# ASSESSING COMPETITIVENESS OF LITHUANIAN CITIES

**Narimantas Paliulis[1], Renata Cincikaite[2]**

[1,2]*Vilnius Gediminas Technical University, Lithuania*

## Abstract

*Competitiveness issues are comprehensively analysed by different researchers from various perspectives. Most frequently the concept of competitiveness is analysed from the production or service, company's, economic, urban, regional and national perspectives. However, the analysis and assessment of urban competitiveness is rather scarce (particularly among Lithuanian scientists).*

*Many questions arise while analysing and assessing cities. One of the key questions is why manufacturing and services as well as other sectors flourish in certain urban areas and the population feels comfortable, whereas totally opposite tendencies are observed in other cities. What does the concept 'a competitive city' mean? What are the decisive factors, which determine urban competitiveness?*

*In Lithuania strategic plans are developed, aiming to increase competitiveness of a city. Sub-national authorities manage and control different factors and use levers determining competitiveness of individual factors. Nevertheless, the concept of urban competitiveness is not uniformly defined, and the factors that determine the competitiveness of a city are not unanimously identified. There has not been established a uniform urban competitiveness evaluation model. The article introduces methodological guidelines of the urban competitiveness assessment model, developed by the authors, based on the results of theoretical and empirical assessment.*

*The type of the article: Research report.*

*Keywords: a city, urban competitiveness, assessment of urban competitiveness, urban competitiveness models.*

*JEL Classification: G18, O11, O18, P43, R11, R51, R58.*

## 1. Introduction

The number of people living in cities is growing rapidly. In 2000 the number of the world population living in cities reached 2.9 billion, and it is predicted that by 2030 – their number will be 5 billion (Conference on the State of European Cities: The Urban Audit, 2008). Population is migrating from rural to urban areas. In 1970, 37 per cent of population lived in the city and 63 per cent - in the country. In 2000, 53 per cent of the world's population lived in rural areas and 47 per cent in the city. It is forecasted that by 2030, 60 per cent of the world's population will live in cities. More than 85 per cent of the EU GDP is created in urban areas (Action Plan on Urban Mobility, 2009).

In scientific literature the effect of the urbanization process (in the article the concept of urbanization is synonymous with the concept of urban growth) on the urban and regional economic development is considered unambiguously. Some researchers (Singhal *et al.*, 2009, Xu, Watada, 2008, OECD, 2007, Henderson, 2003, Parkinson *et al.*, 2003) refer to the positive impact of this process on the urban economic development, highlighting the strength of urbanization rate and GDP 0.85 correlation coefficient, greater opportunities for business development, investment, increase in productivity and innovation, more favourable population's conditions of living, working, studying and recreation. Others (Witcher, 2006) envisage a negative impact due to the deteriorating environmental and social situations (social inequality, differences in income, poverty, etc.), increasing pollution, morbidity, the lack of water, food, living space, over-consumption of energy;

whereas others (Čiegis, Pareigis, 2010 Čiegis *et al*., 2009 a, b, Rutkauskas, 2008 Arbušauskaitė *et al*., 2007) focus on the necessity to implement the principles of sustainable urban development within urban development and competitiveness, and emphasize that urban planning should cover a large number of different problems and objectives related to economic activities, the environment, cultural heritage and distribution of costs and benefits of the socio-economic development.

Despite the diversified researchers' evaluation and the general trend of the urban population growth, authors of this article acknowledge the growing influence of the urban competitiveness on the regional and national competitiveness.

Until now, scientists do not agree on the concept of urban competitiveness. According to OECD (2005), the city's competitiveness is assessed based on competitive products created in this city and income of the population; however, none assessment is conducted regarding the competitiveness of the provided services, the population's education and investment. Storper (1997), who defines the city's competitiveness as an economic ability to attract and maintain firms with stable or rising market shares in specific activities, refers to attracting successful companies, at the same time maintaining or enhancing the involved population living standards. The value of the site is emphasized by Begg (2004) in his definition. Linnamma (2001) believes that the city's competitiveness consists of six interrelated elements: infrastructure, human resources, quality of living environment, cost-effective networks and involvement in networks (alliances). A new element occurs – involvement in networks (alliances). While Kresl (1995) very specifically defines the city's competitiveness by distinguishing six quantitative and qualitative attributes: creating jobs which require high skills and create high value-added; production must develop into the environment-friendly goods and services; production should focus on goods and services of the desired properties; the rate of economic growth should allow to achieve full employment; the city has to specialize in activities that allow it to control its future; the city has to be able to strengthen its position in the hierarchy of other cities. Jiang and Shen (2010), Piliutytė (2007), Shen (2004) consider urban competitiveness as closely linked to urban management. A good strategy and an appropriate decision-making is the basis for ensuring a long-term successful development. Rogerson (1999) links the city's competitiveness to a high standard of living. While Webster and Muller (2000) identify the city's competitiveness with the company's (business) competitiveness. Urban competitiveness means the urban region's ability to produce and sell a package of products (goods and services) which are characterized by a high value (not necessarily by the lowest price), compared to similar products of other cities. This approach is contradicted by Lever (1993) and Turok (2004), claiming that urban competitiveness is different from the competitiveness of business companies. Cities compete to increase their attractiveness to potential target markets, modern infrastructure, high technologies, innovation activities. Locations are also competing to raise the quality of life and standards of environmental conditions. The authors agree with the scientists that business, rather than cities, is competing; however, emphasize the importance of urban environment and conditions of business for increasing competitiveness.

The authors perceive the city's competitiveness as its ability to create appropriate conditions for businesses to become more competitive and enhance their competitiveness, while at the same time maintaining a high standard of living conditions in the city and involving into alliances with other cities. (Paliulis, Činčikaitė, 2010). In this article the city is approached as a vibrant economic and social system, and the social problems of urban competitiveness are considered from the dynamic, rather than static, aspect.

In the scientific literature, there is no unanimous classification of determinants of urban competitiveness. Some authors classify these factors by their impact on the development, Lengyel (2003), Bristow (2005), citing Kresl (1995), according to the possibilities of controlling factors Reiljan et al. (2000). One of the most frequently mentioned classification in scientific literature references involves the internal and external factors of competitiveness (see Table 1).

**Table 1.** Classification of determining factors of urban competitiveness

| Factor group | Author |
|---|---|
| General factors, main characteristics of the market economy,  factors of operational infrastructure | Aušra Liučvaitienė, Kęstutis Paleckis (2011) |
| External factors | Cheshire and Hay (1989) |
| Internal factors | Jacobs (1970), Castells (1989), Storper (1997), Hall (1998), Scott (2001), Florida (2002), Budd (1998), Begg (1999), Webster and Muller (2000), Turok *et al.*, (2003) |
| Economic factors, strategic factors | Kresl (1995), G.Bristow (2005) |
| Territorial factors; Transmitted factors; Created factors | J.Reiljan *et al.* (2000) |

When analysing the abundance of internal factors, it has been noted that the majority of authors identify the following: innovation, information, knowledge, creativity, human resources, talent. Only Budd (1998) considers the size of the city and local economy as the key internal factors. He puts more emphasis on the territorial division. The authors also attach major attention to the inter-municipal cooperation, infrastructure, physical advantages of the location. Kresl (1995), G.Bristow (2005) proposed to classify the determining factors of urban competitiveness into two categories: Economic factors - factors of production, infrastructure, location, economic structure and institutions of the city. Strategic factors – the efficiency of the government, the city's strategy, partnership between private and public sectors, institutional flexibility. P. Hugon (2000), J. Reiljan *et al.* (2000) classified the determining factors of urban competitiveness into territoritial, transmitted and created factors. Liučvaitienė (2011) classified the factors into general, the key characteristics of the market economy and factors of operational infrastructure.

Following the analysis of factors determining the city's competitiveness, we can argue that urban competitiveness is affected by not one but a group of factors and their interactions.

## 2. Method

Scientific literature involves various methods of measuring competitiveness. Some authors assessed urban competitiveness by one or more indicators (Porter (1990), Krugman (1996), others (Sinkiene, 2009, 2008, Cho 1994, Rugman, D'Cruz & Verbeke, 1998, Kresl, 2007, Webster, Muller, 2000 *et al.*), developed theoretical models of urban competitiveness, combining a specific set of quantitative indicators; whereas others (Bruneckiene *et al.*, 2010, Bustillo *et al.*) measured by index (the knowledge-based economic development index, European competitiveness index, IMD Global Competitiveness Index, etc.) or created various mathematical equations.

The proposed urban competitiveness assessment model (see Figure 1) is based on the software targeted management approach. The essence of the software targeted management model is the software network management, which is based on the formulation of objectives, development of the system of a desired condition and establishment of criteria for achieving the objectives, forecasting measures for performing the analysis, development of action plans to achieve the objectives and setting up the action plan (Burkov *et al.*, 2010 Irikov *et al.*, 2009, Irukov *et al.* 2007).
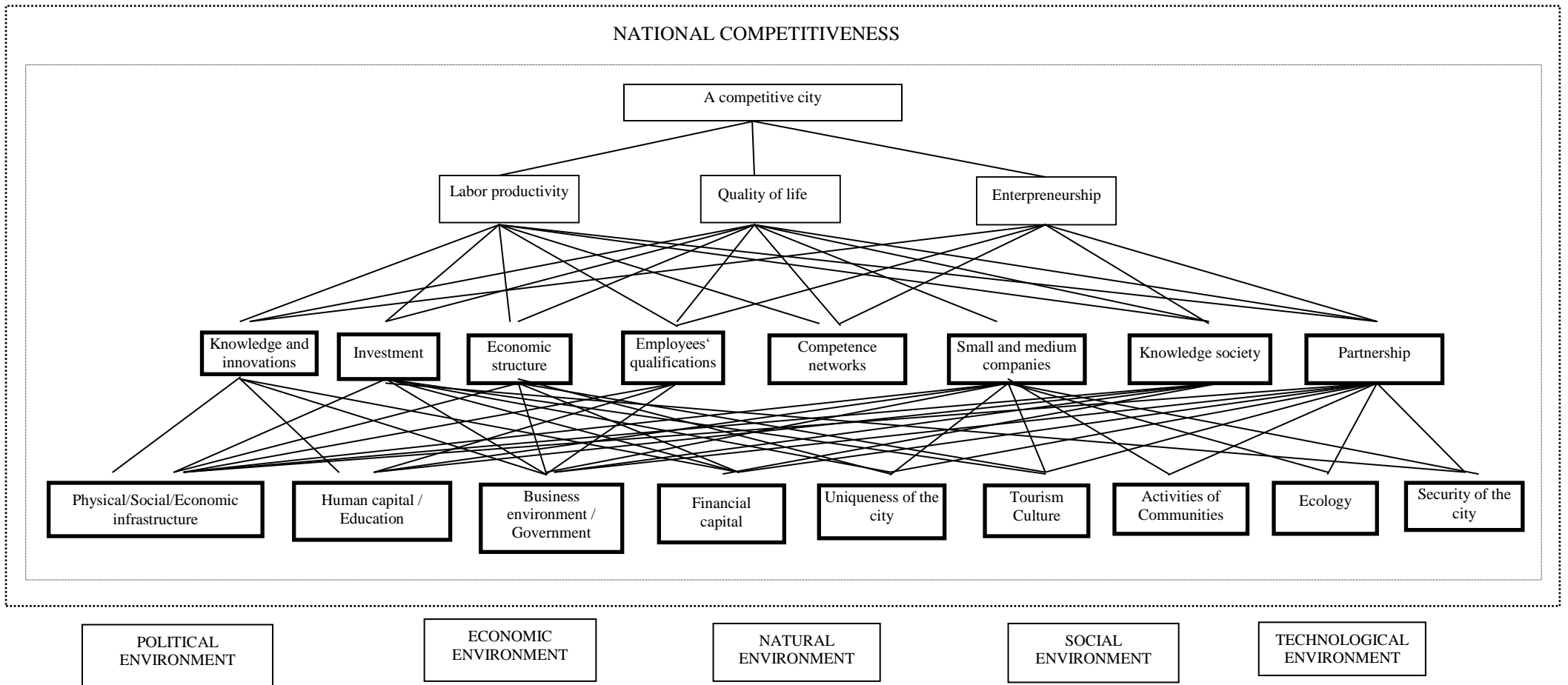
**Figure 1.** Urban Competitiveness Assessment Model

The urban competitiveness assessment model consists of four components:

– Assessment of the national external environment. This section assesses the environment in which the city is analysed; the city's competitiveness is measured. The identified factors: social environment, technological environment, economic environment, political environment, infrastructure, natural environment.
– Assessment of the basic (III)-level includes the following factors: physical, social, economic infrastructure, human capital, education, business environment and the government, its effectiveness, the city's uniqueness, tourism, culture, ecology, security of the city, communities and their activities.
– Assessment of the development (II)-level includes the following factors: knowledge and innovation, investments, employees' qualifications, economic structure, involvement in networks / alliances, business incubators / establishment of small business centres.
– Assessment of the success (I)-level includes the following factors: labour productivity, productivity, quality of life, entrepreneurship.

The proposed urban competitiveness model is used for:
1. A comprehensive assessment of the overall competitiveness between cities;
2. A comprehensive assessment of competitiveness between cities by separate levels (basic, development and success).

Quantitative applicability of the urban competitiveness model was conducted based of the sample of Lithuanian cities, using the expert assessment, multicriteria methods SAW, COPRAS and city's competitiveness assessment index.

# 3. Results

Almost 70 per cent of Lithuania's population lives in cities. Lithuania has 103 cities. The provided information on Lithuanian cities in statistical databases is neither detailed nor accessible; for this reason, the assessment of urban competitiveness, using multicriteria methods SAW and COPRAS, is made between the following cities: Alytus, Kaunas, Klaipeda, Marijampolė, Panevėžys, Šiauliai, Tauragė, Telšiai, Utena, Vilnius. Indicators used in the study are presented in the table below (see Table 2). It should be noted that the study does not consider the environment, i.e. the economic, political, social, natural and technological environment. The reason - different cities of one state are measured, i.e. the impact of environmental on each city of the same state is the same.

**Table 2.** Indicators

| Factor | Indicator | Weight coefficient |
|--------|-----------|--------------------|
| I level (success) | | 0,3 |
| Productivity | Gross domestic product (GDP), mln. Litas | 0.4 |
| Quality of life | Stock of dwellings, thousand m². Characteristics: place of residence | 0.3 |
| | Average monthly gross wages and salaries | 0.3 |
| II level (development) | | 0,3 |
| Knowledge and innovations | Number of computers | 0,15 |
| | Access to the Internet | 0,15 |
| Investment | Direct foreign investment, mln. Litas | 0,25 |
| SME | Number of operating small and medium-sized enterprises | 0,45 |
| III level (basic) | | 0,4 |
| Physical infrastructure | Length of local roads | 0,025 |
| Social infrastructure | Number of hospital beds | 0,05 |
| | Number of outpatient health care institutions within the Ministry of Health system | 0,05 |

| Factor | Indicator | Weight coefficient |
|--------|-----------|--------------------|
| Human capital / Education | Number of population at the beginning of the year | 0,1 |
| | Live births | 0,025 |
| | Dead | 0,025 |
| | Registered unemployed | 0,05 |
| | Employed | 0,1 |
| | Departed | 0,05 |
| Business environment / government | Number of operating economic entities | 0,1 |
| | Taxes, total | 0,05 |
| | Municipal budget expenditure | 0,15 |
| | Exports of goods of Lithuanian origin | 0,05 |
| Tourism | Accommodated tourists | 0,05 |
| Culture | Number of museums | 0,005 |
| | Libraries administered by the Ministry of Culture at the end of the year | 0,005 |
| Ecology of the city | Number of road vehicles at the end of year | 0,025 |
| Safety of the city | Recorded criminal offenses | 0,04 |
| | Number of police officers at the end of the year | 0,05 |

Each indicator, according to the expert assessment, is provided with the weight coefficient. The expert evaluation was carried out in January of 2013. The study interviewed 10 experts whose activities are related to urban and regional strategic planning, development, promotion of territorial socio - economic development. The study involved five experts with up to 1 year of work experience, three experts - from 1 to 3 years, one expert - 3 to 5 years, one expert - from 5 to 10 years. The surveyed individuals' qualifications and practical experience allows treating them as experts in assessing factors of urban competitiveness. Geographically, the expert assessment covered all the most densely populated cities in Lithuania.

Weight coefficients of factors determining competitiveness and their individual groups are identified by the statistical average method as follows:

$$\text{Weight coefficient} = \frac{\bar{s}_i}{\sum\limits_{i=1}^{m} \bar{s}}, \qquad (1)$$

where, $\bar{s}_i$ - statistical average, $\sum\limits_{i=1}^{m} \bar{s}$ - sum of statistical averages.

Weight coefficient varies from 0 to 1. The higher it is, the greater is the impact of the determining competitive factor. The sum of weight coefficients all the factors is equal to 1.

The study used two multicriteria evaluation and index methods:

− SAW (Simple Additive Weighting) method (Hwang, Yoon 1981):

$$S_j = \sum\limits_{i=1}^{m} w_i \tilde{r}_{ij}, \qquad (2)$$

where: $S_j$ – multicriteria evaluation value of the j-th alternative; $\omega_i$ – weight of the i-th indicator; $r_{ij}$ – normalised value of the i-th indicator for the j-th alternative.

$$\tilde{r}_{ij} = \frac{r_{ij}}{\sum\limits_{j=1}^{n} r_{ij}}, \qquad (3)$$

− COPRAS complex proportional assessment method (Zavadskas, Kaklauskas 1996; Zavadskas *et al*. 2004). Calculating by applying COPRAS method the data is normalized:

$$\tilde{r}_{ij} = \frac{r_{ij} w_i}{\sum\limits_{j=1}^{n} r_{ij}} \qquad (4)$$

where: $\omega_i$ – weight of the i-th indicator; $r_{ij}$ – normalised value of the i-th indicator for the j-th alternative.

The assessment of Lithuanian cities' competitiveness during the period from 2005 to 2011, by applying the expert assessment and multicriteria evaluation methods SAW and COPRAS, has been carried out: a complezx assessment of competitiveness between cities at separate levels (basis, development and success) (see Figures 2-4), a complex assessment of the overall competitiveness between cities (see Figure 5).
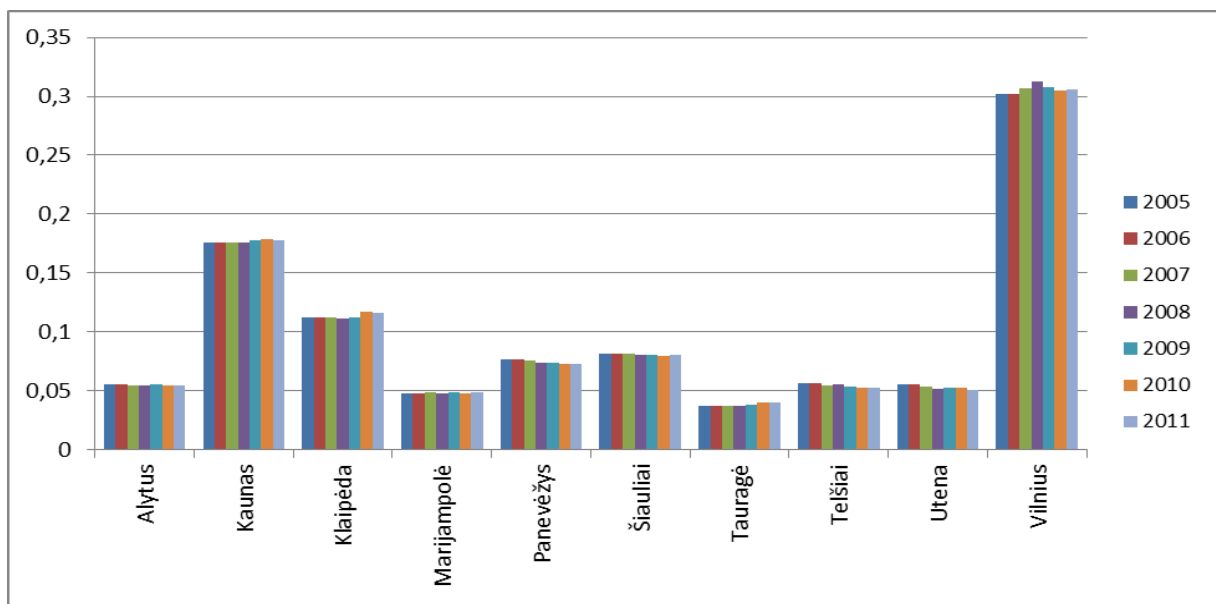


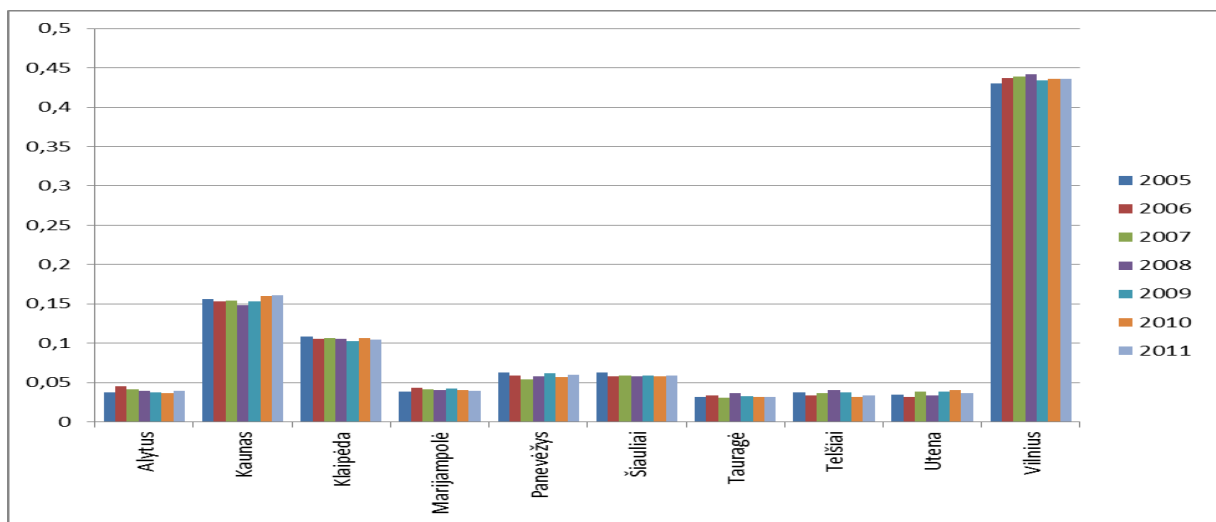**Figure 2.** Complex assessment of competitiveness of Level I factors



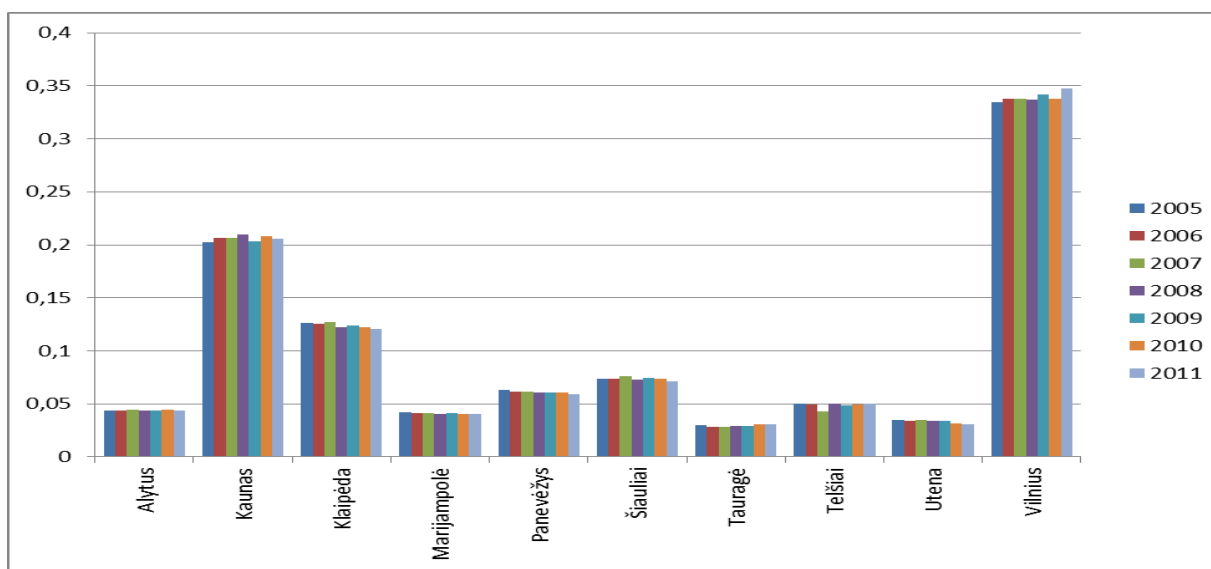**Figure 3.** Complex assessment of competitiveness of Level II factors

**Figure 4.** Complex assessment of competitiveness of Level II factors

Following the study (see Fig. 2-4) it has been noted that at all levels (basic, development and success), as to competitiveness, Lithuanian cities are located in the similar position: Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys, Telšiai, Utena, Alytus, Marijampolė and Tauragė.

In measuring the overall competitiveness between cities (see Figure 5), the situation remains the same as in the measuring of urban competitiveness by levels.
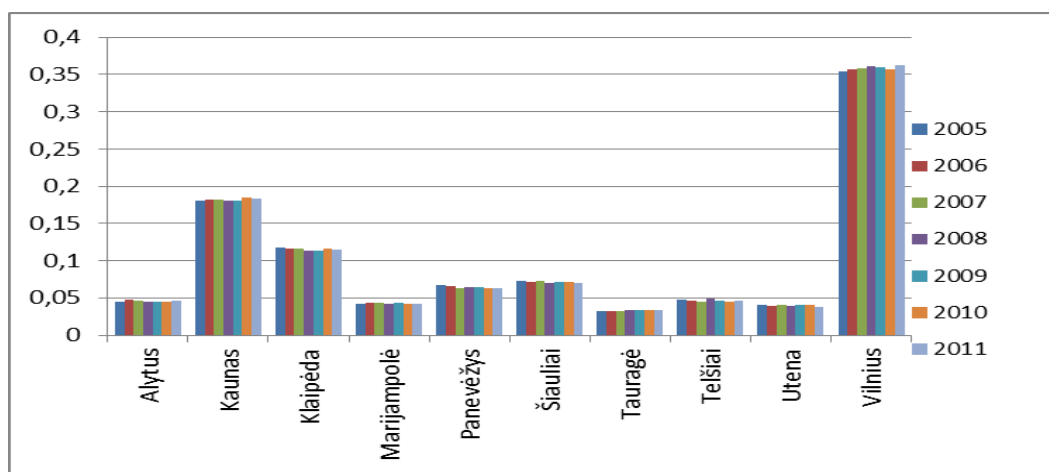


**Figure 5.** Complex assessment of urban competitiveness in Lithuania

The sequence of Lithuanian cities' competitiveness would be as follows: Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys, Telšiai, Utena, Alytus, Marijampolė and Tauragė.

It has been noted that for different indexes of competitiveness different data normalization methods are applied. In order to determine which of the normalization methods for assessing the Lithuanian uban competitiveness evaluation index is the most accurate, the following methods are applied (see table below):

 − The standard deviation from the mean;
 − Distance from the minimum and maximum values.

**Table 3.** The city's competitiveness assessment index by applying different normalization methods

| City | 2008 | | 2009 | | 2010 | | 2011 | |
|---|---|---|---|---|---|---|---|---|
| | **Standard deviation from the mean** | | | | | | | |
| | **Index** | **Rate** | **Index** | **Rate** | **Index** | **Rate** | **Index** | **Rate** |
| Vilnius | 1.991 | 1 | 2.025 | 1 | 1.985 | 1 | 2.024 | 1 |
| Marijampolė | -0.452 | 6 | -0.442 | 6 | -0.45 | 6 | -0.44 | 6 |
| Alytus | -0.504 | 10 | -0.505 | 10 | -0.494 | 9 | -0.496 | 9 |
| Utena | -0.457 | 7 | -0.489 | 8 | -0.508 | 10 | -0.505 | 10 |
| Telšiai | -0.466 | 8 | -0.46 | 7 | -0.476 | 8 | -0.468 | 8 |
| Panevėžys | -0.365 | 5 | -0.363 | 5 | -0.365 | 5 | -0.367 | 5 |
| Šiauliai | -0.248 | 4 | -0.241 | 4 | -0.243 | 4 | -0.259 | 4 |
| Klaipėda | 0.136 | 3 | 0.127 | 3 | 0.118 | 3 | 0.113 | 3 |
| Kaunas | 0.867 | 2 | 0.839 | 2 | 0.908 | 2 | 0.863 | 2 |
| Tauragė | -0.503 | 9 | -0.49 | 9 | -0.475 | 7 | -0.466 | 7 |
| **City** | **Distance from the minimum and maximum values** | | | | | | | |
| | **Index** | **Rate** | **Index** | **Rate** | **Index** | **Rate** | **Index** | **Rate** |
| Vilnius | 0.874 | 1 | 0.874 | 1 | 0.873 | 1 | 0.872 | 1 |
| Marijampolė | 0.072 | 6 | 0.073 | 6 | 0.071 | 6 | 0.07 | 6 |
| Alytus | 0.052 | 10 | 0.052 | 10 | 0.057 | 9 | 0.052 | 9 |
| Utena | 0.071 | 7 | 0.057 | 9 | 0.05 | 10 | 0.048 | 10 |
| Telšiai | 0.068 | 8 | 0.067 | 7 | 0.06 | 8 | 0.06 | 8 |
| Panevėžys | 0.099 | 5 | 0.098 | 5 | 0.1 | 5 | 0.095 | 5 |
| Šiauliai | 0.138 | 4 | 0.139 | 4 | 0.141 | 4 | 0.13 | 4 |
| Klaipėda | 0.265 | 3 | 0.258 | 3 | 0.259 | 3 | 0.25 | 3 |
| Kaunas | 0.51 | 2 | 0.492 | 2 | 0.524 | 2 | 0.497 | 2 |
| Tauragė | 0.057 | 9 | 0.057 | 8 | 0.061 | 7 | 0.061 | 7 |

From the table above we can see that the competitiveness of Lithuanian cities (using the standard deviation from the mean normalization method) is located in the following sequence: Vilnius, Kaunas, Klaipėda, Šiauliai and Panevėžys. However, in 2009 there are certain adjustments in the location of urban competitiveness between the following cities: Telšiai, Tauragė and Alytus. The most interesting fact is that when applying the distance between the minimum and maximum values data normalization method in 2009, the cities Tauragė and Utena changed places according to the urban competitiveness assessment index.

The conducted study does not assess qualitative indicators; due to this reason the empirical application of the proposed model should be elaborated.

The study revealed that Lithuanian cities, Vilnius, Kaunas and Klaipėda in particular, occupy the leading position; thus, it is suggested to conduct the assessment between cities which are similar according to the numer of population, area, etc.

# 4. Discussion

The city is a lively economic and social system, while the problems of the city's competitiveness are considered from the dynamic, not static, aspect.

Urban competitiveness is the ability to create appropriate conditions for businesses to be more competitive and to increase their competitiveness, while at the same time maintaining a high standard of living conditions in the city and involving into alliances with other cities.

Collecting the data on cities with less than 150,000 (NUTS III classificatory min. the number of population) is very complicated as the data is not publicly available in accessible statistical indicators databases.

The city competitiveness assessment model is introduced, consisting of four components: assessment of the state's external environment. This section assesses the environment in which the city is analysed; the city's competitiveness is evaluated. Identified factors: the social environment, technological environment, economic environment, political environment, infrastructure, natural

environment; assessment of the basic (III) level, the identified factors: physical, social, economic infrastructure, human capital, education, business environment and the government and its effectiveness, uniqueness of the city, tourism, culture, ecology, security of the city, communities and their activities; assessment of the (II) level of development, the identified factors: knowledge and innovation, investments, employees' qualifications, economic structure, involvement in networks / alliances, business incubators / establishment of small business centres; assessment of the (I) success level, the identified factors: labour productivity, productivity, quality of life and entrepreneurship.

The proposed urban competitiveness assessment model is used for: a comprehensive assessment of the overall competitiveness between cities, a comprehensive assessment of competitiveness between cities at separate levels (basic, development and success).

Following the empirical study, by competitiveness Lithuanian cities are classified as follows: Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys.

The conducted study does not assess qualitative indicators; for this reason empirical application of the proposed model should be elaborated.

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