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Development Potential of Cities in the Lubelskie Voivodship

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Abstract

The goal of the article was the analysis of the development potential of cities in the Lubelskie Voivodship based on endogenous factors. As a main research method the analytical hierarchy process was used. The method solves decision-making problems presented in the form of multi-criteria hierarchical structure. The weights of elements in each level of the hierarchy were obtained as a result of pair-wise comparisons of components constituting development potential. The development potential based on endogenous factors was divided into 5 components: human and social capital, standard of living, economic potential, the local government activity and tourism potential. In terms of development potential Lublin was at first place. The largest city in the region had the best synthetic indices in terms of human and social capital, standard of living and economic potential. The city with the best local government activity was Janów Lubelski, and the highest level of tourism was noted in Kazimierz Dolny. The development potential of cities indicated considerable diversification in groups of administrative functions (cities with powiat status, powiat cities and other cities) as well as territorial division. The lowest development potential was in cities located in the southeast part of the voivodship: Tyszowce, Łaszczów, Szczebrzeszyn, Józefów and also Annopol, Kock and Rejowiec Fabryczny. They were characterized by low transport accessibility, as well as demographic and social problems.

Introduction

One of the most important factors that affect the regional development and growth potential of cities are the endogenous resources. The growing interest in endogenous factors can be noted in a number of policy documents produced by important international organizations such as the European Union, the OECD, as well as the Polish government publications such as the National Strategy for Regional Development 2010–2020, and the National Spatial Development Concept 2030. The purpose of this article is to explore the potential of urban development based on the endogenous factors of Lubelskie Voivodship. The main research method is the Analytical Hierarchy Process.

1 Analytical Hierarchy Process

Analytical Hierarchy Process (AHP) is one of the fastest growing methods in recent years and the best known mathematical method used for solution of multicriteria decision problems (Adamus and Ptaszek 2012). It allows a better, easier, and more efficient identification and selection of criteria. Thus, AHP drastically reduces the decision cycle. The author of the method is professor Thomas Saaty (1980). He suggested the use of AHP to determine the system of weights to solve complex problems presented in the form of multi-criteria hierarchical structure (Wysocki 2010).

The starting point for solving the decision-making issue with AHP is a 4-step procedure for solution of the main problem (Saaty 2008b):

* Voivodeship — Polish administration region on the NUTS 2 level. Poland is divided into 16 voievdeships.

1. Definition of the problem and determining the scope of the knowledge needed to solve it.
2. Construction of a hierarchical structure of the problem. At the top of this hierarchy is the main objective, which is the most important decision problem a researcher is facing. One or more levels including indirect objectives are located below the main goal. They serve as supports to the implementation of the main objective. The variants of the decision-making process (scenarios) comprise the lowest level of the hierarchy.
3. Creation of a system of weights that will determine what part of the hierarchy element affects the main objective. Each element at a higher level serves as a reference point for comparisons made at the level immediately below. Calculation of weights is carried out by the 'reversible pair-wise' comparison of elements at each level of the hierarchy (Gręda and Adamus 2005). Reversibility means that when comparing parts A and B, we assign the value of a_i, then automatically we have to assume that the result of comparison B and A is the value of $1/a_i$.
4. The weights of the individual components calculated at each level of the hierarchy are used to calculate the weights (global priorities) expressing the significance of the item in relation to the implementation of the main objective.

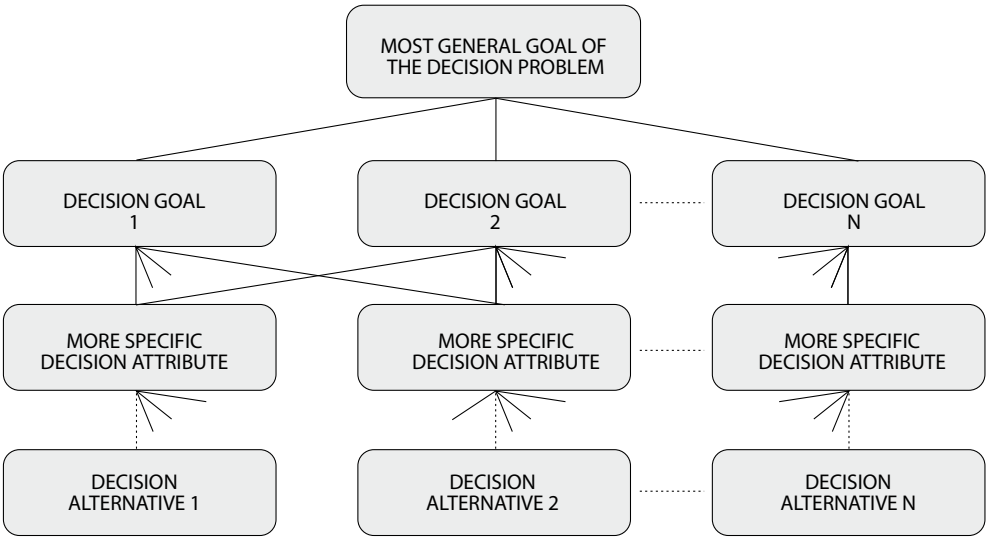

Fig. 1. A hierarchical structure of the AHP model

Source: Vinohradnik (2008)

The result of pair-wise comparison using the fundamental scale is matrix

$$\mathbf{A} = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ \frac{1}{a_{12}} & 1 & \cdots & a_{2n} \\ \vdots & \ddots & & \vdots \\ \vdots & & \ddots & \vdots \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & \cdots & 1 \end{bmatrix}, \text{ where } a_i \text{ is the result of pair-wise comparison.}$$

In the next step there is verification of whether the comparison matrix is carried out correctly. For this purpose, a consistency ratio (CR) is calculated:

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} \cdot 100\%,$$

where:

$$\mathrm{CI} = \frac{\lambda_{max} - n}{n - 1} \cdot 100\% \text{ — the consistency index,}$$

Tab. 1. Fundamental Scale by Saaty

Intensity of significance	Definition	Explanation
1	Equal significance	Two activities contribute equally to the objective
2	Weak	–
3	Moderate significance	Experience and judgment slightly favor one activity over another
4	Moderate plus	–
5	Strong significance	Experience and judgment strongly favor one activity over another
6	Strong plus	–
7	Very strong or demonstrated significance	An activity is favored very strongly over another; its dominance has been demonstrated in practice
8	Very, very strong	–
9	Extreme significance	The evidence favoring one activity over another is of the highest possible order of affirmation
Reciprocal of above	If activity i has one of the above non-zero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared with i	A reasonable assumption

Source: Saaty (2008b)

λ_{max} — maximum or main proper matrix value used to estimate consistency as a representation of preference proportionality,

n — number of columns = number of rows in the matrix,

RI — average consistency index for randomly generated pairs from the reverse matrix.

RI changes as a function with the matrix dimension. Defining the reverse matrix in the scale of 1 to 9, will generate the following average values of random indexes for the respective matrix rows (Vinohradnik 2008) (see tab. 2)[1].

Tab. 2. Random Index

Matrix row n	1	2	3	4	5	6	7	8	9	10	11	12
RI	0,00	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,49	1,49	1,51	1,56

Source: Vinohradnik (2008)

The table 3 presents the four methods to calculate the approximate value of the eigenvector. In the article the third method was used. On the basis of statistical data and weights calculated from a pair-wise comparison matrix the ranking of cities in the Lubelskie Voivodship was drawn up.

AHP evaluations are based on the assumption that a decisionmaker is rational. If the decisionmaker says criterion x is of equal significance to criterion y and criterion y is absolutely more significant than criterion w, then criterion x should also be absolutely more significant than criterion w. In the ideal case the comparison matrix is fully consistent and CR = 0. In the non-consistent case, which is more common, the comparison matrix is considered as a perturbation of the previous consistent case. It affects the result of CR which may take values other than zero. The inconsistency needs to be of a smaller order of magnitude so as to not dramatically disrupt consistency. This means it should be set at no more than 10% (Saaty 2008b). If the CR is greater than 10%

1. [In the journal (in both Polish and English texts) European practice of number notation is followed that is, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style). Furthermore in the International System of Units (SI units), fixed spaces rather than commas are used to mark off groups of three digits, both to the left and to the right of the decimal point.]

Tab. 3. The methods of calculation of the eigenvector from a pair-wise comparison matrix

No.	Accuracy	The procedure
1.	The most inaccurate	Sum up elements in each row of the matrix and normalize by dividing each sum from row by the sum of all elements in the matrix. Obtained numbers are the eigenvector of matrix **A**.
2.	Better than method 1	Sum up elements in each column and take inverses of these sums. Next normalize by dividing the inverses of the sums by the sum of all inverses. Obtained numbers are the eigenvector of matrix **A**.
3.	Good	Divide elements of each column by the sum of all columns (normalize). Add elements in each obtained row and divide by the number of elements in the row. Obtained numbers are the eigenvector of matrix **A**.
4.	Good	Multiply elements in each row and calculate the root of such a degree, how many elements exist in the row. Normalize the obtained numbers by dividing each of them by their sum. Obtained numbers are the eigenvector of matrix **A**

Source: Łuczak and Wysocki (2005)

then the judgments are untrustworthy because they are too close for comfort to randomness and the exercise is valueless or must be repeated.

The advantages of AHP over other multi-criteria methods are its flexibility and its ability to test inconsistencies. Additionally, the AHP method has the distinct advantage in that it decomposes a decision problem into parts and builds hierarchies of criteria. Therefore, the significance of each element becomes clear. The AHP method supports group decisionmaking through consensus by calculating the geometric mean of the individual pair-wise comparisons. The development potential of cities of the Lubelskie Voivodship in using the AHP method was divided into components, which are the basic level of the hierarchy. Within each of these, the subcomponents were isolated. In order to reduce the number of variables, in some cases factor analysis was used. In this way, among a number of observable statistical variables, one unobservable variable was isolated. This variable in the best possible way reflects the volatility of the components included in it. In each case, when factor analysis was applied, validity was verified by the application of the Kaiser-Mayer-Olkina test and Bartlett's test of sphericity using an SPSS application.

All variables used in the analysis were divided into two groups according to their impact on the studied phenomenon:

- stimulants — variables positively affecting the development potential of cities
- destimulants — variables negatively affecting the development potential of cities

Due to the fact that the variables are expressed in different units, the normalization procedure was applied using the following formula (Runge 2006):

$$H_{ij} = \frac{100(x_{ij} - x_{i\,min})}{x_{i\,max} - x_{i\,min}}, \text{ for stimulants,}$$

$$H_{ij} = \frac{100(x_{i\,max} - x_{ij})}{x_{i\,max} - x_{i\,min}}, \text{ for destimulants,}$$

where:
x_{ij} — empirical value of i-th variable in j-th city,
$x_{i\,min}$ — the lowest among the cities of the region value of the i-th variable,
$x_{i\,max}$ — the highest among the cities of the region value of the i-th variable.

The applied normalization allowed the inclusion of all of the variables in the range of 0–100 points, enabling easier and more illustrative representation of cities in the rankings. A hierarchical structure used to examine the development potential of cities of Lubelskie Region is shown in figure 2.

The aim of this article is to examine development potential of cities in the Lubelskie Voivodship. The term 'potential' is commonly used in various aspects of science and human activity. From

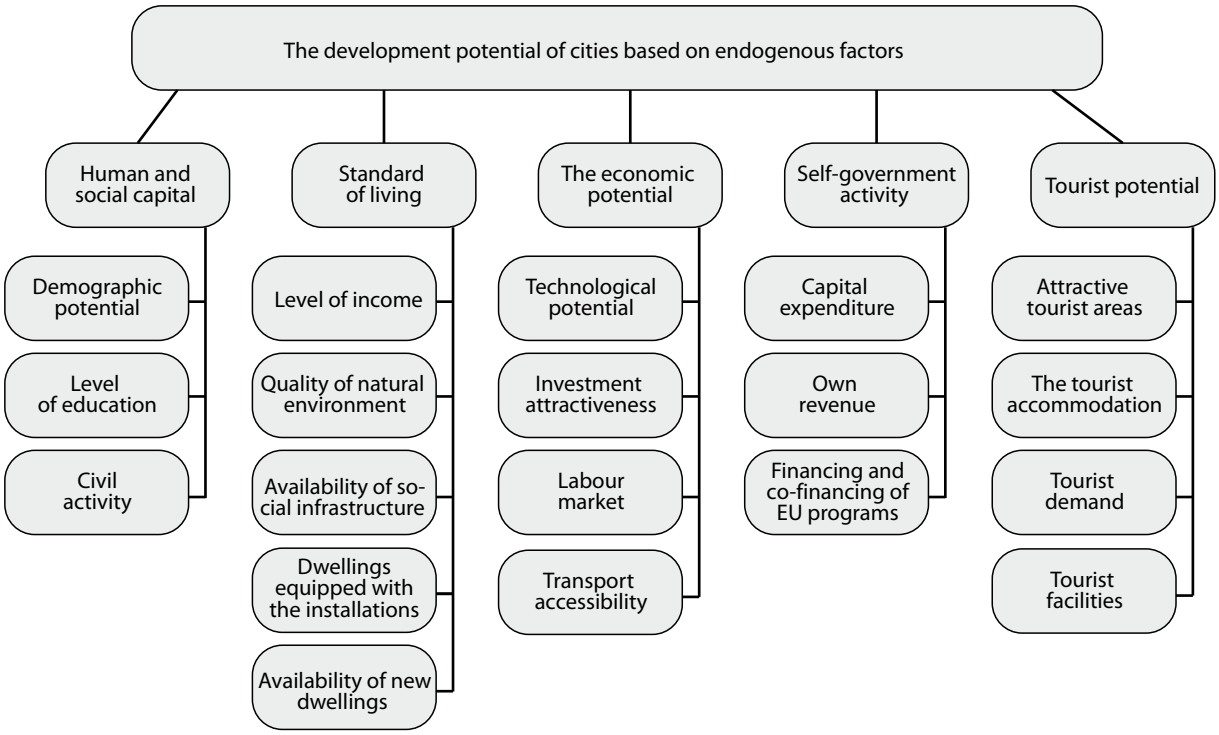

Fig. 2. A hierarchical structure for the development potential of cities

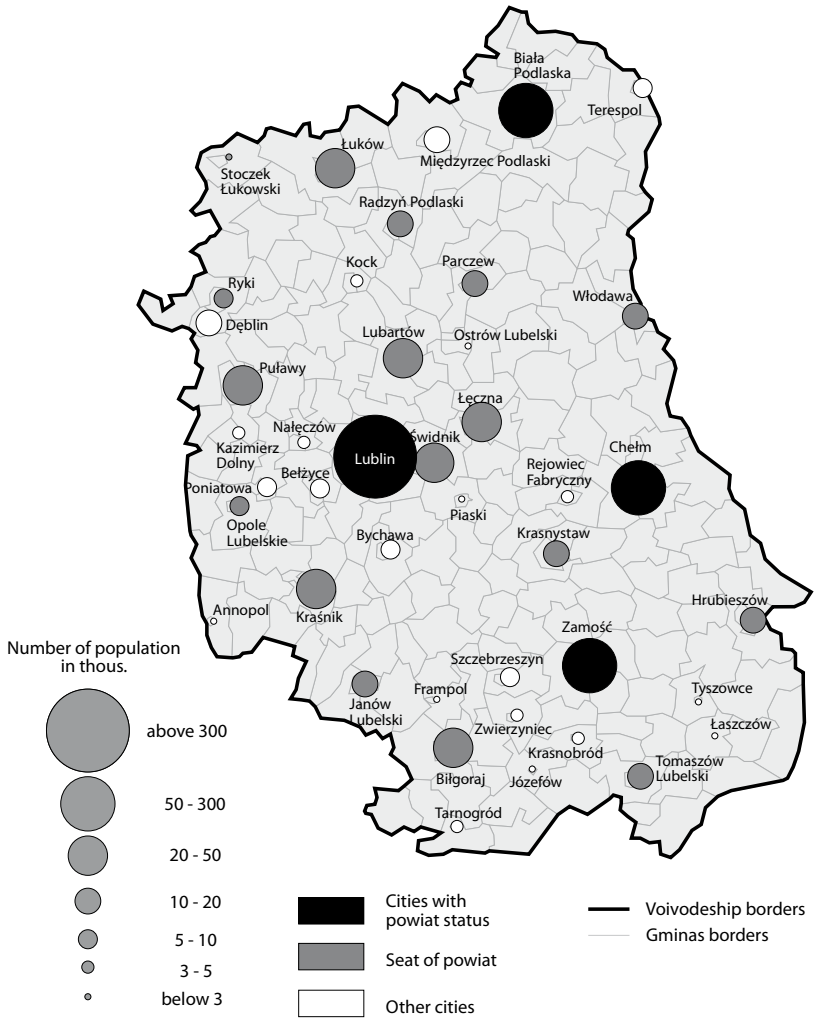

Fig. 3. Cities in Lubelskie Voivodship

a philosophical point of view it means (by Aristotle) something which is possible or something which will happen in the future, in contrast to something which is real, which already exists. According to the definition in the Polish Language Dictionary, 'potential' is the resource of possibilities, powers, or production capacity rooted in something; efficiency, productivity, or opportunity, especially of state in some field e.g. economic, military. The term 'potential' in this article refers to development in its economic and social aspects. Therefore 'development potential' should be understood as creating conditions for positive quantitative and qualitative changes in the economies of a region or city.

The subject of the analysis were 42 cities located in Lubelskie Voivodship. Within this group there are 4 cities with powiat[2] status (Lublin, Chełm, Zamość, Biała Podlaska), 20 cities — capitals of powiats, and 18 other cities with a local range. In terms of administrative status there were 20 urban areas and 22 urban-rural areas. The location, status and population of cities in Lubelskie Voivodship is presented in figure 3.

2 Human and social capital

An important factor in the socio-economic development of local governments, especially cities, is the quality of human and social capital. It is also an important element in the development potential, having its source in the endogenous resources. The definition adopted by the majority of business organizations recognizes human capital as the knowledge, skills and competencies embodied in a person, which stimulate the creation of personal, social and economic well-being (The Well-Being… 2001). The creation of human capital is a dynamic process. Its expansion lasts a lifetime through the various stages of in school and out of school, as well as through the acquisition of knowledge and skills to work through various trainings and courses, and the daily activities related to a profession. Human capital, in some cases, tends to decrease its potential (e.g., loss of certain skills with the passage of a period of human life).

The growing significance of the information society and knowledge-based economy led to the need for improving and complementing methods of measuring human capital. Currently, in addition to formal educational level, other important skills in the context of human capital are taken into account (Węziak-Białowolska and Kotowska 2011):

- knowledge of ICT
- ability to obtain and use information from electronic sources
- fast communication
- knowledge of foreign languages, especially English, which is the main language of the Internet and in science

In this study a set of statistical data was used to present in the best possible way the complexity, multi-dimensionality and the specificity of human capital.

Human capital is inseparable from social capital. Almost all economic activity is carried out not by individuals but by organizations, which involves the need for cooperation in the social sphere (Fukuyama 1995). Social capital is the result of the interdependence and interaction of economic and social phenomena, it is a source of the social bonds in which they are involved and available to individuals and groups active in the field of economics. It constitutes factors determining the quality of human interaction in the fields of politics, economics and social life (Bartkowski 2007). In the literature, many definitions of social capital could be found. Their commonality is recognition of social capital as a grass-roots initiative formed in a given environment, based on a network of relationships, knowledge, and mutual respect for norms and values. Social capital is a resource of individuals and it affects their willingness to cooperate and the potential of its effectiveness. A special feature of social capital is that it allows the achievement of goals that otherwise would not be attained at all or that would require higher costs. In this perspective, social capital is not a public good, but rather a "club" because not everyone has access to it — only those entities within the network (Kaźmierczak 2007).

2. Powiat — Polish administration region on the NUTS 4 level. Lubelskie Voivodship is divided into 24 powiats.

2.1 Human and social capital in the cities of Lubelskie Voivodship

Three subcomponents were used to calculate the component human and social capital (the weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):

- demographic potential (20%)
- level of education (49%)
- civil activity (31%)

The calculated component is very strongly correlated (correlation coefficient equal to 0,75) with the range of the city measured by the size of the population. It proves the view that living in a large city increases the opportunity for education at each level of the formal educational system, and it encourages people to profit from a large density of cultural and social infrastructure. Inhabitants of big cities are more likely than residents of small towns to participate in elections and actively work in organizations such as foundations and associations.

The highest synthetic rate in 2010 was achieved by Lublin, with an index amounting to 85. Such a good result arose mainly from the very good (the best among all cities) level of formal

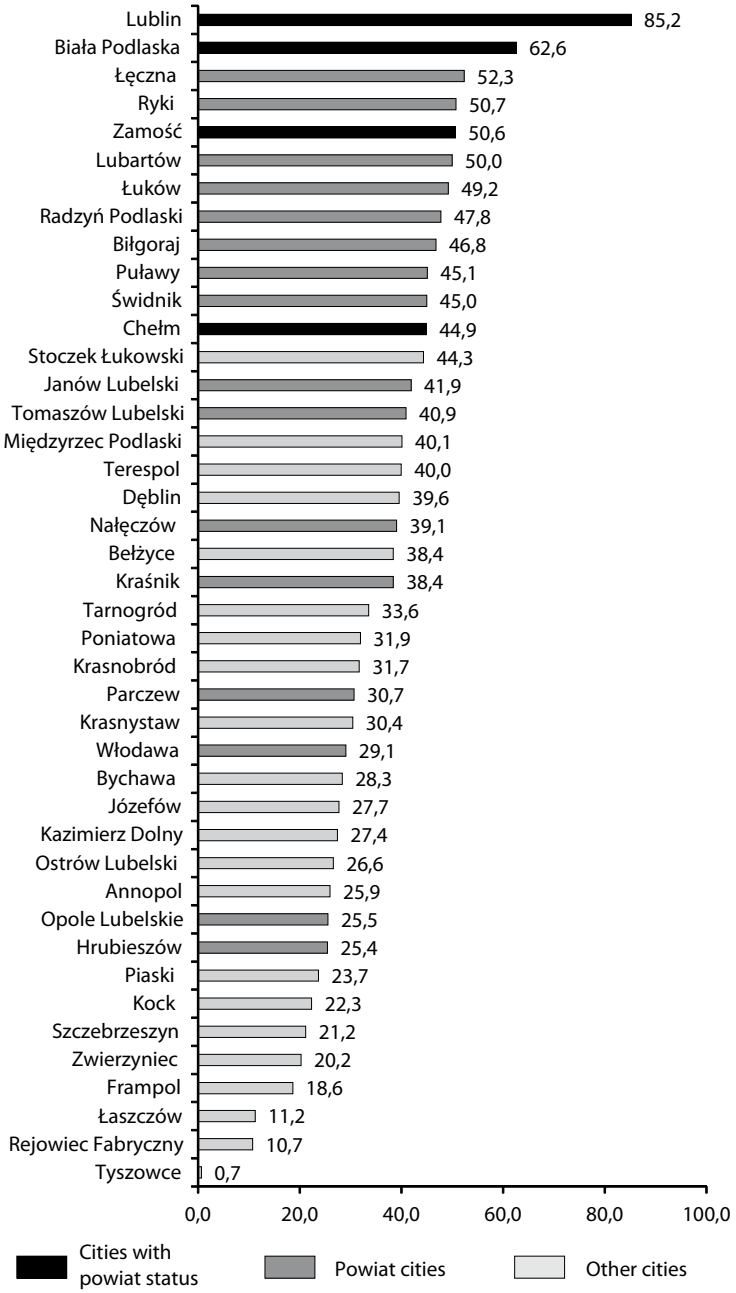

Fig. 4. Synthetic index for component human and social capital

education as well as civil activity. Lublin, as the main academic center in the region, is the undisputed leader in the number of students and graduates. In Lubelskie Voivodship more than 8 in 10 students study in Lublin, the same relation holds for graduates. Student society plays a significant role in the city economy. Students create demand for various services connected with education, accommodation, sustenance and leisure time (Łoboda 2011). Lublin had also leading positions in such categories as: the percentage of students who passed the matriculation examination (6th place), percentage of pupils in secondary schools with the high result of examination (2nd place) and average exam score in primary schools (2nd place). The largest city in the region was characterized by the high activity of its inhabitants, which was reflected in the high voter frequency in the elections to parliament and in presidential elections. What is interesting is that the local government elections attracted relatively less attention from Lublin inhabitants. Another aspect of activity of the citizens was the willingness to undertake social activity in foundations and associations; their number in relation to the number of inhabitants was one of the highest among the cities and towns in the region.

The second place in the ranking was Biała Podlaska, for which the synthetic index of human and social capital was 63. The strength of the city was higher than the average level of activity in the region. In third place was Łęczna. This city was distinguished by a favorable age structure of population resulting from the large-scale settlement of young people connected with development of the mining industry in the 1980s and 1990s. A relatively large group of the population were young people, which confirms the youth rate of 7,9%, while the average for the Lubelskie Voivodship was about 3,8 percentage points lower. Moreover, the share of persons of non-working age for every 100 persons of working age was 33, compared to 58 in all the region. A factor that in the future may undermine these positive trends is the large scale migration of primarily young people associated with economic migration and the process of suburbanization. A relative strength of this city is also civil activity shown by high participation in elections and a willingness to participate in foundations and associations.

In the subsequent positions of the ranking of human and social capital were Ryki with a high level of civil activity and another city with powiat status — Zamość. The worst position among cities with powiat status was Chełm, with a synthetic index amounting to 45, which gave it 12th place in the ranking. Among small cities with a local range the highest position (13th) was for Stoczek Łukowski, with one of the highest participations in elections. Among the cities with the worst rate of human and social capital mostly small settlement units located in the southern part of the region are found such as: Tyszowce, Łaszczów, Frampol and Zwierzyniec.

3 Standard of living

The definition of standard of living is very complex and conditioned by a set of various factors. The United Nations expert committee in 1954 formulated a definition: "the concept of standard of living includes the whole of the real conditions of people's life and the degree of fulfillment of material and cultural needs through the stream of goods and services, as well as from the social funds" (Kozera and Kozera 2011). This definition became the basis for further concepts. A similar approach was presented by Luszniewicz defining standard of living as the degree of fulfillment of material and cultural household needs achieved by streams of goods and paid services and by streams of funds of public consumption (Luszniewicz 1982). The standard of living of the urban population is undoubtedly closely connected with regional development as well as with the potential for growth. A favorable socio-economic condition of the country and the region is reflected in the growth of the population's income levels and increased revenues to the budgets of local government units. These factors promote investment in housing, as well as social and cultural infrastructure, affecting other non-material factors to improve the quality of life.

In this article the component 'standard of living' was divided into 5 subcomponents (weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):

- level of income (37%)
- quality of natural environment (20%)

- availability of social infrastructure (13%)
- dwellings equipped with installations (7%)
- availability of new housing (23%)

Similar to the human and social capital component, standard of living is also strongly correlated with the range of the city measured by the size of the population (the correlation coefficient amounted to 0,68). Statistical results show that the bigger the city, the higher the income level of inhabitants, and the better the availability of social infrastructure such as health care facilities, libraries, and educational facilities. In a large city there is increased opportunity to live in a housing with good access to water-line and gas-line installations. An important advantage is also a better availability of new housing. An unfavorable side of life in a large city, which was reflected in the ranking, is the quality of the natural environment. In large crowds of people there are problems concerning fumes and particulates of air pollution, treatment of waste water and storage of accumulated waste.

In the ranking 'standard of living' the best city was Lublin with a synthetic index amounting to 83. The capital of the Lubelskie Voivodship was characterized by the highest level of income of in-

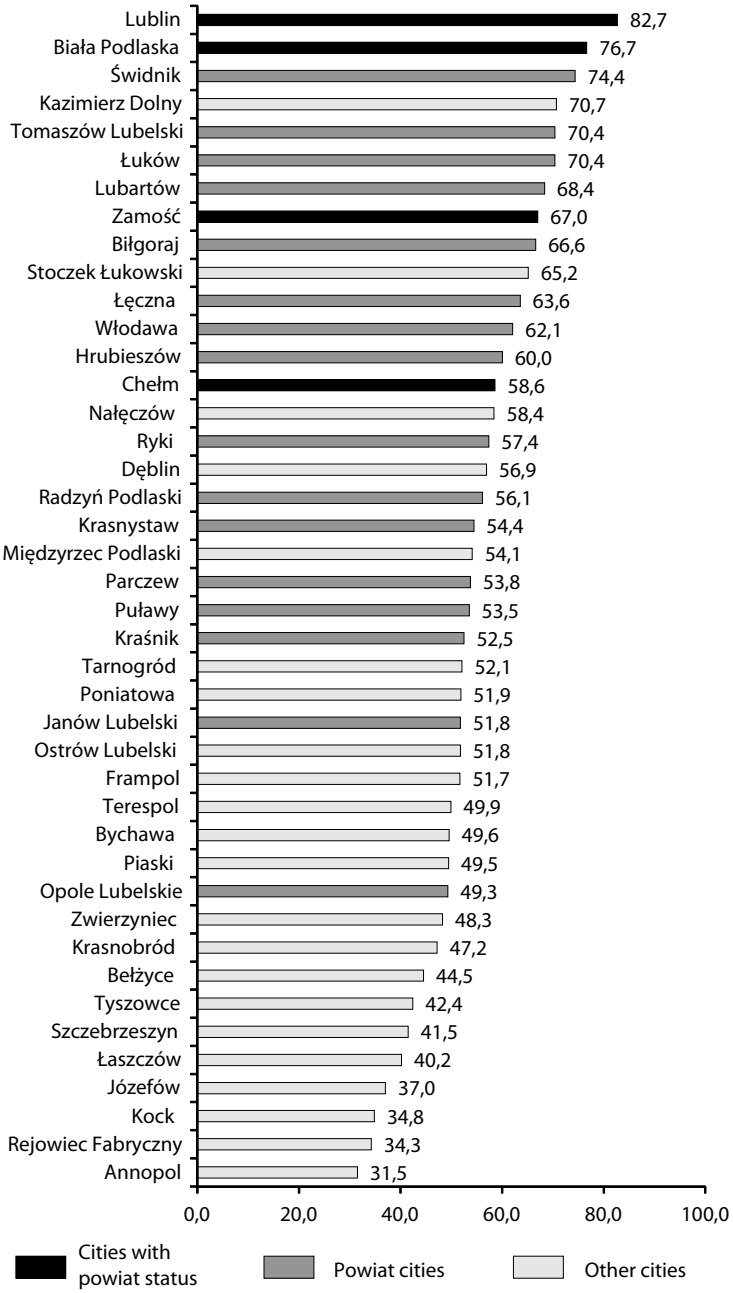

Fig. 5. Synthetic index for component standard of living

habitants measured by the taxes from personal income revenues, which in 2010 equaled PLN 842, while the average for cities in the region was PLN 356. In this city there was also a relatively small number of people benefiting from social assistance, measured by the share of the total population. This index in 2010 was 4,5 percentage points lower than the average for cities of Lubelskie Voivodship. Lublin had also a good accessibility to new housing. Average of dwellings completed in the years 2008–2010[3] per 1000 inhabitants amounted to 5,0, which was 2,6 more than the average for all cities in the region. The city had a worse than average number of healthcare facilities per 10 000 inhabitants and collection of books in public libraries per 1000 inhabitants. A slightly better situation was noted in terms of accessibility to pre-primary schools. In 2010 the number of places in pre-primary schools in relation to 100 children of pre-school age amounted to 89, while the average was 81. The number of pupils in primary and lower secondary schools per number of computers with access to Internet was on the average level.

Other cities in the ranking were: Biała Podlaska with good availability of new housing and the relatively good quality of its natural environment and Świdnik with advantageous housing equipped with installations. Synthetic indexes for these two cities amounted to 77 and 74 respectively. Subsequently placed in the ranking was Kazimierz Dolny — the smallest town in the top ten. Such a high position was due to its best in the region access to new housing. Moreover the quality of its natural environment was on a high level. The cities with the worst standard of living were: Annopol with the lowest in the region level of income and small number of new housing starts, Rejowiec Fabryczny and Kock. Similar standards of living were also noted in Józefów, Łaszczów, Szczebrzeszyn and Tyszowce located in the southern part of Lubelszczyzna. These cities, apart from geographic location, are similar in terms of: low incomes of inhabitants, insufficient development of housing construction on the one hand, and high quality of natural environment on the other hand.

Among cities with powiat status the worst standard of living was noted in Chełm in 14th position. It had availability of social infrastructure on a relatively low level and also one of the highest degrees of natural environment degradation mainly due to the cement industry. This town is a good example of problems concerning cities with an industrial function which also want to provide a sufficient standard of living for their inhabitants. In such cities the conception of eco-development should be implemented. This idea could be defined as a strategy of social and economic development, which use widely understood resources of the natural environment, and simultaneously do not lessen its values in terms of future possibilities of civilizational development (Czaja 2001).

4 Economic potential

Economic potential could be understood as a combination of socio-economic, cultural, demographic, technological and institutional variables, upon which depends the rate of development of the center and its impact on the region (Sagan 2010). Undoubtedly, it is an important factor of development potential because well-developed economic functions favor economic growth, causing the increase of inhabitants' wealth, and by the diffusion effect improve the economic situation in surrounding areas. Such a process makes cities the centers of growth, and positively affects the development of all the region.

The component economic potential was divided into 4 subcomponents (weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):

- investment attractiveness (17%)
- transport accessibility (24%)
- labor market (14%)
- technological potential (45%)

The correlation between the component economic potential and the range of the city measured by population size was statistically significant. It means that cities with concentration of population and production create conditions especially favorable for cooperation and transfer of knowledge

3. Due to high variability of the number of dwellings completed in subsequent years, the average from years 2008–2010 was used.

among enterprises. Such favorable circumstances facilitate the creation of a mutual learning process, which is an important element in economic growth based on endogenous factors. The best city in Lubelskie Voivodship in terms of economic potential was Lublin. It was the leader in 3 subcomponents: investment attractiveness, transport accessibility and technological potential. This observation is not surprising, because of the fact that this is an important administrative, scientific, economic and cultural center. Additionally, the city has a large investment area calculated as a share of non-built, urbanized areas in the total area.

Apart from investment area in a geographical sense, the institutional and legal environment is important for investors as well. Special Economic Zones (SEZ) were established to accelerate regional development, decrease unemployment and also increase the competitiveness of innovative enterprises in some regions of Poland. Features of business conducted in special economic zones include exemption from income and property tax. In Lubelskie Voivodship the largest area of SEZ was located in Lublin. In 2010 the subzone Lublin, constituting a part of Special Economic Zone

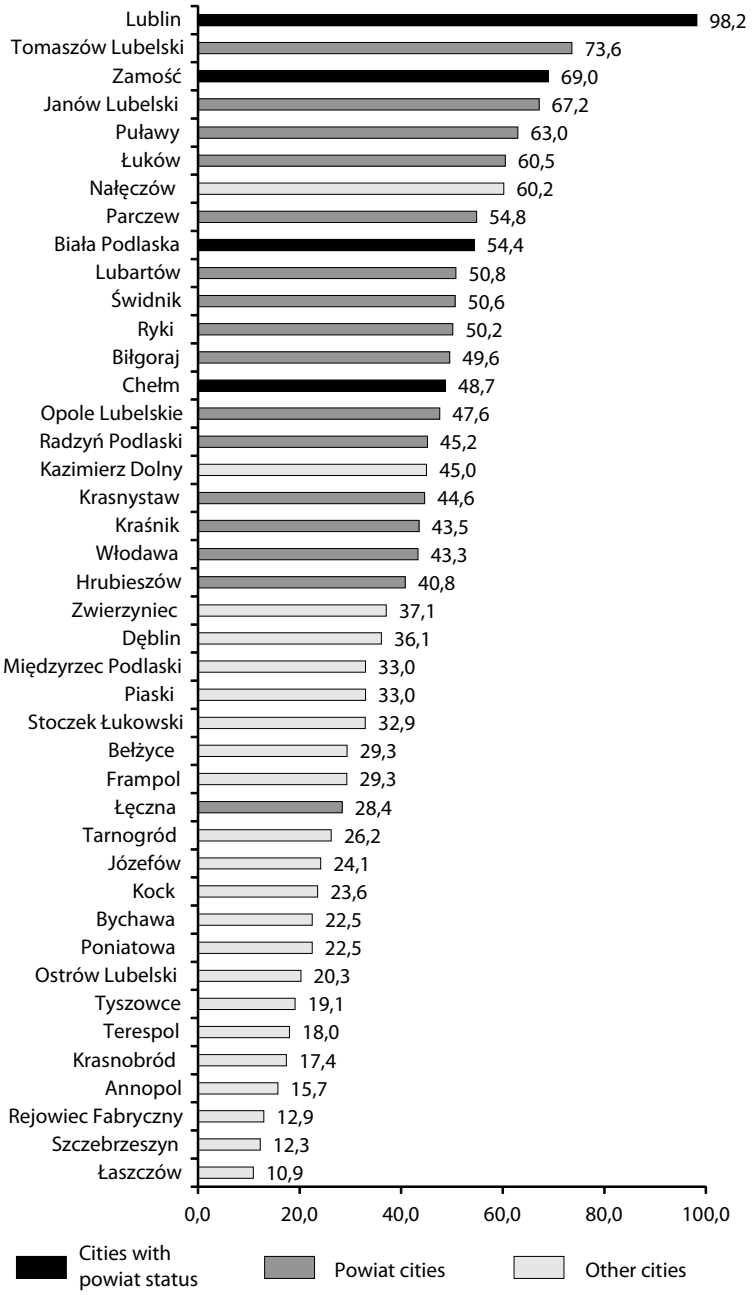

Fig. 6. Synthetic index for component economic potential

Euro-Park Mielec was established within a 118 hectare area, which is almost 35% of all SEZ areas in the cities of Lubelskie Voivodship.

The relatively good environment for investments in Lublin is proven by one of the highest number of companies with foreign capital per 10 thousand inhabitants, which in 2010 was 13,8. However, the first place in this category was noted in the small town of Piaski with as much as 15,0 companies with foreign capital per 10 thousand inhabitants. Such a high position was probably due to its location on the crossroads of national roads numbers 12 and 17, and good transport accessibility to the Polish-Ukrainian border crossing. At present there is a growing importance of the Internet as a source of knowledge about investment possibilities in a region. For the purpose of this article, evaluation of local government websites in terms of investor attractiveness was performed. The presence of information on investment offers, investment incentives, administrative procedures concerning the investment process, access to development plans, and a website in English were taken into account. Lublin took 2nd place in this ranking, together with Janów Lubelski, but the most attractive website for investors was noted in Biała Podlaska. Another subcomponent, in which the capital of Lubelskie Voivodship took first place, was transport accessibility. In this case the following factors were taken into consideration: location by the main roads and railways, travel time to Lublin and to the nearest powiat city. The best transport accessibility of Lublin was due to its location on the crossroads of main roads and railways in the region, and location in the center of the region.

In the ranking of labor market Lublin took 5th position. The potential of labor market was described by such elements as: level of entrepreneurship measured by number of economic entities per 1000 population and by number of economic entities newly registered (during the year) in the REGON register, number of working persons per 1000 population and level of unemployment measured by the share of unemployed persons in the population of working age. Taking into account all variables included in this subcomponent, Lublin was positioned above the average of all the cities, but did not achieve the best values.

One of the most important elements affecting the development potential based on endogenous factors is technological progress. In this article the approximation of it is the number of economic entities functioning in manufacturing industries and services connected with advanced technology per 100 population. The list of such activities was drawn up according to OECD experts (Hatzichronoglou 1997). This index in 2010 for Lublin amounted to 69 and the result gave the first place in the ranking. A slightly lower level of advanced technology was noted in Tomaszów Lubelski. This second place in the ranking of economic potential mentioned above (Tomaszów Lubelski) showed a high level of economic entities operating in the advanced technology sector, and a well-functioning labor market. The weaker side of the city was transport accessibility (lack of the access to railways) and investment attractiveness. Subsequent places were noted for Zamość, which is relatively attractive for investors and had good location in terms of transport availability and Janów Lubelski characterized by a large number of economic entities with advanced technology and high investment attractiveness.

On the bottom of the ranking there was a group of small towns located in the south eastern part of Lubelskie Voivodship — Łaszczów, Szczebrzeszyn, Krasnobród, Tyszowce. The main problem of these cities, with respect to economic potential, is a peripheral location and low transport accessibility. Therefore they became unattractive for investors. Cities with equally low economic potential were Annopol, with relatively good transport accessibility and Rejowiec Fabryczny distinguished by investment attractiveness (23rd place in the ranking).

5 Local government activity

Endogenous growth theory assumes that regional development is based on creation, expansion and utilization of internal resources on each spatial level. In the frames of this conception an important role is attributed to local authorities, because the majority of factors responsible for development are created within the urban system and depend on local, regional policy. The influence of local and regional authorities may include creation and development of institutions and organizations

supporting economic growth, development of mechanisms of innovations absorption, assistance in financing interesting projects within the scope of research and development, investments in human capital as well as in infrastructural projects. The use and strengthening of endogenous development factors and simultaneous provision of exogenous elements of economic growth is an opportunity, especially for regions delayed in development.

The component self-government activity was divided into 3 subcomponents (weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):[4]

- capital expenditure (49%)
- own revenues (20%)
- financing and co-financing of EU programs (31%)

The best city in terms of local government activity was Janów Lubelski. This relatively small city with a population of about 12 000 had the best results in two components — own revenues

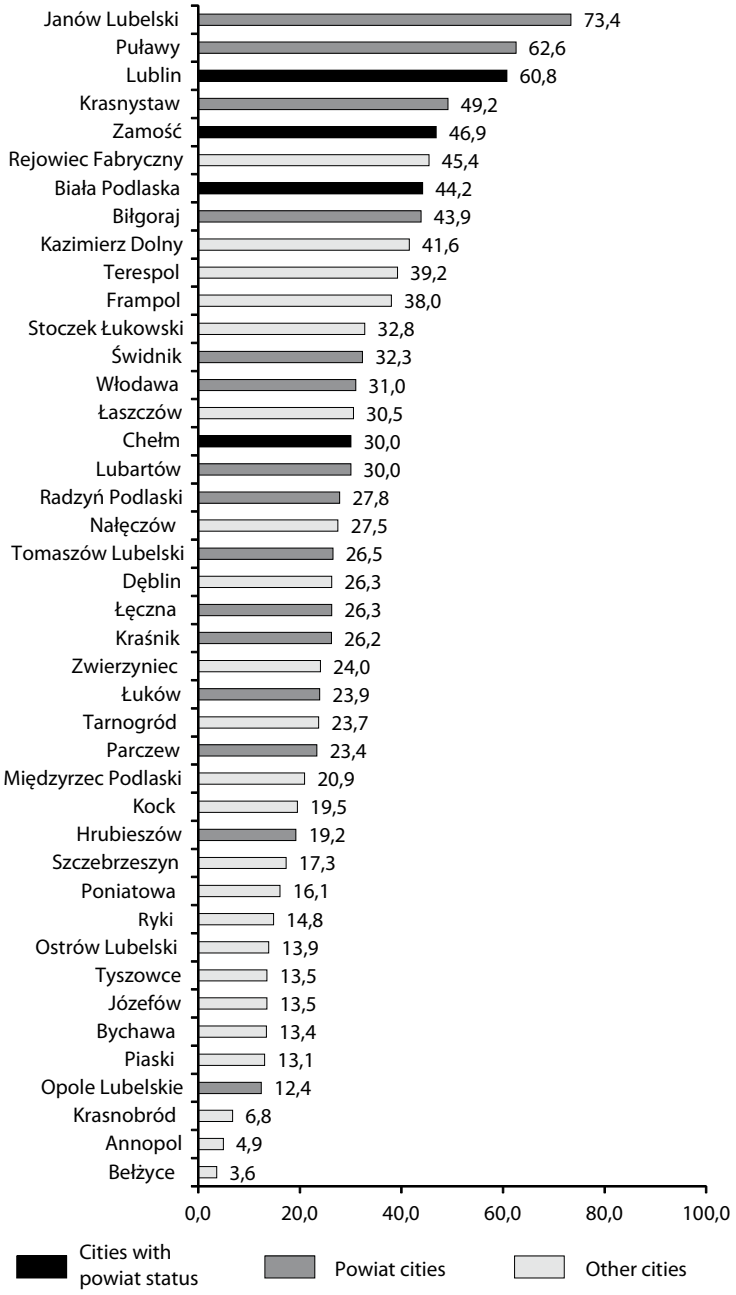

Fig. 7. Synthetic index for component local government activity

4. Because of high volatility of data concerning capital expenditure and own revenues in subsequent years the average from 2008–2010 was taken into account.

per capita amounted to PLN 1 150 and revenues coming from financing and co-financing of EU programs per capita, which was PLN 1 873, while the average for cities of Lubelskie Voivodship was PLN 306. In the ranking of own revenues per capita Janów Lubelski took further position, but still its index was above the average. Efficiency in the work of local authorities within the scope of local government finance in Janów Lubelski was recognized by the authors of the Rzeczpospolita ranking, in which the city was placed in 24th position among urban-rural gminas in Poland. The ranking took into account increase of capital expenditure, the value of EU funds raised, value of debt in relation to revenues, etc.[5]

The second place in ranking was Puławy, with a high level of own revenue per capita, and capital expenditure per capita. However, the level of EU funds was lower in comparison to other cities. In the third place was Lublin, characterized by the highest in the region level of own revenue per capita, which amounted to PLN 1 922, but a worse than average capital expenditure and value of EU funds raised per capita. Subsequently placed was Krasnystaw with a high level of own revenues and capital expenditures. In the group of cities with local range the best synthetic index was achieved by Rejowiec Fabryczny, in which there was a relatively high level of revenues coming from financing and co-financing of EU programs.

The worst city with powiat status in respect of local government activity was Chełm, which ranked 17th. The city was characterized by a very low level of revenues coming from financing and co-financing of EU programs, moreover little money was allocated in capital expenditure. At the end of the ranking there were such cities as: Bełżyce, Annopol and Krasnobród and powiat city Opole Lubelskie characterized by low local government activity in each aspect taken into account in the analysis.

6 Tourism potential

Tourism is an increasingly important branch of the economy. Tourism potential may become an important development element based on endogenous resources, involving significant human and economic potential. Tourism could be an effective instrument for solving social problems and could stimulate the financial situation for various spheres of the economy. The potential of tourism in a region is defined by tourist demand understood as the level of tourist traffic together with its needs on the one hand and the tourist product meaning everything which can be purchased by tourists on the other hand. Tourist product in turn could be divided into natural and cultural values.

Lubelskie region has features comprising potential for tourism development and could attract tourists interested in various forms of leisure and recreation. The essential advantage of Lubelszczyzna is a relatively unharmed or transformed natural environment with a significant diversity of landscape. A definite advantage is also the history of the region and numerous tangible and intangible cultural values (Flaga 2011). The component 'tourism potential' was divided into 4 subcomponents (weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):

- tourist demand (41%)
- tourist accommodation (26%)
- tourist facilities (20%)
- attractive tourist areas (13%)

The best city in terms of tourism potential was Kazimierz Dolny with a synthetic index amounting to 88. This city located on the picturesque bank of the Vistula River is a tourist attraction of cross-regional and international range. Kazimierz Dolny combines natural and cultural values by its location within the borders of Kazimierski Landscape Park. Natural values include Vistula Valley, which is one of the most important ecological corridors in the region. One of the most interesting places worth visiting are loess ravines, creating the densest network in Europe. With regards to cultural tourist values, the city of Kazimierz Dolny together with the surrounding landscape constitutes an attraction complex of international range. The most valuable attractions

5. See *Rzeczpospolita*, no. 166, 2011.07.19.

are the splendidly exposed ruins of Kazimierz Wielki castle, the parish church from the 16th c. and the monastery complex from the second half of the 17th c. Kazimierz Dolny is also famous for current cultural events. Every year in June the Festival of Folk Bands and Singers is held and in August the Film Festival *Dwa brzegi*. Kazimierz Dolny took first place in the frame of two subcomponents — tourist demand and tourist accommodation. The great tourism potential was demonstrated by the largest number of tourists using collective tourist accommodation establishments per 1 000 population, which amounted to 23 688 persons, while the average for cities in the region was 1 219 persons. The city also dominated in the category of tourist accommodation measured by the number of beds in collective tourist accommodation establishments per 1 000 population. Moreover, the tourist accommodation in Kazimierz Dolny was well equipped with sports and recreation facilities, conference rooms and facilities for disabled people.

Second place in the ranking was Nałęczów. Similarly to Kazimierz Dolny, this city is also a well-known health resort, with specific features of climate, natural mineral waters and therapeutic mud. The main disorders treated here are diseases of the circulatory system and nervous

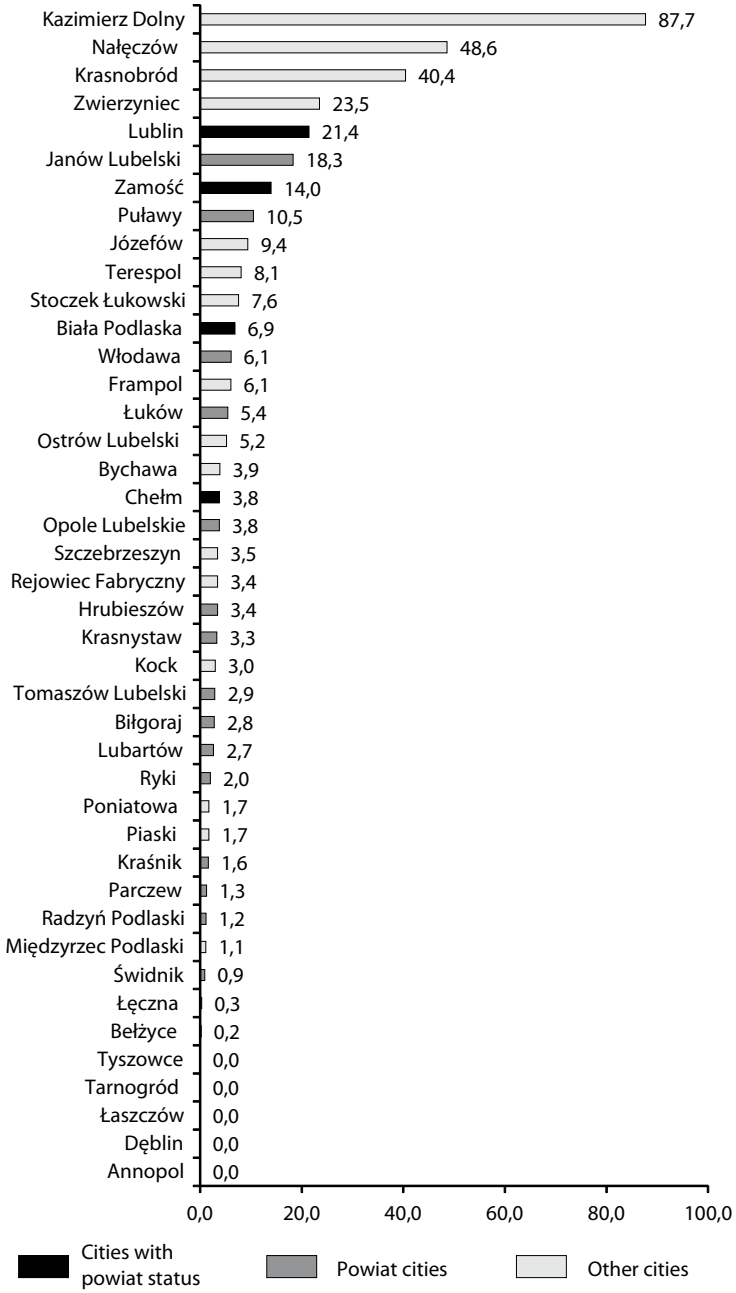

Fig. 8. Synthetic index for component 'tourism potential'

system. The tourist attraction is the spa park, with Pałac Małachowskich constituting a great cultural value of the city. Nałęczów is distinguished by a wealth of tourist accommodation. The number of beds in collective tourist accommodation establishments per 1 000 population amounted to 342 persons, which positioned the city in second place. Tourist accommodation was well-equipped with sports and recreation facilities.

In terms of tourism potential, subsequent placed were two cities located in Roztocze — Krasnobród and Zwierzyniec. Such a high position is due to the great natural environment values connected with the influence of Roztoczański National Park. The park attracts tourists looking for peace and quiet, walking and cycling in the forests. Both Krasnobród and Zwierzyniec had a relatively high number of tourist accommodation, visited by many tourists, but in comparison with other cities located near national parks in Poland the number of visitors is significantly smaller, mainly due to a lack of appropriate marketing and insufficiency of the tourism infrastructure. Zwierzyniec as the headquarter of Roztoczański National Park stood out by the region's highest index concerning legally protected areas possessing unique environmental value.

Lublin occupied 5th place in the ranking, characterized by the region's best supply of tourist accommodation with sports and recreation facilities, conference rooms and facilities for disabled people. This is the first city in the ranking with a dominance of cultural tourist values rather than natural values. In next place was the first powiat city — Janów Lubelski. Its relatively high position was because of its location near an attractive forest — Lasy Janowskie, with a status of Landscape Park. Relatively large touristm potential was also noted in Zamość, with well-equipped tourist accommodation, and in Puławy constituting the last in the ranking element of the "tourism triangle" — Kazimierz Dolny-Nałęczów-Puławy.

7 The synthetic index of development potential

The main objective of the hierarchical structure development potential of cities in the Lubelskie Voivodship was divided into 5 components, which were described above (weights obtained as a result of pair-wise comparisons of subcomponents are shown in brackets):

- human and social capital (38%)
- standard of living (22%)
- economic potential (18%)
- local government activity (10%)
- tourism potential (12%).

7.1 Development potential of Lublin

In terms of development potential the first place is occupied by Lublin. The largest city in the region had the best synthetic indices in terms of human and social capital, standard of living and economic potential, and in two other components it also took top positions. The further development of Lublin has a key role in shaping the development potential of the region. As a metropolitan center, Lublin should focus on providing services of a higher level and simultaneously transferring some tasks to centers of a lower level. Strengthening of its metropolitan function should be achieved by improvement of transport accessibility (road, railways, air) among the most important centers in the country and also abroad. Therefore the construction of airport and a bypass of Lublin constitute the key factor in improvement of metropolitan functions. However, an important factor in enhancement of regional cohesion is development of intraregional transport accessibility, especially among Lublin and smaller cities nearby. Transport connections improve the usage of the economic potential of Lublin and facilitate transfer of development to surrounding areas, which assists in strengthening regional cohesion.

Dynamic and persistent development of the region is not possible without strengthening the growth center. Regional policy should lead to improvement of the competitiveness of the region involving especially the expansion of the main urban center. In this context, the important factor is to enhance innovative potentials, based on research linked with the main directions of regional policy and using the research in practice. It should be accompanied by creation of educational

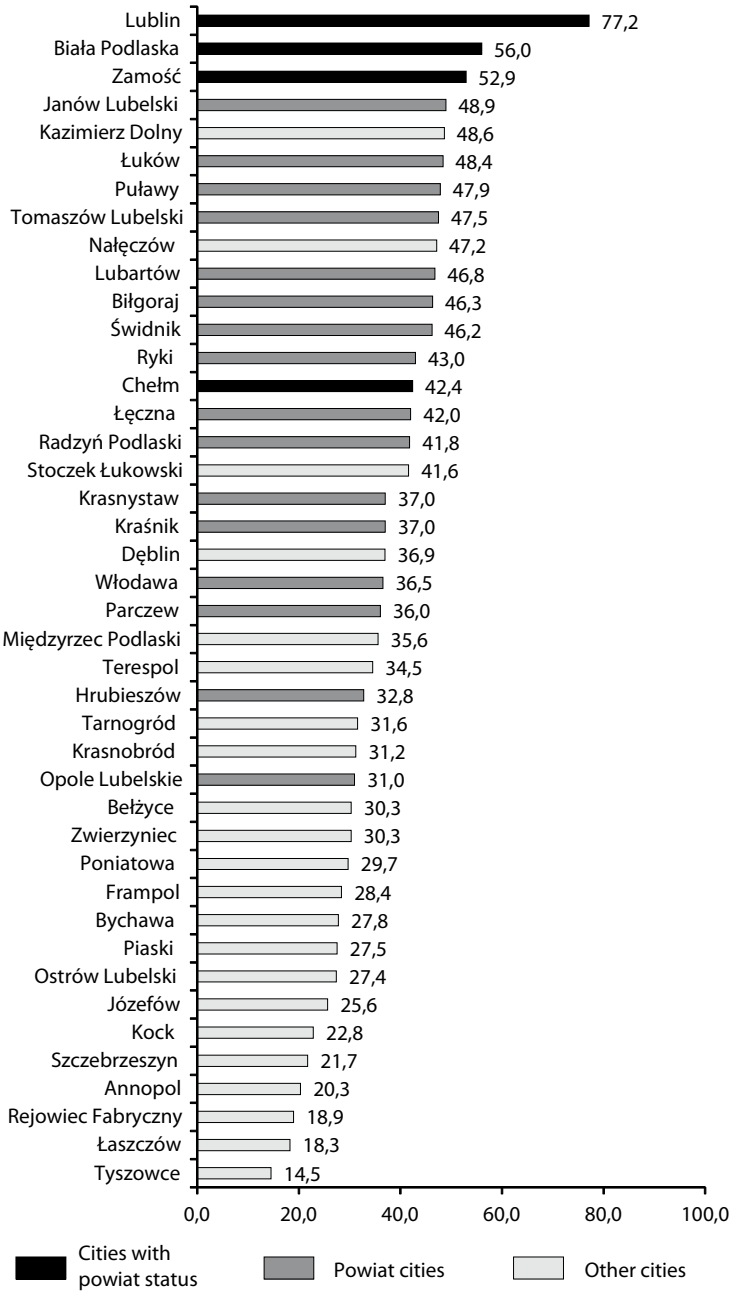

Fig. 9. Synthetic index for main objective development potential of cities in the Lubelskie Voivodship

centers enabling attainment of the level and profile of education coherent with the development directions of the region. It is worth emphasizing that Lublin already has rich resources of human capital, not only in comparison with cities in Lubelszczyzna, but also in relation to cities with a comparable population.

7.2 Development potential of medium-size cities

The second and third positions in the ranking were held by two cities with powiat status — Biała Podlaska and Zamość. The strength of Biała Podlaska are human and social capital, and standard of living, but tourism and economic potential are on a lower level. The asset of the city is convenient location next to the National Road No. 2 and railways with international significance — Berlin–Warsaw–Biała Podlaska–Minsk–Moscow, which could be an opportunity to become a center operating in cross-border trade connected with the border crossing in Terespol.

Zamość had a good position in the category of economic potential, local government activity, and human and social capital. In terms of tourism potential it ranked 7th. The city has unique

urbanistic values with its Town Hall in the Rynek, Fortifications and the Zamoyski Palace. Additionally, it is located near the attractive tourist complex of Roztocze, with Roztoczański National Park as a major attraction. Above all, Zamość has good transport availability due to its location by National Roads No. 17 and 74. Considering the combination of natural and cultural tourist attractions of the city and its surroundings, Zamość could develop its tourism functions and become a base for tours of southern Lubelszczyzna.

Generally speaking, the role of medium-size cities such as Biała Podlaska, Zamość and further positions in the ranking Puławy and Chełm, is crucial for regional development. Through their location within the voivodship area, they could deliver services with supralocal range. They function as important economic centers, providing jobs in non-agricultural sectors for residents of surrounding areas. They also meet social needs by supplying health, cultural and educational services.

7.3 Development potential of other cities

Janów Lubelski was the best city in the category of powiat cities and took 4th position in the general classification. It was distinguished by region's best local government activity. The strength of the city is also its economic potential, with a high level of transport accessibility due to its convenient location by National Roads No. 19 and 74. Another asset of the city is its wealth of tourist accommodation connected with the Lasy Janowskie Landscape Park. The main problem of Janów Lubelski is its low standard of living, related to weak housing and social infrastructure.

A group of other powiat cities were in the rankings 6th, 8th and positions 10–13: Łuków, Tomaszów Lubelski, Lubartów, Biłgoraj, Ryki, and Świdnik. These cities and other with powiat seat play the key role in ensuring social and economic consistency of the region. They provide access to educational services, especially at secondary level, and deliver basic cultural and public services for their residents as well as for inhabitants of surrounding areas. Additionally, even distribution throughout the region supports the advantageous polycentric structure of the settlement system.

In Lubelskie Voivodship, there are a few cities with unique functions and character with a national position and significance. Good examples of such cities are Kazimierz Dolny and Nałęczów, in the ranking 5th and 9th position respectively. They are tourism and health centers with interregional and even international importance. These cities should continue the sustainable development policy involving social and economic growth harmonized with care for the natural environment, which could preserve the unique assets of these cities. The barrier to development is low transport accessibility, the existing road infrastructure leading to Kazimierz Dolny and Nałęczów from Lublin and Warsaw is definitely insufficient, especially in periods of heavy tourist traffic. Due to the specific location near tourist attractions, the settlement expansion of these cities is significantly limited.

In the group of small towns, apart those mentioned above (Kazimierz Dolny and Nałęczów), Stoczek Łukowski had the highest position with a relatively high level of standard of living and a large area with natural value in the Łukowski Area of Protected Landscape. The city was also distinguished by one of the region's highest activity in elections. Międzyrzec Podlaski also had a relatively good ranking, with high civil activity of inhabitants.

The majority of small cities is strongly related to the agricultural sector, and they experience rural problems such as: lack of jobs in non-agricultural sectors, low profitability of agricultural production, hidden unemployment, process of depopulation, and low transport accessibility leading to low mobility of residents. The existence of these factors could lead to an irreversible process of degradation of a significant part of the voivodship. Regional policy should try to activate these problematic areas by strengthening city functions supporting economic activity.

The situation of small towns in Lubelszczyzna is strongly diversified. In relatively good condition are the towns conveniently located with good transport accessibility (Terespol, Międzyrzec Podlaski) and those taking advantage of neighboring areas attractive in terms of tourism (Krasnobród, Tarnogród, Zwierzyniec). On the other hand, there are towns with very low transport accessibility, and social and demographic problems like Tyszowce and Łaszczów. There were also towns such as Szczebrzeszyn and Józefów that have not yet taken advantage of their convenient location near the tourist attraction of Roztoczański National Park.

Tab. 4. The places of cities by value of the synthetic index

Place	Development potential	Human and social capital	Standard of living	Economic potential	Local government activity	Tourism potential
Annopol	39	32	42	39	41	39
Bełżyce	29	20	35	27	42	37
Biała Podlaska	2	2	2	9	7	12
Biłgoraj	11	9	9	13	8	26
Bychawa	33	28	30	33	37	17
Chełm	14	12	14	14	16	18
Dęblin	20	18	17	23	21	39
Frampol	32	39	28	28	11	14
Hrubieszów	25	34	13	21	30	22
Janów Lubelski	4	14	26	4	1	6
Józefów	36	29	39	31	36	9
Kazimierz Dolny	5	30	4	17	9	1
Kock	37	36	40	32	29	24
Krasnobród	27	24	34	38	40	3
Krasnystaw	18	26	19	18	4	23
Kraśnik	19	21	23	19	23	31
Lubartów	10	6	7	10	17	27
Lublin	1	1	1	1	3	5
Łaszczów	41	40	38	42	15	39
Łęczna	15	3	11	29	22	36
Łuków	6	7	6	6	25	15
Międzyrzec Podlaski	23	16	20	24	28	34
Nałęczów	9	19	15	7	19	2
Opole Lubelskie	28	33	32	15	39	19
Ostrów Lubelski	35	31	27	35	34	16
Parczew	22	25	21	8	27	32
Piaski	34	35	31	25	38	30
Poniatowa	31	23	25	34	32	29
Puławy	7	10	22	5	2	8
Radzyń Podlaski	16	8	18	16	18	33
Rejowiec Fabryczny	40	41	41	40	6	21
Ryki	13	4	16	12	33	28
Stoczek Łukowski	17	13	10	26	12	11
Szczebrzeszyn	38	37	37	41	31	20
Świdnik	12	11	3	11	13	35
Tarnogród	26	22	24	30	26	39
Terespol	24	17	29	37	10	10
Tomaszów Lubelski	8	15	5	2	20	25
Tyszowce	42	42	36	36	35	38
Włodawa	21	27	12	20	14	13
Zamość	3	5	8	3	5	7
Zwierzyniec	30	38	33	22	24	4

Conclusions

The analysis conducted presented development potential as a complex and multi-level phenomenon resulting from the influence of various factors. The synthetic index of development potential was significantly correlated with the range of the city measured by population size (correlation coefficient amounted to 0,74 and p-value was less than 0,001). Among the components included in analysis the strongest correlation indicated was human and social capital, and economic potential. Negative correlation, but insignificant (p-value equaled to 0,356), was observed for tourism potential, which is related to environmental and cultural conditions rather than population size.

The development potential of cities indicated considerable diversification in terms of administrative functions. In each of the isolated groups (cities with powiat status, powiat cities and other cities) there was a large difference between the best and the worst cities, achieving from 58% to 187%. Similar diversification could be observed on account of territorial division. The highest level of development potential was in Bialski subregion,[6] not much lower in Lubelski subregion and the lowest in Chełmsko-zamojski subregion. Additionally, ignoring the influence of Lublin, the Lubelski subregion would achieve the level of development potential comparable with Chełmsko-zamojski subregion, which shows the great impact of the capital of Lubelskie Voivodship on surrounding areas and consequently, through diffusion effects throughout the region. Continued and coherent regional development is conditioned by support of cities on each level of the administrative division. The shaping of development potential should be a process directed to identification and use of specific social, economic and natural conditions.

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6. Subregion — Polish administration region on the NUTS 3 level. Lubelskie Voivodship is divided into 4 subregions: bialski, chełmsko-zamojski, lubelski, puławski.

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