Warmia-Masuria, Lubusz, Podlaskie, and Świętokrzyskie.

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CULTURE – IMPORTANT FACTOR FOR TOURISM DEVELOPMENT TOWARDS ECONOMIC GROWTH OF THE COUNTRY

Abstract

Cultural potential of the country can be an important factor in its economic development. The underlying assumption of using cultural potential for the development of cultural tourism is maintenance of buildings and objects of cultural heritage in good condition, their professional presentation and access to a general public.

The aim of this paper is to highlight the fact that culture can play an important role in economic and social development of Slovakia and strengthen its competitiveness in the coming years. On the basis of secondary data it is necessary to analyze selected indicators of the Slovak economy towards residents of the country and also to highlight the development of tourism indicators, which greatly affect the country's economy.

JEL Classification Code: **L83**.

Keywords: Culture, cultural tourism, funding of culture, tourism.

Introduction

The Slovak Republic has got a huge cultural heritage. Cultural heritage lies in the cultural level of the Slovak nation, national minorities, ethnic groups and individuals, who live or previously lived in its territory. An important role in the culture plays a traditional folk culture with its tangible and intangible products of human activity transferred from generation to generation. The progress of cultural tourism in Slovakia should primarily offer tangible as well as intangible elements of culture

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specific for individual regions in order to increase prosperity of the country and the people living in it.

1. Culture – the driving force of tourism

According to the definition adopted by UNESCO, Culture is „a complex of specific spiritual, material, intellectual and emotional features of society or social group, which includes along with art and literature also a common way of life, life style, value systems, traditions and beliefs." (Dvorsky, 2006).

„Visitors are inclined to accept and believe what their culture tells them regardless of objective validity and to bloc or ignore anything that is contrary to their culture, or in conflict with faith." (Gúčik et all, 2011).

Accordingly, it is appropriate if the tourist destinations adapt to the cultural and social habits of fundamental values resulting from family traditions, habits and customs. From this perspective, cultural tourism is a form of tourism focusing just on learning about the history, culture, traditions, habits and customs of own country or foreign countries. Table 1 shows the distribution of various historical monuments.

Table 1. Cultural and historical monuments (species)

Cultural and historical monuments	
Architectural secular monuments	Citadels, castles, manor houses, buildings of folk architecture, urban conservation areas, and other cultural and historical buildings
Religious sites	Churches, monasteries, chapels, etc.
Technical works	Bridges, tunnels, dams, etc.
Artistic works and art monuments	Monuments, statues, tools, old weapons, instruments, statuary, pictures, etc.
Folklore	(cloths, art production, dwellings) – intangible origin (songs, customs and traditions, proverbs, sayings and weather lore, etc.)
Archeological sites	Sites in nature and museum collections
Historical places of fights	They are places where the fight took place in the past and are the birthplace of national history
Cultural and educational institutions	Theatres, art galleries, museums, open air museums, memorial buildings

Source: Rašl (2009), own processing

In every culture there are groups of people who have a similar system of values resulting from current experiences and situations. Tourism has got an impact on education, attitudes and values, traditions and customs, human behaviour, and forms of entertainment, etc. The education level of the population affects the demand for tourism and influences purchasing decisions of consumers. Attitudes and values of population determine what is appropriate and what inappropriate for the consumer

in their demand for tourism. Significant elements of culture make a destination on the tourism market competitive. Culture largely influences purchase behaviour in tourism.

On the supply side of tourism, in addition to natural conditions, an important recreational function is performed by preserved folk architecture, cultural and historical monuments. From the perspective of cultural tourism participants, the most important urban conservation areas in the territory of the Slovak Republic may include the capital Bratislava, Banska Bystrica, Banska Stiavnica, Bardejov, Kezmarok, Kosice, Kremnica, Levoca, Presov, Spisska Kapitula (Chapterhouse), Poprad, Spisska Sobota, Trencin, Trnava and Zilina. In the Slovak Republic there are ten conservation areas of folk architecture like Brhlovce, Cicmany, Osturna, Plavecky Peter, Podbiel, Sebechleby, Spania Dolina, Velke Levare, Vlkolinec and Zdiar, as well as 83 monument zones.

According to a survey of Eurobarometer in 2012, the culture and history ranked on the fourth place in tourism incentives. 22% of respondents who were surveyed and had possibility to choose from more answers reported that the main reason for their participation in tourism wasculture.

According to the World Tourism Organization (UNWTO) and the Global Code of Ethics for Tourism the strategies and activities in tourism should result in the interests of cultural and artistic heritage that should be preserved and transmitted to future generations. Particular attention should be paid to the preservation and spread of monuments, museums, and historic sites open to the public. (Global Code of Ethics for Tourism [online] [cited 2014-04-11].

2. Financing of culture - prerequisite for the development of cultural tourism

The main prerequisite for the cultural tourism in the country is undoubtedly the maintenance of historical and cultural monuments in terms of their technical competence, as well as organizing events towards the promotion of live culture. This, however, needs financing. There exist various forms and types of tourism. The authors or particular professions create their own definitions and categories under which they differentiate the various types and forms of tourism. In terms of sustainability we can speak of eco-tourism protecting natural and cultural heritage and maintaining a standard of living of residents in certain destination.

„We can speak of the forms of tourism when we take into account the different conditions and causes that affect it and the consequences that it carries. Types and forms of tourism are found in combination in order to optimally meet the needs of visitors to tourism„ (Orieška, 2010).

The development of tourism can be directly or indirectly associated with the use of cultural and historical potential, which constitutes of cultural heritage, cultural facilities and cultural events.

There was conducted the research in the processing of Marketing Strategy of the Slovak Agency for Tourism for the years 2011 – 2013 to examine the perception of Slovakia by the foreign visitors. The results reveal that more than 35% of the foreign visitors to Slovakia were very satisfied and 42% were satisfied. The most positive features of Slovakia as a tourist destination were: beautiful scenery and natural attractions, cultural and historical attractions, traditions and originality, relax and escape from busy life (Tourism Development Strategy to 2020).

The main prerequisite to the progress of cultural tourism in the country is undoubtedly the necessity to maintain historical and cultural monuments in terms of their technical work capacity, as well as organizing various social events towards the support and presentation of live culture in the regions. These goals cannot be achieved without funding from the state and private investors.

The Slovak Government aims to create conditions for more efficient use of funds for culture through the structural funds and community programmes of the European Union. There will be incorporated more priorities for culture (restoration of cultural heritage, reconstructions and construction of cultural infrastructure, support for education and training in the cultural sector, encouragement of partnerships among cultural sector and other sectors) via operational programmes after 2013. Successful projects of community programmes will be guaranteed by the co-financing from grant system of the Ministry of Culture of the Slovak Republic.

Financing of culture can be realized from public and private sources in terms of national, regional or local level. An important role in financing has had European programmes and funds.

Culture financing through public resources can be divided into direct and indirect funding. The direct funding is presented as a support of culture via state subsidies to ensure the public interest in the field of culture and promote the activities of cultural institutions. The indirect funding means a support for culture via tax relief through setting legal or donor environment, identifying priorities and other regulations. (Ministry of Culture, 2014)

Financial security of culture in tourism is realized by revenues from sales of its own production. Moreover, funds can be obtained from the state budget, municipal budgets, culture funds, different grants and sponsorships, various trusts and enterprising in culture, donations and cultural programmes of the European Union. (Tajtakova, 2010) Financing of culture can be done at national, regional or local level as displayed in Table 2.

Table 2. Interaction of financial instruments of the public sector to the development of culture

Public sector	National level	Regional level	Local level
Cultural institutions	National cultural institutions	Regional cultural institutions	Local cultural institutions
Own cultural activities and projects of	Ministry or other central body of state administration and the like	Higher territorial unit	Local municipality
Grant support and incentive mechanisms	Departmental grant and support system for non-state entities	Regional grant system of higher territorial unit for culture	Local grant system for culture (if applicable)

Source: Tools of cultural policy. (2011), own processing.

Indicators for the examined period and a forecast to 2015 point to the fact that the cultural tourism could develop favourably towards the Slovak residents in terms of forecasts for favourable development of the economic indicators as seen from the Table 3.

Table 3. Forecast of selected economic indicators of the SR

No.	Indicator	Reality			Forecast			
		year	2010	2011	2012	2013	2014	2015
1.	GDP, current prices	bn €	65.7	69.1	71.3	74.8	79.2	84.0
2.	Export of goods and services	%	16.5	10.8	2.2	8.2	5.9	5.3
3.	Import of goods and services	%	16.3	4.5	0.7	7.8	5.2	4.7
4.	Average monthly wage in economy (nominal growth)	%	3.2	2.2	3.4	4.3	4.7	5.6
5.	Average growth of employment according to VZPS	%	-2.0	1.5	-0.3	0.4	0.6	0.8
6.	Average registered unemployment rate	%	12.5	13.2	13.6	13.6	13.5	13.2
7.	Harmonised index of consumer prices	%	0.7	4.1	2.8	2.3	2.3	2.5

Source: Strategy of tourism development to 2020

Today, statistics indicates an aging of population and its annual growth. This should be taken into account and adapt the offer of cultural tourism to senior's segment. Seniors are in advanced economies considered an important segment of customers, and therefore they may be interesting for Slovak business environment. Senior marketing requires different approach to the use of marketing and communication tools, due to their age group, lifestyle and shared values. We cannot forget the young generation, which constitutes an important segment and is in favour of

multiple forms and types of tourism, and has a broader scope. This segment is important in terms of abundance of free time and free funds that can be used exclusively for themselves. It is necessary to focus on active travel tourism, and adapt to the requirements of foreign participants of cultural tourism creating a favourable business environment towards profitability of businessmen and the republic. The Table 4 presents development of selected indicators of tourism in Slovakia.

Table 4. Development of tourism indicators in the SR

Indicator	2003	2006	2009	2013
Average length of stay	3.6	4.0	4.3	4.8
The total number of tourists staying (in thousands)	3,373	3,600	3,900	4,300
The number of foreign tourists (in thousands)	1,386	1,450	1,570	1,710
The number of foreign visitors (in thousands)	24,984	25,900	26,500	27,200
The number of nights total (in thousands)	12,058	14,400	16,770	20,640
The ands)	4,964	5,800	6,751	8,208
Average expenditure of visitors per day in US$	46.32	52	60	70

Source: Ministry of Economy of the SR.

From the Table 4, we can assume a positive trend in the development of tourism indicators, but it cannot be considered as a satisfactory situation due to inadequate development of occupancy indicator of Slovak hotels compared to other indicators. The Slovak accommodation facilities in 2012 had one of the lowest utilization of their capacity throughout the European Union. There were only 28% of beds occupied on average. The offer of beds in accommodation facilities in Slovakia has gradually increased. In 2011, there were 17% more beds in Slovakia compared to the year 2000. The increase in accommodation capacity was registered mainly from 2000–2002, and in the period of 2006 – 2009.

Conclusion

Cultural diversity is a driving force behind economic growth through which the values are being created. Ranking of cultural tourism in the country should be stable and should be given appropriate attention in terms of financing and protection of cultural heritage, as well as support of live cultural traditions on all levels from local municipalities to the state itself whether from private or public sectors. Only under these conditions can cultural tourism meet the needs of its participants either domestic or foreign ones, which ultimately leads to economic growth of the entrepreneurial entities participating in tourism services and the state. The aim of this paper was to point out that Slovakia has much to offer to its visitors in terms of culture and cultural heritage and to stress the projected trends in its development.

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