

Measurement of Urban Competitiveness in Lithuania

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The theoretical and practical aspects of the measurement of urban competitiveness are analyzed in this article. But, why the measurement of urban (at the same time regional or national) competitiveness is so important? The answer to this question is related to the fact, that if the competitiveness cannot be measured, it cannot be improved. As the cities compete directly among other cities on regional, national and global level, the constant improvement of the urban competitiveness will increase the productivity, visibility, popularity, attractiveness, quality of life etc. of the city and at the same time of the region and the country.

While the academic understanding of urban competitiveness is still forming, the factors of urban competitiveness are still being identified, the urban competitiveness levels of analysis are still being modelled in the scientific literature, the competitiveness of a city can be measured in different ways: analyzing one or several factors of urban competitiveness, using theoretical models of urban competitiveness, creating composite indices, etc. As every method has its advantages and disadvantages, scientists seek to find the most reliable, methodologically justified, understandable, convenient to use and objective method, which could be accepted generally and widely used in urban governance.

The core factors of urban competitiveness based on sustainable development perspective, the indicator system for measuring urban competitiveness, the stages and the main aspects of the composite index for measurement the urban competitiveness are presented in the article. The theoretical background is empirically tested on the basis of the data of 24 Lithuanian cities from 10 Lithuanian regions during the period of 2007 - 2009. The results of the measurement of urban competitiveness in Lithuanian regions and advantages and disadvantages of the use of urban competitiveness index are presented in the article. The strategic aspects of the improvement of the competitiveness of Lithuanian cities are also provided in the article.

The new created Lithuanian urban competitiveness index, presented in the article, is one of the ambitions to promote the methodological background for urban governance and improvement the competitiveness of Lithuanian cities.

Keywords: *urban competitiveness, factors, indicators of urban competitiveness, measurement of urban competitiveness, urban competitiveness index.*

Introduction

The attention to urban competitiveness was increasing among scientists, politicians, investors, tourists and even sport or culture events organizations during recent decades. The cities interrelate in the global urban system and according to their particular performance in different sectors and activities (manufacturing, services, high technology, tourism etc.) as well as spheres of influence (regional, national, international), compete for employment, investments, new technologies, tourists, national projects, preferential policies, etc. Cities consistently are looking for perspective niches where they should or could increase their competitiveness and hereby upgrade their status in the inter-city competition.

Various articles have been published on the concept of urban competitiveness, representing the diverse aspects of economic, technological, political-legal, social-cultural, ecological-environmental conditions and factors of a city, proposing ranks of the most competitive cities around the world. Most studies of urban competitiveness focus on the world wide known core cities or larger urban zones of the United States, Europe and Asia. The competitiveness of the cities of the countries, which correspond to the second level NUTS¹ of the European Union is lacking of scientific attention.

Despite the increasing number of scientific works on urban competitiveness issues, the researches about the techniques of measurement of urban competitiveness are still lacking, especially in Lithuania. Since the competitiveness of a city is originated from diverse inputs and the outputs achieved from competitiveness are dispersed to various issues of a city, a single indicator alone is not able to represent the urban competitiveness. Economic, social and environmental factors should be taken into consideration in the measurement of competitiveness of a city. The composite index is considered to be one of the methods to analyze competitiveness in a complex way.

The research showed that there is the lack of scientific works, which reveal the particularities of the measurement

¹ *Nomenclature of Territorial Units for Statistics*

of urban competitiveness by a composite index and clear interpretations of the results. The two most famous Competitiveness Index of IMD and Global Competitiveness Index of World Economic Forum have been formed and widely applied in the world, but they are generally intended for the measurement of the competitiveness of a country. There is the lack of the researches about their possibilities of application in the measurement of urban competitiveness within a country, especially which correspond to second level NUTS of the European Union. Hence, an urban competitiveness index, which would be grounded methodologically and would enable to measure the competitiveness of the cities of the country, is still missing. Lack of a means of complex measurement of competitiveness is becoming one of the obstacles which prevents from measuring a competitive potential of a city and forming effective strategies of increase in competitiveness.

The aim of the article is to create and practically use the Lithuanian urban competitiveness index and provide the strategic aspects for the improvement of the competitiveness of Lithuanian cities.

Methods of the research: systemic, comparative and logical scientific literature analysis; empirical research employing systemic analysis of external secondary data.

The concept of a city and urban competitiveness

The concept of urban competitiveness is closely related to the concept of a city. The concept of a city is mostly analyzed in the scientific works, connected with the spatial development. In recent years, the economic researches about the role of the cities on the economic development or competitiveness of a region or the country become more popular among scientists. Most of them provide the definition of a city based on the background of the spatial development. The scientists use two types of the concept of the city: "city" and "city-region". The concept of a city is mostly used in the analysis of towns, which are smaller in area and have less impact on economic development at global level in comparison with the city-region. The concept of a city-region is used in the analysis of large in area, world wide known business centers, such as New York, London, Tokyo, Paris, etc. The "city-region" has the "core city" and many towns and villages, which thrive because of the inter-actions which flow outwards from "core-city" role. In this article the concept "city" will be used in the same way as it is presented in the chapter 1 of the law on territorial administrative units and their boundaries in the Republic of Lithuania (Zin., 1994, Nr. 60-1183): the towns are compactly built up residential areas with clearly settled boundaries, where more than two-thirds of the working population are employed in industry, business and production, social infrastructures.

In the scientific literature (Lukovics, 2007) the role of the competitive city on the regional (national) competitiveness or development is described mostly coincidentally. Jeney (2010) considered cities as more developed elements of the spatial structure in all member states of the European Union. Kresl, (2007) argued that the economic well-being of the entire nation depends upon the

economic vitality of the principal city. HM Treasury (2003) affirmed that competitive cities create prosperous regions. Sinkiene (2008) emphasized that cities are the centers and engines of national and international socio-economic growth. Singhal, et al, 2009, Ratcliffe ensured that cities are fast coming to function as the basic motors of the global economy. Rogerson (1999) pointed to the fact that there are clear links between the attraction of capital to the city (city competitiveness) and quality of life. Despite the fact of positive interlinks between competitive city and competitive region (country), the theoretical explanation of urban competitiveness is still one of the most difficult and complicated parts of the conception of competitiveness.

In order to measure the urban competitiveness of Lithuanian cities, the acceptable definition of "urban competitiveness" should be provided. The research carried out by the authors of the article has proved that in scientific literature competitiveness is analyzed in a number of ways: according to separate macro-economic indicators, indicators of activity of firms or separate sectors, policies carried out by the authorities, conditions which make firms be competitive or combine several aspects under discussion at the same time. Some authors (Kvainauskaite et al., 2003, Kvainauskaite, Snieska, 2002) measure the competitiveness of the territory by business structure or market demand, still others (Saboniene, 2009) - by export, some authors (Snieska, Drakstaite, 2007) - by outsourcing of knowledge process. Snieska et al. (2002) proved that the cluster based approach in the implementing policy can increase regional competitiveness and speed up economic development. Malakauskaite, Navickas (2010) proved that there is the relation between the clusterization and competitiveness of tourism sector. Startiene & Genyte (2004) were evaluating the competitiveness of milk processing sector by two levels: macro environment (distant, general or social environment) and by factors excluded in Porter's model. Rutkauskas (2008) defined the competitiveness as a three-dimensional indicator, which depends on the fields of activity, dominating in the country, international economic relations and legal, financial, ecological, natural resources and geographical location environment competitiveness.

The research showed, that the urban competitiveness refers to interrelations among its causes (or determinants), the process of competence itself (rivalry among economic units) and its consequences (effects in the macro and micro evolution). The urban competitiveness in economic literature is often identified to the productivity of a city, success in external markets, growth in local income and employment, i.e. the economic performance of the city is emphasized. Under this view of the analysis, the concepts of urban competitiveness and urban economic competitiveness are interchangeable. As the concept of competitiveness was first used in the industrial and business sectors, some authors conceptualize the concept of urban competitiveness to competitive firms, mainly in its productivity and profit. The other authors highlighted the local conditions for cities to be competitive. Jiang and Shen (2010), Shen (2004) affirmed that competitiveness of firms and operational environments are important determinant of competitiveness of cities. OECD (2006)

conceptualized the urban competitiveness in terms of two closely linked dimensions: 1) the development of the productivity of the business sector and 2) the development of human capital in the city. Landry (2000) suggested that urban vitality is a new source of urban competitiveness. Jiang and Shen (2010), Piliulyte (2008), So, Shen (2004) highlighted that the concept of urban competitiveness is closely related to the effectiveness of urban governance. A good strategy and entrepreneurial and competitive style of urban governance are the basis for coordinating long-term development of a city. The other authors included many various factors to the concept of urban competitiveness. Jiang & Shen (2010) cited Kresl (1995), who divided the sources of urban competitiveness into two parts: economic determinants and strategic determinants. Economic determinants include factors of production, infrastructure, location, economic structure, and urban amenities, while strategic determinants include governmental effectiveness, urban strategy, public-private sector cooperation, and institutional flexibility. The other authors (Rogerson, 1999) analyzed the urban competitiveness in a broad-brush view and identified it to high quality of life. Despite the various views of the authors to the concept of urban competitiveness, the scientific literature lacks specific definition of urban competitiveness. Mostly the authors provide the definitions which are similar to definitions of regional or national competitiveness. The main definitions of urban competitiveness are presented in Table 1.

Table 1

Definitions of urban/city competitiveness

Author	Definition
European Commission, 1999	Competitiveness is defined as the ability to produce goods and services which meet the test of international markets, while at the same time maintaining high and sustainable levels of income, or, more generally, the ability of (city) to generate, while being exposed to external competition, relatively high income and employment levels.
OECD (Begg, 1999)	The degree to which it can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long term
D. Webster, L. Muller, 2000	City competitiveness refers to the ability of a city region to produce and market a set of products (goods and services) that represent good value (not necessarily lowest price) in relation to comparable products of other city regions. Non-tradables, e.g., local services, are part of the competitiveness equation.
P. K. Kresl, 2007	Urban competitiveness refers to the degree to which a city or urban region, in comparison with other competing cities, is able to provide jobs, income, cultural or recreational amenities, degree of social cohesion, governance and urban environment to which is current and targeted new residents aspire.
J. Sinkiene, 2009	It is the ability of city population to maintain competitive position within a specific area (market) of competition among other cities of similar type and pursuing similar aims by conserving resources and improving wellbeing of city members by management of factors of external and internal environment.

Some other authors (Martin et. al., 2004) analyzed the competitiveness in the view of relations among two or more objects or the change of position in the spatial

system. The members of Global urban competitiveness project defined the urban competitiveness as a change in cities' economic position in the national or international urban system, or even as the interrelation between the local economic performance and other social, political and environmental manifestations of the urban life.

The authors of the article applied this viewpoint to the analysis of regional competitiveness (Snieska, Bruneckiene, 2009, Bruneckiene, Cincikaite, 2009). The results of scientific research proved the appropriateness of such viewpoint to analysis of competitiveness in the context of competitiveness measurement. In this article an urban competitiveness is defined as an ability of a city to use factors of competitiveness in order to make a competitive position and maintain it among other cities. Such viewpoint allows treating the competitiveness as a self reinforcing process, where present factors of competitiveness (inputs) create future factors of competitiveness (outputs) and after that outputs become inputs for a new cycle of competitiveness process. Of course, the whole process can operate in the opposite direction. This issue is fundamental for strategic planning, as the process of improving urban competitiveness is a continual and cyclical. The strategic decisions should be based on the up to date results of the measurement of competitive position and potential of a city.

The research showed that the concept of urban competitiveness, provided in the scientific literature, is mostly connected with the economic well being of the city. The authors agree with Jiang, Shen (2010), that the economic success does not guarantee the success of the noneconomic aspects or even of long-term economic success. If economic success alone is sufficient to represent competitiveness, then probably the increasing urban problems such as pollution should be accepted (Turok et al., 2004). Competitiveness of a city is sensitive to its economic performance, social development, quality of environment (Bailey et al., 2002, Begg, 1999) and effective urban governance. This justifies the necessity to analyze urban competitiveness in a comprehensive perspective.

The essence of competition among cities

The research showed that the concept of urban competitiveness is a subject of controversy. Krugman (1994) stated that territories do not compete with each other, only firms do, because countries, regions can not go out of the business. Camagni (2002) contradicted that territories can suffer long-term out migration, stagnant investment, falling per capita incomes and raising unemployment. The authors of the article support the idea that countries, regions and cities compete. The simple example of competition among cities is provided by the authors when New York, London, Paris, Madrid and Moscow were competing to be the city of 2012 Summer Olympics. To win such competition, each city must struggle to enhance its competitiveness, that is its ability to compete against other comparable cities (Kresl, 2007).

Despite the contradictory discussions about the expedience of the application of competitiveness concept

to territories (Porter, 1990, Krugman, 1994, Camagni, 2002, Turok, 2004, Kresl, 2007), the attention of scientists to the concept of urban competitiveness arises and the number of scientific researches grows. This is determined by the more intensive competition among the cities, independent from their size, location or economic power. The scientific researches shows, that the firm remains the central element in the scientific approaches in the studies of competitiveness and designing a policy by the city. As the firms are direct users of the competitiveness of the city and urban economics, this justifies the necessity to disclose the essence of competition among cities more widely. Referring to the authors (Piliutyte, 2007, Begg, 1999) cities are in competition and compete internationally, nationally and at regional level. Regardless of what factors the competition among cities is analyzed by different scientists, all of them stress the same aim: to be attractive city for business, residents, investments, tourists, financial support of EU, etc. According to Turok, et al (2004), cities compete for the position of regional service centre, for nationally and internationally traded products, for inward investment, for skilled mobile population, and in “episodic markets” to host international conventions, cultural festivals, sporting fixtures and other hallmark events. Globalization, advances in information technology and structural changes (i.e. European, global integration) make cities similar to a certain extent. Because of this similarity, the inter-city competition increases. The academic discussion is provided about the market of urban competitiveness. Piliutyte, 2007 stressed that in order to increase the competitiveness of a city, it is crucial to correctly identify the markets of the competition. The markets in which cities compete may be defined in terms of spatial scale (regional, national or international) or type of commodity (products, services or resources such as finance or labour). The form and intensity of competition and the structure of incentives will vary between them, so the way cities gain a competitive advantage will differ too. Some authors affirmed that cities compete not in all spheres. The cities identify the market of the competition, in which the city has competitive advantages or possibilities to compete with. Begg (1999) and Kresl (2007) highlighted that urban competitiveness refers to the all round strengths of a city instead of a particular kind of strength alone. Not all cities are in competition with each other. In scientific literature the practical example of competition among global cities such as London, New York, Tokyo have been provided for a long time. Despite the fact, that the competition is not restricted to the cities with a comparable level regarding size, economic structure, welfare etc., the practical example of competition of business center and other domestic small cities is provided very rare. The researches provided 3 stereotypes of cities in competition, depending on their size (the economic agglomeration):

1. Single city of a single country which is in competition with other single city (from the same or different country) from the same market of urban competition.

2. Medium- and small-sized cities as highly specialized economic agglomerations which are in competition with other specialized locations.

3. Regions centers which are in competition with other regions centers.

The scientists (Rainisto, 2003, Sotarauta, R. Linnamaa, 2001), analyzed the essence of competition among cities and often paid the attention to the examples of successful cities and their characteristics and used the research results for conceptualization of a competitive city. Begg (1999) cited Kresl (1995), who identified six attributes of a competitive urban economy:

- the jobs created should be high-skill, high income jobs;
- production should evolve towards environmentally benign goods and services;
- production should be concentrated in goods and services with desirable characteristics, such as high income elasticity of demand;
- the rate of economic growth should be appropriate to achieve full employment without generating the negative aspects of overstressed markets;
- the city should specialize in activities that will enable it to gain control over its future, that is, to choose among alternative futures rather than passively accepting its lot;
- the city should be able to enhance its position in the urban hierarchy.

Rainisto (2003) cited Sanchez (1997), who identified the criteria of internationally competitive city:

- population over one million; a diverse, qualified labour force; the presence of great universities, of high-level research and of a complete infrastructure;
- international activities that earn the city a place in networks of economic, scientific and cultural exchange and make it a financial centre; a high volume of air traffic; being well-served by advanced telecommunication facilities;
- a high level of specialization and the availability of services at an international level; the ambition to serve as a location for the headquarters of international corporations;
- facilities that allow the organization of international events such as congresses, trade shows and festivals;
- resident communities of foreign officials and business leaders with their associations or clubs;
- cultural infrastructure, including press agencies and book publishers, museums, monuments to be visited, cultural events of international renown; artistic manifestations that project it as a centre for business, culture, leisure and tourism far beyond the national borders;
- city should strive to remain distinct among the set of competitors in a global context, spanning the cultural, political and economic fields.

The research showed that some authors, defining competitive cities, emphasized the transition from manufacturing to services, to knowledge based activities. The others stressed the niche manufacturing, logistics, administration or culture and recreation.

The research showed that different authors identified various key factors of a success city, but mostly pointed a diverse economic base and qualified human capital;

services with high technology and strong local linkages to knowledge-based institutions; developed and modernized infrastructures (transport links and telecommunications, etc.); a high quality of urban environment - built environment, public open space and urban life and the institutional capacity to develop and implement future-oriented development strategies. According to the analysis of the key factors of a success city, the urban city should be analyzed in a complex way, i.e. analyze economic, social and environmental factors.

Despite the fact, that different authors in scientific literature used different criteria and characteristics of a competitive city (human resources, quality of living environment, firms, infrastructure, institutions and effective policy-networks, memberships in networks) all of them agree, that the most competitive cities are those offering the highest quality of life to their inhabitants, the most acceptable conditions for business and investment, the most attractive conditions for tourists, etc.

In order to better disclose the complexity and controversy of the concept of city competitiveness and justify methodologically the measurement of the urban competitiveness, the main factors of urban competitiveness should be identified and analyzed.

The factors of urban competitiveness

The research of the region competitiveness done by the authors (Bruneckiene, 2010, Snieska, Bruneckiene, 2009, Bruneckiene, Cincikaite, 2009) proved the importance of the identification of the main factors of competitiveness in improving the competitiveness of region and cities. The identification of the core factors of urban competitiveness and incorporation to the urban governance and strategic planning let identify the current competitive position of the city more effectively and to foresee possible perspectives for a more targeted city development and competitive policy.

The analysis of scientific literature showed that scientists often identify the same factors of urban competitiveness as regional competitiveness. The authors noticed that the scientists pay more attention to the governance by analyzing the urban competitiveness than analyzing regional competitiveness. The authors of the article presented the main models of competitiveness, highlighted their advantages and disadvantages and identified the factors of regional competitiveness in previous articles (Bruneckiene, 2010, Snieska, Bruneckiene, 2009, Bruneckiene, Cincikaite, 2009,). In this article more attention is paid to the specific factors of competitiveness of the city.

In real life cities create the development strategies for short (usually 1- 3 years) or for long period (usually 7 – 15 years) in order to increase their competitiveness. Various factors of competitiveness are identified and various sets of them are developed. The experience of the authors let confirm that in practice it is difficult to precisely find which and how concrete factor of competitiveness determine the increase or decrease of urban competitiveness.

Different authors used different classifications of factors of urban competitiveness. OECD (2006) identified

two sets of factors: urban specific and external ones. The former are localized assets, including the quality of urban/regional governance, whereas external factors include the national and international economic and policy context. The other authors (Porter, 2000) identified the factors of competitiveness with business performance and the local conditions for firms to be competitive. Jiang and Shen (2010) cited Kresl (1995), who divided the sources of urban competitiveness into two parts: economic determinants and strategic determinants. Sotarauta, Linnamaa (2001) the infrastructure, firms and human resources identified as traditional factors of competitiveness. Webster and Muller (2000) classified the factors of competitiveness into four separate groups: economic structure (economic composition, productivity, output and value added, and investment – foreign and domestic), territorial endowment (location, infrastructure, natural resources, amenity, cost of living and doing business, and an urban region's image), human resources (skill levels, availability, and costs of labor), institutional and cultural milieu (business culture, governance and policy frameworks (including incentive structures), and network behavior. The authors stressed that human resources, along with the institutional milieu are probably the most important factors in explaining competitiveness.

In recent years cities have started focusing more on promoting such factors as the quality of the living environment, institutions and effective policy-networks, and memberships in networks. Webster and Muller (2000) classified the factors of urban competitiveness into external and internal. The external factors include the factors, which represent the external (global and national) conditions for the city to be competitive: national and supranational policies, structure of national economy, level of innovations, national tax policy, integration process of the country, development of human resources, tariffs, initiatives of macroeconomics and industry, other public policy conditions, level of accessibility, labor force skills, etc. Sinkiene (2009, 2008) classified the external factors into the economic, technological, political-legal, social-cultural, ecological-environmental factors.

Internal factors of a city include four groups of factors: human factors, institutional factors, physical factors, economic factors. Sinkiene (2009) affirmed that among physical factors, urban infrastructure and geographical location of a city are indicated as most important. In the group of institutional factors, the most important is effectiveness of local government activity. In the group of human factors, factor of local labour skills and local city leaders received the greatest importance. In the group of economic factors, local high value added activities were indicated as having the greatest importance for city competitiveness. Within the group of internal factors, the following factors of local R&D institutions and local tax system received the least attention. The other authors (Bustillos et al, 2010, HM Treasury, 2003) stressed universal factors, which can be applied to every city (such as innovation, efficiency of transport connection to key market, capacity to deliver long term development strategies, creativity, health sector, information), or specific factors, according the feature of the city (such as

forest exploitation, mining). Despite the fact that different authors identified different factors of urban competitiveness, all of them agree, that the competitiveness of the city depend on a complex of the factors and interrelations of them, not on the single one. However, the competitive significance of each of the factors depends on the local context.

Jiang, Shen (2010), So, Shen (2004) stressed, that a city is not only an economic unit, but also a social–ecological system. Sinkiene, 2008, Begg, 1999, Lever and Turok, 1999, have highlighted the importance of quality of life to urban competitiveness. According to the fact that social, ecological, environmental, etc. factors have direct impact on a city’s recent and future performance and cannot be generally excluded from the city’s life, the sustainable view to the analysis and measurement of urban competitiveness should be incorporated. The authors think that urban sustainability is a must to incorporate to the methodology of measurement urban competitiveness, competitiveness-building strategies and monitor systems.

The methods of measurement of urban competitiveness

The scientific research done by the authors and the experience of the authors in measuring regional competitiveness (Snieska, Bruneckiene, 2009, Bruneckiene, Cincikaite, 2009, Bruneckiene, 2009) let affirm, that the methodological background of measuring urban competitiveness does not differ much from measuring regional competitiveness. The specific is in identifying the factors of urban competitiveness.

The research carried out by the authors of the article has proved that in scientific literature urban competitiveness is analyzed in a number of ways, which have advantages and disadvantages. So there’s no single, the best way to measure territorial competitiveness.

The competitiveness of a city can be measured in different ways: analyzing one or several factors of competitiveness, using theoretical models of competitiveness, creating composite indices, etc. Porter (1990), Krugman (1996) stressed that productivity is a major part of competitiveness. Kresl (2007) used such issues as industrial districts, clusters and agglomeration, structure and productivity for the analysis of urban competitiveness. The other authors analyzed the real per capita income or productivity growth, trade performance, export. Some authors analyzed the urban competitiveness according to a set of macro-economic indicators. Webster and Muller (2000) combined the factors into four separate groups (economic structure, territorial endowment, human resources, institutional milieu). The other authors (Begg, 2002) used the equation which consisted of the sum of retail sales, manufacturing value added and business sales for the competitiveness analysis.

The other authors analyzed urban competitiveness based on most widely acknowledged models of competitiveness (“National Diamond” model, “Double Diamond” model, “Nine factors” model, “Competitiveness Cycle” models) or based on advantages of widely acknowledged models create their own urban competitiveness models (Sinkiene, 2009, 2008). The other

authors (Jiang, Shen, 2010, Bustillos et al, 2010, So, Shen, 2004) used a composite index for the measurement of urban competitiveness. The analysis of urban competitiveness index showed that the methodology of these indices differs from the two most famous indices (the Competitiveness Index of IMD and The Global Competitiveness Index of World Economic Forum) in the identification of factors and indicators of urban competitiveness and the incorporation of the sustainability perspective to the composition of index.

The analysis of the main problems of urban competitiveness measurement showed that competitiveness cannot be completely defined by one or several economic and social indicators. Thus, complex measurement of competitiveness is a must. The researches (Snieska, Bruneckiene, 2009, Ciegis et al, 2009 a, Ginevicius, Podvezko, 2009) proved that the measurement by a composite index helps to solve the problem of complexity. The analysis of the criteria of a competitive city and the opinion of the scientists (Jiang, Shen, 2010, Bustillos et al, 2010, Melnikas, 2010, Balkyte, Tvaronaviciene, 2010, Ciegis et al, 2009 b, Kavaliauskas, 2008, So, Shen, 2004, Deas, Giordano, 2001) that a competitive city must be doing well economically with good social facility and structure as well as good quality of environment, proved, that the urban competitive measurement should be measured in a sustainable development perspective. The carried out aspects will be incorporated by the authors to the methodological basis of the formation of Lithuanian urban competitiveness index (LUCI) as well as in a measurement of urban competitiveness in Lithuania

The methodology of Lithuanian urban competitiveness index

The scientific analysis of the main problems of urban competitiveness measurement and the analysis of regional competitiveness measurement (Bruneckiene, 2010, Snieska, Bruneckiene, 2009, Bruneckiene, Cincikaite, 2009) proved that the measurement of regional competitiveness and urban competitiveness by composite index mostly differs in the selection of competitiveness factors and indicators and techniques of factors weighting. The researches of the authors (Snieska, Bruneckiene, 2009) proved that when applying different techniques of weighting the factors, the results of ranking measurement, carried out with the help of regional competitiveness index, do not change significantly. According to the scientific results, the same weight coefficients will be provided for all factors of urban competitiveness distinguished in the methodology of Lithuanian urban competitiveness index. Also the LUCI will be calculated by the method of the normalization of the distance from the minimum and maximum values. Because of the space limitation in the article and the fact that the fundamental scheme of competitiveness index calculation was presented in other articles of the authors (Bruneckiene, 2010, Snieska, Bruneckiene, 2009), in this article more attention is given to the identification of the factors and indicators of urban competitiveness. The authors briefly remind that an index of competitiveness is calculated via the following stages:

forming the model of competitiveness (i.e. identification of the factors and indicators and grouping them in one system), normalizing, grouping and weighting the indicators and calculating the index of competitiveness.

Based on the analysis of the concept of urban competitiveness, the perspective of sustainable development will be incorporated into the measurement of urban competitiveness and economic, social and environmental factors and indicators will be identified. In the scientific literature there is no doubt that the economic dimension is the basic one for the measurement of urban competitiveness. Social dimension has also big influence on competitiveness of the city, as the solution of social problems burdens the economy and society of the city. Moreover, the healthy social environment facilitates many activities in the city (Camagni, 2002, Gardiner et al., 2004). The environmental problem is a great challenge to the country to ensure that its cities are livable, attractive, and competitive in the future (Jiang, Shen, 2010). The authors make the assumption that economic, social, and environmental dimensions are interrelated and contribute to a city's competitiveness. Such view to the measurement of urban competitiveness is very important, because serious social and environmental problems are quickly emerging and closely related with the rapidly growing urbanization level and prosperity of the cities.

The identification of the factors of urban competitiveness under each dimension is based on the opinion of the authors that factors of urban competitiveness should create the competitive advantage for the city in comparison with other cities-competitors, but not positive presuppositions for its achievement. Furthermore, a city is a composite part of a country, i.e. a part of a larger economic, social and environmental space. Factors which are developed on a national level are not included into the factors and an indicator system (for example, the stability of the supply of energy resources), as the influence they bring is the same on all cities within the country (the policy of export or taxes carried out by the government).

The possible factors and indicators of urban competitiveness, which can be included into LUCI, are numerous. The authors agree with Zaric (2009) opinion, that for a postmodern men could be of interest to incorporate various indicators, such as wildlife measured by the population of birds. The selection of factors and indicators depend on the approach. The research done by the authors (Bruneckiene, 2010, Snieska, Bruneckiene, 2009) showed that the most famous Competitiveness Index of IMD and Global Competitiveness Index of World Economic Forum are providing a number of useful ideas and methods for the measurement of regional and urban competitiveness, but the main problem is that these indices use a huge number of indicators, which burden the practical use of the index and some of these indicators cannot be gained at regional or urban level.

The selection of factors and indicators of urban competitiveness is based on the scientific experience of the authors, the research done by the authors on the concept of urban competitiveness and the ambitious to identify and incorporate only the critical factors of urban

competitiveness to LUCI. The factors and indicators system for measuring Lithuanian urban competitiveness is presented in Table 1.

The measurement of urban competitiveness is based on three-level components: economic, social and environmental competitiveness. These three competitiveness components are broken down into seven groups of factors, which consist of 22 different factors and 30 indicators, according to their nature.

The authors of the article seek to analyze the economic competitiveness of a city in the present and perspective view, that's why this component is divided into economic performance and growth of urban economic capacity. The factors of economic performance represent the present competitiveness of the city and the factors of growth of urban economic capacity – the future potential of competitiveness. The research showed that economic competitiveness mainly depends on such economic factors as the competitiveness of firms, investments, labor market, export, etc. A city with dynamic companies and strong growth potential will tend to perform better as they are the sources of employment, production and export. A city with a large capital investment implies that its investment environment is attractive and competitive. For the economy of city of the country, especially which correspond to second level NUTS of the European Union, is crucial to be opened, that's why the export is incorporated into the factors of competitiveness. Also, a city's overall economic performance can be indicated by GDP per capita and the growth of urban economic capacity - by GDP growth rate. It is noted that the indicator GDP is affected by the problem of the data receiving at urban level, therefore this indicator is eliminated from the system of indicators. Although Kresl (2007) emphasized that the economic structure is crucial to the competitiveness of a city and that the contribution of tertiary sector to GDP and the proportion of employees working in this sector is larger if the city has a more competitive economy. The analysis of sectoral trends is affected by the problem of the data receiving at urban level, therefore these indicators are eliminated.

The social competitiveness component of a city is measured by four groups, i.e. human resources and education system, social welfare, conditions for living and government efficiency. The results of the expert evaluation (Snieska, Bruneckiene 2009) showed that the structure of inhabitants' age and qualification, infrastructure of studies and science make the biggest influence on competitiveness of Lithuanian regions. It is noted that the indicator of inhabitants' qualification is affected by the problem of the data receiving at urban level, therefore this indicator is eliminated from the system of indicators.

The research showed that there is a direct link between social welfare and conditions for living and the competitiveness of an individual city. If a city is not able to satisfy the needs of its inhabitants, no one is willing to stay there. A competitive city is normally governed by a responsible and efficient government, which capacitate for firms to be competitive and for inhabitant to live convenient, by implementing effective public policies related to economic capacity, employment, education,

public health, welfare services and environment. The research showed that there is no direct way to evaluate the government efficiency, especially in quantitative

indicators. However, the budgetary revenue of a local government can serve as the proxy measures of government efficiency.

Table 1

System of factors and indicators for the calculation of Lithuanian urban competitiveness index

Components	Groups of factors	Factors	Indicators of factors	
CALCULATION OF LITHUANIAN URBAN COMPETITIVENESS INDEX	ECONOMIC COMPETITIVENESS (EC)	Economic performance (EP)	Competitiveness of firms	Number of economic entities in operation per 1000 inhabitants Number of leaders of the market, which income exceed 100 million litas per year per 100000 inhabitants
			Attractiveness of a city for investments	Investment in tangible fixed assets per capita Foreign direct investment per capita
			Effectiveness of labor market	Ratio of the unemployed persons to the working age population
			Attractiveness of a city for tourists	Number of accommodated guests in hotels per 1000 inhabitants Occupation rate of hotels
			Openness of a city's economy	Revenue from export of goods produced in the city per capita
		Growth of urban economic capacity (UC)	Increase of competitiveness of firms	Yearly variation of number of economic entities in operation per 1000 inhabitants
			Increase of attractiveness of a city for investments	Yearly variation of investment in tangible fixed assets per capita Yearly variation of foreign direct investment per capita
			Increase of effectiveness of labor market	Yearly variation of ratio of the unemployed persons to the working age population
			Increase of attractiveness of a city for tourists	Yearly variation of number of accommodated guests in hotels per 1000 inhabitants
			Increase of openness of a city's economy	Yearly variation of revenue from export of goods produced in the city per capita
	SOCIAL COMPETITIVENESS (SC)	Human resources and education system	Structure of inhabitants' age	Working age population
			Migration of inhabitants	Net migration per 1000 inhabitants
			Infrastructure of studies	University students per 1000 inhabitants College students per 1000 inhabitants
Social welfare		Level of material wealth	Average gross monthly wage	
		Level of social burden	Number of families at social risk per 1000 inhabitants Number of supported persons from municipal budget per 1000 inhabitants	
		Social security	Number of hospital beds per 1000 inhabitants	
		Public security	Recorded criminal offences per 100 000 inhabitants	
Conditions for living		Housing quality	Average useful floor area per dwelling	
		Quality of transport infrastructure	Length of local roads with improved pavement Personal passenger cars per 1000 inhabitants	
		Level of recreation and culture development	Number of museums	
Government efficiency	Level of budgetary revenue	Budgetary revenue from taxes of local government per capita		
ENVIRONMENTAL COMPETITIVENESS (EnC)	Quality of environment	Air pollution	Emission of air pollutant per 1 square kilometer	
		Water pollution	Inadequately treated sewage per 1000 inhabitants	

The environmental competitiveness is described by air and water pollution. A city is not competitive if its economic and urban development is not compatible with environment. It is noted that a city, whose economic and social development is based on the expense of the environment, is not treated as a competitive one.

Main assumptions and principles of urban competitiveness measurement in Lithuania

According to Nomenclature of Territorial Units for Statistics, Lithuania as a whole, corresponds to NUTS 2 regions. The measurement of urban competitiveness in Lithuania is based on these issues:

- the ambitious to eliminate the subjectivity and intangible and sophisticated aspects in measurement of urban competitiveness. In order to fulfill this issue, only the tangible indicators were selected.

- the ambitious to create urban competitiveness index, which can be widely used practically by Lithuanian community. In order to fulfill this issue, all indicators of factors of urban competitiveness can be found in the Department of Statistics of the Government of the Republic of Lithuania. The authors of the article were confronted with the problem of the lack of the reliable data while measuring regional competitiveness (Snieska, Bruneckiene, 2009). The gained experience showed, that in order the provided method of competitiveness measurement to be important for community and practically useable, the indicators should be easily collected and no special survey needed.

The selection of Lithuanian cities for the empirical measurement of urban competitiveness is based on the level of urbanization. Considering the fact that with reference to the chapter 5 of the law on territorial administrative units and their boundaries in the Republic of Lithuania (Zin., 1994, Nr. 60-1183), Lithuania consists of 60 municipalities. There are only 8 city municipalities:

Vilnius, Kaunas, Klaipeda, Panevezys, Siauliai, Alytus, Palanga and Visaginas. According to the fact, that these city municipalities do not cover all Lithuania regions (missing Marijampole, Taurage and Telsiai regions), the municipalities, whose level of urbanization (portion of population, living in the urban area) exceed 50 percent (based on data of 2009 years), is included into the empirical research. Total 24 municipalities are selected (see Table 2), with the assumption, that the biggest influence on the economic, social and environmental development of the municipality has the core city of the municipality and the urban competitiveness of the municipality can be treated as the competitiveness of the core city.

Table 2

Lithuanian cities, included into the empirical analysis

Municipality	The core city	Level of urbanization
Alytus region		
Alytus c. mun.	Alytus city	100 %
Druskininkai mun.	Druskininkai city	67 %
Kaunas region		
Birtonas mun.	Birtonas city	61 %
Jonava d. mun.	Jonava city.	66 %
Kaunas c. mun.	Kaunas city	100 %
Kedainiai d. mun	Kedainiai city	50 %
Klaipeda region		
Klaipeda c. mun.	Klaipeda city	100 %
Kretinga d. mun.	Kretinga city	51 %
Palanga t. mun.	Palanga city	100 %
Marijampole region		
Marijampole mun.	Marijampole city	68 %
Panevezys region		
Panevezys c. mun.	Panevezys city	100 %
Siauliai region		
Akmene d. mun.	Akmene city	62 %
Siauliai c. mun.	Siauliai city	100 %
Taurage region		
Taurage d. mun.	Taurage city	59 %
Telsiai region		
Mazeikiai d. mun.	Mazeikiai city	68 %
Plunge d. mun.	Plunge city	54 %
Telsiai d. mun.	Telsiai city	58 %
Utena region		
Utena d. mun.	Utena city	68 %
Visaginas mun.	Visaginas city	99 %
Vilnius region		
Elektrėnai mun.	Elektrėnai city	68 %
Svencionys d. mun.	Svencionys city	59 %
Trakai d. mun.	Trakai city	54 %
Ukmergė d. mun.	Ukmergė city	60 %
Vilnius c. mun.	Vilnius city	100 %

The main source of the data used in the calculation appears to be the Department of Statistics of the Government of the Republic of Lithuania. The following difficulties were faced while collecting information about indicators of urban competitiveness factors:

- Department of Statistics of the Government of the Republic of Lithuania calculates the main indicators, especially economic and environmental, only on national or regional level, and does not do that on municipality level (for example, gross domestic product, education of human resources). The lack of statistical data burdens the empirical measurement of urban competitiveness, the analysis of robustness and sensitivity of LUCI and prevent

for formation of methodological background of urban competitiveness improvement in Lithuania.

- Department of Statistics of the Government of the Republic of Lithuania started to calculate some indicators on municipality level only since 2007. This determines the time period of the analysis of urban competitiveness in Lithuania. The possibilities of receiving the data on municipality level prove that the methodological background of urban competitiveness improvement in Lithuania is not formulated yet and this concept should get more attention from scientists.

Results of empirical application of LUCI to measure the competitiveness of Lithuanian cities

The empirical application of LUCI reveals the change of competitive positions of cities during 2007-2009 (see Figure 1). According to the LUCI, the most competitive cities were Vilnius (1st rank), Kaunas (2nd rank) and Klaipeda (3rd rank) and Palanga (4th rank) in 2009. The least competitive cities of Lithuania were Taurage (22th rank), Ukmergė (23th rank) and Svencionys (24th rank).

During the period of 2007-2009, the biggest improvement of competitiveness was of the cities Jonava (+ 12 ranks), Panevezys (+ 11 ranks), Visaginas (+ 6 ranks) and Kedainiai (+ 4 ranks). The biggest reduction of competitiveness was of the cities Kretinga (- 10 ranks), Mazeikiai (- 10 ranks) and Svencionys, Ukmergė, Plunge, Taurage, Marijampole (- 3 ranks). Only Vilnius and Palanga didn't change their competitive position among the other cities during the period of 2007-2009. The analysis shows, that the most intensive competition was between Kaunas and Klaipeda, all the time competing for the most competitive 2nd and 3rd city of Lithuania.

The analysis proved that the competitiveness of cities and the competitiveness of regions are strongly interrelated. The most competitive regions contain the most competitive cities (see Table 3).

In order to verify the assumption that the competitiveness of cities and the competitiveness of regions are strongly interrelated, the comparison of regional competitiveness and urban competitiveness ranks, gained by LUCI was done (see Table 4). The results proved that the most competitive regions contain the most competitive cities. Each region of Lithuania has the core city, mainly on the expense of which is based the competitiveness of the region.

The results proved that all the core cities under the approach of urban competitiveness coincide with the administrative center of region, according to the law on territorial administrative units and their boundaries in the Republic of Lithuania (Žin., 1994, Nr. 60-1183), except Alytus region, where the core city, according to LUCI, is Druskininkai. In Klaipeda region there are two core cities – Klaipeda and Palanga and in Utena region – Utena and Visaginas. During the period 2007-2009, the position of the core city in Telsiai region lost Mazeikiai and gave place to Telsiai. The competitiveness between Utena and Visaginas, Mazeikiai and Telsiai is very intensive and the analysis of future period will prove which city is the core city in the region.

It is difficult to identify the main reasons of the annual change of competitiveness of Lithuanian cities because of the change of the situation not only in the analyzed city, but also in comparative ones. However, the analysis of

competitiveness of Lithuanian cities, according to factors and their groups, let identify the main reasons of the change (see Table 5).

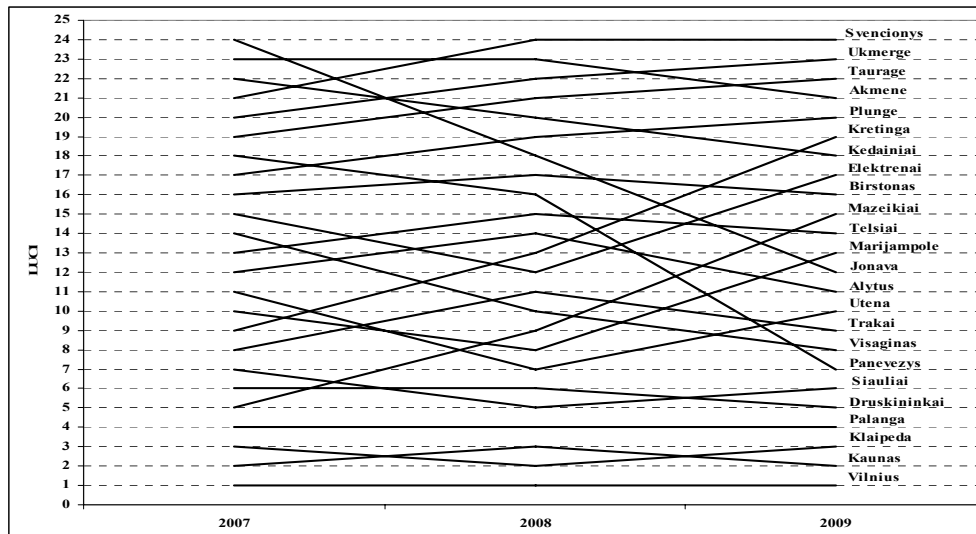


Figure 1. Change of competitiveness of Lithuanian cities during 2007-2009 years

Table 3

The competitiveness ranks of Lithuanian cities and regions according to LUCI

Cities*	2009		2008		2007		Regions
Alytus	11	5	14	8	12	5	Alytus region
Druskininkai	5		6		6		
Birstonas	16	3	17	3	16	3	Kaunas region
Jonava	12		18		24		
Kaunas	2		3		2		
Kedainiai	18		20		22		Klaipeda region
Klaipeda	3	2	3	2			
Kretinga	19	2	13	2	9	2	
Palanga	4	4	4	4			
Marijampole	13	7	8	7	10	7	Marijampole region
Panevezys	7	6	16	6	18	9	Panevezys region
Akmene	21	4	23	4	23	6	Siauliai region
Siauliai	6		5		7		
Taurage	22	10	21	10	19	10	Taurage region
Mazeikiai	15	9	9	5	5	4	Telsiai region
Plunge	20		19		17		
Telsiai	14		15		13		
Utena	10	8	7	9	11	8	Utena region
Visaginas	8		10		14		
Elektrenai	17	1	12	1	15	1	Vilnius region
Svencionys	24		24		21		
Trakai	9		11		8		
Ukmerge	23		22		20		
Vilnius	1		1		1		

* the bolded cities are treated as the core cities of the region. The italic cities are treated as second the core cities.

Table 4

Compatibility of regional and urban competitiveness ranks, gained by LUCI

Regional competitiveness to be compared to competitiveness of	2009		2007-2009	
	Kendall's W ^a	Asymp. Sig.	Kendall's W ^a	Asymp. Sig.
Core cities	0.982	0.039 (<0,05)	0,935	0.03 (<0,05)
Administrative centers	0.960	0.02 (<0,05)	0,921	0.00 (<0,05)
Core cities, included (Visaginas instead of Utena and Mazeikiai instead of Telsiai)	0.964	0.00 (<0,05)	0.926	0.00 (<0,05)

Table 5

The correlation* of LUCI with groups of factors

	EC	EP	UC	SC	EnC
Coeff. of Pirson correlation	0.892	0.903	0.345	0.870	-0.138
p value	0.00	0.00	0.00	0.00	0.248
Coeff. of Spearman correlation	0.857	0.869	0.316	0.834	-0.209
p value	0.00	0.00	0.007	0.00	0.078

* Correlation is significant at the 0.01 level (2-tailed).

The analysis let affirm that LUCI and at the same time the competitiveness of the city is mostly correlated with economic and social factors. These coefficients of correlation were treated as indicators of causality. So in order to simplify the measurement of urban competitiveness and at the same time to get statistically reliable results, economic and social competitiveness can be equated to urban competitiveness and environmental competitiveness can be excluded from the process of measurement. Regardless the correlation of LUCI with environmental competitiveness is not significant, but the coefficients of

Pearson and Spearman correlation show the negative interaction. According to the short period of the analysis, presented in this article, the interaction between urban and environmental competitiveness should be analyzed more precisely.

The strongest coefficients of Pearson correlation between LUCI and factors of competitiveness are presented in Table 6.

Table 6

The main factors of Lithuanian urban competitiveness

Factor of urban competitiveness	Coeff. of Pearson correlation (p=0.00)
ECONOMIC COMPETITIVENESS	
Competitiveness of firms	0.817
Attractiveness of a city for investments	0.800
Attractiveness of a city for tourists	0.528
Openness of a city's economy	0.512
SOCIAL COMPETITIVENESS	
Structure of inhabitants' age	0.529
Infrastructure of studies	0.765
Level of material wealth	0.787
Public security	-0.602
Quality of transport infrastructure	0.662
Level of recreation and culture development	0.672

The coefficients of Pearson correlation between urban competitiveness and factors increasing competitiveness of cities proved that the biggest influence is made by the competitiveness of firms, investment, infrastructure of studies and level of material wealth. It can be noticed, that condition of life in the city (level of recreation and culture development, quality of transport infrastructure and public security) make quite strong influence on urban competitiveness.

LUCI is able to show the change of competitiveness of a city during the period and provide the information about the factors or groups of factors of competitiveness (see Table 7).

The analysis of urban competitiveness, according to LUCI, allows identifying the core strengths and weaknesses of each city in comparison with other cities,

which should be incorporated into the competitive strategies of each city.

Table 7

The ranks of urban competitiveness according to the different groups of factors, in 2009

City	LUCI		EC		SC		Ecol	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank
Alytus	12.14	11	3.87	20	6.44	7	1.83	12
Druskininkai	13.96	5	6.48	5	5.48	13	1.99	4
Birstonas	11.80	16	6.14	15	3.67	15	1.99	6
Jonava	12.03	12	5.20	24	4.88	20	1.94	16
Kaunas	15.90	2	6.64	7	8.00	2	1.26	24
Kedainiai	11.75	18	5.47	17	4.55	24	1.73	21
Klaipeda	15.76	3	7.26	8	7.50	3	1.00	19
Kretinga	11.65	19	4.12	6	5.54	12	1.99	7
Palanga	15.59	4	7.31	3	7.35	6	0.93	17
Marijampole	12.02	13	4.28	14	5.75	8	1.98	5
Panevezys	13.05	7	5.19	18	6.38	10	1.47	23
Akmene	10.79	21	4.82	23	4.17	21	1.79	14
Siauliai	13.40	6	4.92	10	7.01	4	1.47	13
Taurage	9.93	22	3.36	12	4.59	22	1.98	8
Mazeikiai	11.91	15	5.17	2	5.38	16	1.36	22
Plunge	11.32	20	4.58	11	4.86	18	1.88	15
Telsiai	11.98	14	4.82	9	5.47	14	1.68	18
Utena	12.36	10	4.80	13	5.57	9	1.99	2
Visaginas	12.91	8	4.88	16	6.40	5	1.63	20
Elekrenai	11.76	17	3.88	21	5.94	11	1.94	9
Svencionys	9.30	24	3.01	22	4.33	19	1.96	10
Trakai	12.89	9	5.77	4	5.11	17	2.00	1
Ukmerge	9.45	23	3.30	19	4.15	23	2.01	3
Vilnius	19.64	1	8.45	1	9.33	1	1.85	11

If the value of competitiveness factor much exceeds the average of the whole cities, it is identified as the core strengths of a region. If it is much below the average, it is identified as the weaknesses of a region. If the value of competitiveness factor corresponds to the average, it is not identified neither strengths nor weaknesses and do not treat as the core advantage. According to the fact, that the formation of competitive strategies of Lithuanian cities are not related with the aim of the article, the main strengths and weaknesses of the cities are identified by the authors in the Table 8, based only on the analysis of LUCI (not on the scientific analysis of this problem).

Table 8

The core strengths and weaknesses of Lithuanian cities according to LUCI, in 2009

City	Strengths	Weaknesses
Alytus	Increase of attractiveness of a city for tourists; Structure of inhabitants' age; Level of social burden; Water pollution	Effectiveness of labor market; Migration of inhabitants
Druskininkai	Attractiveness of a city for tourists; Increase of competitiveness of firms; Level of recreation and culture development; Level of budgetary revenue; Water pollution	Effectiveness of labor market
Birstonas	Effectiveness of labor market; Increase of competitiveness of firms; Increase of effectiveness of labor market; Migration of inhabitants; Public security; Housing quality; Level of budgetary revenue; Water pollution	Openness of a city's economy; Structure of inhabitants' age; Level of social burden; Social security
Jonava	-	Attractiveness of a city for tourists; Increase of competitiveness of firms; Increase of attractiveness of a city for investments ;Social security
Kaunas	Competitiveness of firms; Openness of a city's economy; Increase of attractiveness of a city for tourists; Infrastructure of studies; Level of social burden; Social security; Quality of transport infrastructure; Level of recreation and culture development	Public security; Housing quality; Air pollution
Kedainiai	Effectiveness of labor market Increase of effectiveness of labor market	Level of social burden
Klaipeda	Competitiveness of firms; Attractiveness of a city for investments; Attractiveness of a city for tourists; Openness of a city's economy; Increase of effectiveness of labor market; Structure of inhabitants' age;	Increase of attractiveness of a city for investments Public security Housing quality Air pollution

	Infrastructure of studies; Level of material wealth; Social security	
Kretinga	Increase of attractiveness of a city for investments; Increase of attractiveness of a city for tourists; Public security; Housing quality	Level of material wealth
Palanga	Attractiveness of a city for tourists; Migration of inhabitants; Housing quality; Level of budgetary revenue	Increase of attractiveness of a city for investments; Public security; Water pollution
Marijampole	Quality of transport infrastructure	Attractiveness of a city for tourists; Increase of competitiveness of firms; Increase of effectiveness of labor market
Panevezys	Competitiveness of firms; Quality of transport infrastructure	Increase of competitiveness of firms; Migration of inhabitants; Level of budgetary revenue; Air pollution
Akmene	-	Competitiveness of firms; Attractiveness of a city for investments; Effectiveness of labor market; Structure of inhabitants' age; Migration of inhabitants; Quality of transport infrastructure
Siauliai	Increase of attractiveness of a city for tourists; Infrastructure of studies; Level of social burden	Migration of inhabitants; Water pollution
Taurage	-	Competitiveness of firms; Increase of attractiveness of a city for tourists; Level of material wealth; Level of social burden; Level of budgetary revenue
Mazeikiai	Attractiveness of a city for investments; Openness of a city's economy; Increase of effectiveness of labor market; Level of material wealth; Public security	Effectiveness of labor market; Increase of effectiveness of labor market; Quality of transport infrastructure; Level of budgetary revenue; Air pollution
Plunge	Openness of a city's economy Increase of effectiveness of labor market	Attractiveness of a city for investments Social security
Telsiai	Openness of a city's economy; Increase of attractiveness of a city for investments; Air pollution	Level of budgetary revenue; Water pollution
Utena	Air pollution; Water pollution	Increase of competitiveness of firms; Increase of effectiveness of labor market
Visaginas	Increase of competitiveness of firms; Structure of inhabitants' age; Level of material wealth	Attractiveness of a city for tourists; Increase of attractiveness of a city for investments; Increase of effectiveness of labor market; Housing quality; Level of recreation and culture development; Water pollution
Elektrėnai	Attractiveness of a city for investments; Effectiveness of labor market	-
Svencionys	Public security; Air pollution	Competitiveness of firms; Attractiveness of a city for investments; Openness of a city's economy; Structure of inhabitants' age; Level of material wealth; Quality of transport infrastructure
Trakai	Effectiveness of labor market; Increase of competitiveness of firms; Increase of attractiveness of a city for investments; Air pollution	Openness of a city's economy
Ukmergė	Increase of attractiveness of a city for investments; Air pollution	Competitiveness of firms; Attractiveness of a city for investments; Openness of a city's economy; Structure of inhabitants' age; Level of social burden; Level of recreation and culture development
Vilnius	Competitiveness of firms; Attractiveness of a city for investments; Attractiveness of a city for tourists; Structure of inhabitants' age; Migration of inhabitants; Infrastructure of studies; Level of material wealth; Level of social burden; Social security; Quality of transport infrastructure; Level of recreation and culture development	Public security

There are no common competitive strategies which could be applicable for all types of cities, thus, each city should form the unique strategy for increasing its competitiveness. The analysis has indicated that in order to keep and increase the current level of competitiveness of Lithuanian cities, the measurement of current competitiveness situation and the analysis of it, the identification of new factors of competitiveness and development of them in the city should be done consistently and incorporated into the process of strategic planning.

The results, which have been acquired during the theoretical and empirical researches, proved the LUCI to be a convenient tool of competitiveness analysis, strategic planning and information of a city. With the help of the LUCI, the urban competitiveness can be measured, the competitive position with regard to other cities can be ascertained, the change of competitive position can be identified, the competitiveness according to a definite factor can be evaluated, and the core strengths and weakness of a city can be identified.

Conclusions

1. The researches proved that the concepts of urban, regional and national competitiveness are closely interrelated. The same tools, methods and viewpoints of the analysis of the concept of regional and national competitiveness can be used for the description and analysis of the concept of urban competitiveness.

2. The analysis of scientific literature showed, that the urban competitiveness can be described by various factors of competitiveness. That justifies the impact of the technique of the selection of factors on the results of competitiveness measurement and necessarily of explicit and methodologically grounded background of measurement.

3. Urban competitiveness cannot be completely defined by one or several indicators, thus, complex measurement of competitiveness is a must. The researches proved that the measurement by an index and the approach of sustainable development helps to solve the problem of a complex measurement of urban competitiveness.

4. Lithuanian Urban Competitiveness Index is calculated via the following stages: forming the model of competitiveness (i.e. identification of the factors and indicators and grouping them in one system), normalizing, grouping and weighting the indicators, calculating the index of competitiveness and analyzing the uncertainty and sensitivity of the index.

5. The empirical application of LUCI let identify the main advantages and disadvantages of a new created index. The main advantages of using LUCI are connected with:

- LUCI let treat the competitiveness of a city in a complex way. The inclusion of multi-criteria aspects into the measurement process, prevent the domination of one aspect of the analyzed problem.

- LUCI measures competitiveness in one value. The analysis of competitiveness in one indicator is more convenient when searching for a tendency among a number of different indicators.

- LUCI let analyze the competitiveness of a region according to total competitiveness, groups of competitive factors or definite factors. The analysis of urban competitiveness at different layers let specify the gained information, according to the purpose of the research, which makes the analysis more simple and oriented to the target.

- LUCI shows the change of urban competitiveness in a period of time and among other competitors. The comprehensive and timely information about the competitive position and other competitors is the main presumption of forming the effective strategy of improving the urban competitiveness.

The main disadvantages of using LUCI are connected with the following aspects:

- LUCI includes only the factors of competitiveness, which can be expressed in the quantitative indicators. The exclusion of particular aspects (which define the problem and which are difficult to measure by statistical data) from the calculation of LUCI, the information about the urban competitiveness under consideration may be inappropriate.

- LUCI is a static way of measurement of competitiveness. The incorporation of the aspect of variation of factors (all factors from the group Growth of urban economic capacity) at the current time of analysis, mostly contradicted with other indicators. The analysis proved that in order to get clearer results of the

measurement, two different indices should be created: one representing current situation and including only static indicators. The other is representing near future and including variation of indicators.

- LUCI does not explain the impact of the change of one or several factors to total competitiveness of the city.

Although LUCI have advantages and disadvantages, the authors of the article give more advantages and forecast the increase of the usage of indices in the measurement of urban, regional and national competitiveness.

6. On the basis of the empirical research, in the period of 2006-2009, the most competitive cities of Lithuania were Vilnius (capital), Kaunas (city of universities and industries), Klaipeda (port city), Palanga and Druskininkai (resort towns). The least competitive cities of Lithuania were Akmene, Taurage, Ukmerge and Svencionys. The analysis proved that the geographical location of the cities does not make big influence on urban competitiveness.

7. The competitiveness of cities and the competitiveness of regions are strongly interrelated. The most competitive regions contain the most competitive cities.

8. The coefficients of Pirson correlation between urban competitiveness and factors increasing competitiveness of cities proved that the biggest influence in Lithuania is made by competitiveness of firms, investment, infrastructure of studies and level of material wealth. It can be noticed, that condition of life in the city (level of recreation and culture development, quality of transport infrastructure and public security) make quite strong influence on urban competitiveness.

9. In order to simplify the measurement of urban competitiveness and at the same time to get statistically reliable results, economic and social competitiveness can be equated to urban competitiveness. Environmental competitiveness can be excluded from the aspects of the analysis of urban competitiveness.

10. Though the theoretical and practical backgrounds for measurement of urban competitiveness in Lithuania is still at the beginning of formation, the empirical application of LUCI proved, that it is appropriate means for the analysis of urban competitiveness, strategic planning, information and advertisement of a city.

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Lietuvos miestų konkurencingumo vertinimas

Santrauka

Pastaruoju metu mokslininkai, politikai, investuotojai, turistai ir net sporto bei kultūros renginių organizatoriai vis daugiau dėmesio skiria miestų konkurencingumo koncepcijai. Miestai tarpusavyje konkuruoja skirtinguose ekonominiuose sektoriuose ar veiklos rūšyse (pramonė, paslaugos, aukštosios technologijos, turizmas ir pan.) ir skirtingais lygiais (regioninis, nacionalinis, tarptautinis) dėl žmogiškojo kapitalo, investicijų, naujų technologijų, turistų, nacionalinių projektų, preferencinių politikų ir pan. Daugelis miestų nuolatos ieško perspektyvių nišų, kuriose turėtų ar galėtų plėtoti konkurencinį pranašumą ir taip įtvirtinti savo statusą tarp kitų miestų.

Mokslinėje literatūroje yra įvairių straipsnių miestų konkurencingumo tema, kuriose nagrinėjami ekonominiai, technologiniai, politiniai, teisiniai, socialiniai, kultūriniai, ekologiniai aspektai, išskiriami miestų konkurencingumo veiksniai, skaičiuojami labiausiai žinomų pasaulyje miestų konkurencingumo rangai. Pabrėžtina, kad didžiausias akademinis dėmesys skiriamas didžiausių Jungtinių Amerikos Valstijų, Europos ir Azijos miestų-lyderių ar didesnių pramoninių zonų konkurencingumui vertinti. Tyrimai parodė, kad mokslinėje literatūroje nėra pakankamai išsamių miestų konkurencingumo tyrimų, ypač šalių, pagal teritorinių statistinių vienetų nomenklatūrą priskiriamų antrajam lygiui (NUTS 2), miestų.

Nepaisant didėjančio susidomėjimo pasaulio mokslinėje literatūroje miestų konkurencingumo problematika (Lietuvoje ji ypač mažai nagrinėta), miestų konkurencingumo vertinimo aspektai išlieka vieni iš sunkiausių ir sudėtingiausių šios koncepcijos dalių. Kadangi miestų konkurencingumą sukuriantys įvairūs veiksniai (įvestys) ir konkurencingumo rezultatai (išvestys) pasiskirsto įvairiuose miesto objektuose ir srityse, vienas ekonominis, socialinis ar aplinkosauginis rodiklis negali išsamiai apibūdinti miestų konkurencingumo. Todėl konkurencingumą būtina vertinti kompleksiskai. Vienas iš būdų, leidžiančių spręsti miestų konkurencingumo kompleksinio vertinimo problematiką, - vertinimas indeksu.

Mokslinėje literatūroje pasigendama darbų, kuriuose būtų išsamiai analizuojamas miestų konkurencingumo vertinimo indeksu specifiskumas ir aiškiai interpretuojami rezultatai. Pasaulio ekonomikos forumo konkurencingumo indeksas ir Tarptautinio vadybos plėtros instituto pasaulio konkurencingumo indeksas, kurie pasaulyje plačiai žinomi ir taikomi, daugiausia skirti vertinti šalių konkurencingumą. Tai riboja jų pritaikymo galimybes vertinant konkurencingumą miesto lygmeniu. Pasigendama metodologiškai pagrįsto miestų konkurencingumo indekso, leidžiančio vertinti miestų konkurencingumą. Kompleksinio miestų konkurencingumo vertinimo priemonės nebuvimas tampa viena iš kliūčių, trukdančių įvertinti šalies miestų konkurencinį potencialą ir formuoti efektyvias konkuravimo strategijas.

Mokslinio darbo tikslas – sukurti ir praktiškai pritaikyti Lietuvos miestų konkurencingumo indeksą ir pateikti strateginius siūlymus jų konkurencingumui didinti.

Tyrimo metodai: sisteminė, lyginamoji ir loginė mokslinės literatūros analizė; empirinis tyrimas atliktas taikant išorinių antrinių duomenų sisteminę analizę.

Mokslinėje literatūroje miestų konkurencingumo koncepcija glaudžiai susijusi su miesto koncepcija. Akademiniu lygmeniu miesto koncepcija nagrinėta įvairiais aspektais. Siekiant sumažinti didelę miesto sampratos interpretacijų galimybę, kiekvienuose tyrimuose turėtų būti pateiktas miesto apibrėžimas, apibūdinantis, koks šio daugialypio objekto aspektas nagrinėjamas. Šiame straipsnyje miestas apibrėžiamas taip pat, kaip pateikiama Lietuvos Respublikos teritorijos administracinių vienetų ir jų ribų įstatyme: miestai yra kompaktiškai užstatytos gyvenamosios vietovės, kuriose daugiau kaip du trečdaliai asmenų dirba pramonėje, verslo bei gamybinės ir socialinės infrastruktūros srityse.

Mokslinėje literatūroje konkurencingumo koncepcija įvardyta kaip viena iš sudėtingiausių ir sunkiausiai apibendrinamų tyrimo sričių dėl pačios sampratos kompleksiskumo, konkurencingumo veiksnių gausos ir įvairovės, konkurencingumo proceso sudėtingumo. Siekiant sumažinti didelę konkurencingumo koncepcijos interpretacijų galimybę, kiekvienuose tyrimuose turėtų būti pateikta konkurencingumo samprata. Tyrimai parodė, kad miestų ir regionų konkurencingumas glaudžiai tarpusavyje susiję, todėl miestų konkurencingumo sampratai apibrėžti gali būti taikomas regionų konkurencingumo apibrėžimas. Šiame straipsnyje miestų konkurencingumas apibrėžiamas kaip gebėjimas pasinaudoti konkurencingumo veiksniais konkurencinei pozicijai kurti ir išlaikyti tarp kitų miestų. Šio apibrėžimo taikymas leidžia konkurencingumą traktuoti kaip į ciklinį procesą, kurio metu išvestys virsta įvestimis, vėliau lemiančiomis išvestis.

Tyrimai parodė, kad dažniausiai mokslinėje literatūroje miestų konkurencingumas nagrinėjamas ekonominiu aspektu ir susijęs su ekonomine miesto gerove. Tačiau miesto ekonominė gerovė neužtikrina neekonominės, socialinės ir aplinkos, gerovės. Jei vertinant miestų konkurencingumą analizuojamas tik ekonominis aspektas, tai tokios problemos, kaip miestų užterštumas, turėtų būti priimtinos. Atsižvelgiant į tai, kad miestų konkurencingumas jautrus ekonominei gerovei, socialinei plėtrai, aplinkos kokybei ir efektyviam miesto valdymui, kompleksiskai vertinti miestų konkurencingumą būtina. Šiame straipsnyje kompleksinis miestų konkurencingumo vertinamas pagrįstas darnaus vystymosi aspektu.

Mokslinėje literatūroje sutinkami įvairūs konkurencingumo vertinimo metodai, tačiau kompleksiskumo problemą padeda išspręsti vertinimas indeksu. Tyrimai parodė, kad indeksas formuojamas šiais etapais: konkurencingumo modelio sudarymu (konkurencingumo veiksnių nustatymu ir grupavimu, veiksnių rodiklių nustatymu), rodiklių reikšmių normavimu, svorio koeficientų veiksniams suteikimu, indekso skaičiavimu.

Siekiant įvertinti Lietuvos miestų konkurencingumą, straipsnyje suformuotas Lietuvos miestų konkurencingumo indeksas, apimantis darnaus vystymosi ir kompleksiskumo aspektus. Indeksą sudaro trys komponentai (ekonominis konkurencingumas, socialinis konkurencingumas ir aplinkosauginis konkurencingumas), septynios veiksnių grupės (ekonominė situacija, miestų ekonominio potencialo augimas, žmogiškieji ištekliai ir švietimo sistema, socialinė gerovė, gyvenimo sąlygos, valdymo efektyvumas, aplinkos kokybė), į kurias įeina 22 skirtingi veiksniai ir 30 rodiklių. Vertinant Lietuvos miestų konkurencingumą, visiems veiksniams suteikiamas vienodas svorio koeficientas ir rodiklių reikšmės normuotos atstumo nuo minimalios ir maksimalios reikšmės normavimo metodu.

Lietuvos miestų konkurencingumo indekso taikomumo tyrimas atliktas vertinant 24 Lietuvos miestų konkurencingumą ir jo kitimą 2007-2009 m. Remiantis atlikto tyrimo duomenimis, konkurencingiausi Lietuvos miestai analizuotu laikotarpiu: Vilnius (1 vieta), Kaunas, Klaipėda (2 ir 3 vieta), Palanga (4 vieta). Mažiausiai konkurencingi: Tauragė (22 vieta), Ukmergė (23 vieta) ir Švenčionys (24 vieta). 2007-2009 m. Labiausiai konkurencingumas padidėjo šių miestų: Jonavos (+12 rangų), Panevėžio (+11 rangų), Visagino (+6 rangai) ir Kėdainių (+4 rangai). Labiausiai konkurencinę poziciją prarado: Kretinga (-10 rangų), Mažeikiai (-10 rangų) ir Švenčionys, Ukmergė, Plungė, Tauragė, Marijampolė (-3 rangai). Tik Vilnius ir Palanga nekeitė savo konkurencinės pozicijos Lietuvos miestų konkurencinės sistemos hierarchijoje. Labiausiai įtempta konkurencinė kova vyko tarp Kauno ir Klaipėdos: šie miestai konkuravo tarp antros ir trečios vietų. Lietuvos miestų konkurencingumo indekso taikomumo tyrimas pagrindė, kad miestų ir regionų konkurencingumas glaudžiai susijęs: konkurencingiausiuose regionuose išsidėstę konkurencingiausi miestai. Empirinis tyrimas parodė, kad pagrindiniai pagal konkurencingumą Lietuvos miestai sutampa su administraciniais apskričių centrais, nustatytais Lietuvos Respublikos teritorijos administracinių vienetų ir jų ribų įstatyme, išskyrus Alytaus apskritį, kur pagrindinis pagal konkurencingumą miestas yra Druskininkai. Klaipėdos apskrityje egzistuoja du pagrindiniai miestai – Klaipėda ir Palanga, o Utenos apskrityje – Utena ir Visaginas. Telšių apskrityje Mažeikiai užleido konkurencinę poziciją Telšių miestui.

Nors indeksas yra statinis konkurencingumo vertinimo būdas, tačiau veiksnių augimo aspekto įtraukimas į indekso skaičiavimo metodiką nepasiteisino. Dažniausiai augimą apibūdinantys rodikliai prieštarauja esamą situaciją apibūdinantiems rodikliams. Atsižvelgiant į tai, straipsnio autoriai rekomenduoja naudoti du skirtingus konkurencingumo indeksus: vieną, kuris reprezentuoja esamą konkurencinę poziciją ir į kurį įtraukti tik esamą situaciją vaizduojantys rodikliai; kitą, kuris reprezentuoja konkurencingumo augimo potencialą ir į kurį įtraukti veiksnių variaciją apibūdinantys rodikliai.

Atliktas tyrimas leido nustatyti, kad didžiausią įtaką Lietuvos miestų konkurencingumui daro ekonominiai ir socialiniai veiksniai, todėl, siekiant supaprastinti ir kartu statistiškai reikšmingai vertinti miestų konkurencingumą, miestų konkurencingumo koncepcija gali būti traktuojama kaip ekonominis ir socialinis konkurencingumas. Lietuvos miestų konkurencingumui didžiausią įtaką daro įmonių konkurencingumas, investicijos, švietimo sistema, materialinės gerovės lygis. Pabrėžtina, kad gyvenimo sąlygos (rekreacijos ir kultūros plėtra, transporto infrastruktūros kokybė, viešas saugumas) daro didelę įtaką miestų konkurencingumui.

2007-2009 m. Lietuvos miestų konkurencingumo įvertinimas patvirtino Lietuvos miestų konkurencingumo indeksą kaip tinkamą ekonominės-socialinės-aplinkos analizės, strateginio planavimo, miestų stiprybių ir silpnybių nustatymo, konkurencingumo informavimo priemonę.

Raktažodžiai: *miestų konkurencingumas, miestų konkurencingumo veiksniai ir rodikliai, miestų konkurencingumo vertinimas ir indeksas.*

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