

## THE CONCEPT OF POLYCENTRISM: THEORETICAL GUIDELINES AND TRANSFORMATION OF THE APPLICATION

 **Inguna Lazdina**<sup>1</sup>, Mg.sc.soc.;  **Andra Zvirbule**<sup>2</sup>, Dr.oec/professor

<sup>1, 2</sup>Latvia University of Life Sciences and Technologies

**Annotation.** The concept of polycentrism has acquired a wide field of research in academia and on the political agenda at the national level. In empirical research, the discourse of scientists analyses polycentrism from the prism of both a morphological concept, a functional element, and a normative aspect with a multifaceted analytical tool of spatial planning and an element of the regulatory agenda.

The aim of the study is to study the concept of polycentrism and its transformation into theoretical and conceptual applications using monographic and system analysis and to reflect the formal definitions of polycentrism and the transformation of derivatives. In the course of the study, the author concludes that the spatial development dimension of the concept of polycentrism and the extent of polycentrism in the context of regional development can be applied with different contexts, the nature of which is determined either by the planning document, strategic guidelines, or by scientific-practical research. For the analysis of the theories of regional economic development, the monographic and systemic method of analysis was used. The monographic or descriptive method made it possible to prepare an overview of the theories of economic development of the regions, gathering information about them, books, monographs, scientific articles, and international publications on the theory of economic development of regions and the results of empirical research, while the method of systemic analysis was used to structure information.

**Keywords:** polycentrism, the concept of polycentrism, polycentric development.

**JEL code:** R11, R12, R14

### Introduction

The concepts of "polycentricity", "polycentric", "polycentrism", "polycentric development" (Haite I., 2021), "polycentric spatial structure" used in the scientific literature provide the spatial concept of the concept of theoretical and normative environment and demonstrate, over time, the theoretical extent of the concept during transformations.

Theoretical and morphological analytics and interpretation of the concept of polycentrism have been evaluated in both foreign and Latvian scientific works, for example, the importance of polycentrism in EU cohesion policy and integration with the perspective of European spatial development was studied by Rauhut, Palma, Humer ((Rauhut D., Palma P., Humer A., 2018). Founder of Territorial Strategies Meijer E., 2002, 2007, 2008) stressed the need to reduce regional disparities, thus promoting polycentric development. Krugman P., 1994 introduced the concept of agglomeration into the geographical distribution of economic activity with a consequential effect on consumer behaviour for the demand for goods or services. The paradigm of procedural planning theory, based on decision-based environmental planning, is provided by Faludi A., 2005, 2006, 2015, by Davoudi S., 2002, 2003, 2004, 2010, while Capello (Capello R., 2000) scientific papers explore regional development models and development scenarios, t.sk. polycentric development scenario. Discussions on the phenomenon of polycentricity in territorial development can be found in Kloosterman, Lambert, Musterd (Kloosterman R. C & Lambregts B., 2000, Kloosterman R. C & Musterd S., 2001) in work. The works of Latvian scientists also look at and analyse the approach and perspective of polycentric development, for example, the results of the research in Zaluksne (2014) confirm the positive correlation between the perspective of the urban network and the polycentric region by analysing the weaknesses and opportunities in Zemgale region. Haite (2013), Kalnina-Lukasevica (2013), Bite (2012) using the model of planning and evaluating regional economic development, explored polycentric development opportunities in a local, regional, and national context. As part of the Smart

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1 inguna.lazdina@lau.lv

2 Andra.Zvirbule@llu.lv

Specialisation Strategy, the development of the region is viewed through the concept of wisdom. Rosenwald and the Sword (Rosenwald J., Sword A., 2014) highlights the impact of social innovation in regional development in the context of the social dimension of sustainable development. The largest study of the 20th century on trends and challenges of polycentric development in the context of polycentric and balanced spatial perspective is summarized in the results of the research group of SIA "Laboratory of Analytical Research and Strategies" (2008) on the economic development trends of Latvian cities social. Based on an analysis of diverse quantitative and qualitative information, the study offers an analytical vision of urban development resources, competitiveness factors, urban attractiveness, as well as the impact of urban development on the surrounding areas. The preconditions of the research team for balanced development of the country are integrated into section 9 "Spatial Perspective" of the most important strategic document of Latvia in the Sustainable Development Strategy of Latvia until 2030.

Using monographic and system analysis, the author will study the theoretical concepts and dimensions of transformation of the concept of polycentrism.

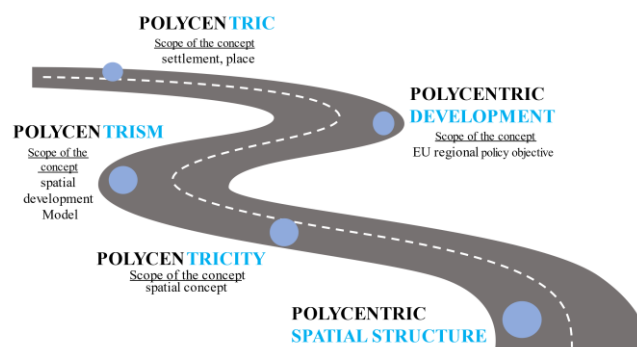
### Materials and methods.

The aim of the article is to study the concept of polycentrism and its transformation into theoretical and conceptual applications, using monographic and system analysis and to reflect the formal definitions of polycentrism and the transformation of derivatives. The tasks of the study: 1) to summarize the theoretical guidelines and transformation dimensions of the existing concept of polycentrism; 2) to carry out in-depth research on the spatial development and urban evolution dimension of the concept of polycentrism. In order to look at the theoretical basis related to the purpose of the article to carry out the analysis of the theories of regional economic development, the monographic and systemic method of analysis was used. Use the method of systemic analysis to structure the results of empirical studies.

### Study results and discussion

#### The theoretical transformational dimension of the concept of polycentrism

Polycentric development policies and trends in Europe are reminiscent of the innovation model – new ideas, theories appear simultaneously with perceptions of spatial and economic development and morphological and theoretical interpretation of the concept (Figure 1).



Source: author's created scheme of transformation of the concept by biographical research

Fig. 1. Theoretical transformation of the concept of polycentrism in time and space

Haite (2013) with the term "**polycentric**" refers to agglomeration with many centres or habitability with several equivalent complementary centres, using the holistic worldview of the dynamics of geographical space and by pithing three approaches to geopolitics: **polycentric**, single/economically sound global system and environmental/socially orderly geopolitics.

**The concept of "polycentrism"** appears both on the regulatory agenda (Governa F., Salone C., 2005) and in the strategic programming documents, the territorial cohesion policy objective (Faludi A., 2006) economic competitiveness policy objective (Muller B. M., 2016). Rauhut D., Palma P., Humer A. (2018) notes the lack of European understanding of the use of the definition of polycentrism, arguing the broad scale of the concept's usability and the scope of activities. Subsequently, the European Commission defines two levels of polycentricity: the European Union level and the regional level. The context at regional level can be seen at national level and at sinter level. Global dynamics can be observed with the European Commission's guiding lines for the perspective of European spatial development, setting a model of development for the creation of space - **polycentric development** aimed at achieving territorial cohesion (cohesion). According to the European Commission, polycentric urban systems are more efficient, sustainable, and more useful for achieving economic and social cohesion in Europe's regions. Thus, there is a consequential dynamic of the concept of "polycentric" in the process with the development vector **"polycentric development"**.

Analysing the historical development of the concept of polycentricity, the first directions for empirical development of the concept appear in 1930 with the theory of the central point. The dynamics of the concept of development can be observed in the 1960s in France, with the purposeful introduction of the concept of metropolises to balance economic development at the state level. Subsequently, in the 1970s, the concept of metropolitan balance expands with an emphasis on the integration of medium-sized urban and rural areas. In the 1980s, however, there is the next stage of polycentric transformation with an emphasis on the development of France's largest cities. The ongoing political and economic changes increase the global impact on the trends of globalisation and urbanisation of the elements of the interacting spatial systems, determining the nature of the evolution of change and the dynamics of growth.

**Polycentricity** has been put forward as the dominant configuration role with an impact on the economic development of regions in the claim of a group of scientists (Keunhyun P., Reid E., Sadegh S., Dong-ah C., Shima H., Guang T., 2020) that the interconnectedness of the world's cities has increased with globalization. Green (2007) defined the morphological and functional definition of polycentricity using social media analysis methods, extending the definition of functional polycentricity to a derivative of the regional functional **polycentricity index**. Green's scientific approach and the results of the study prove the shortcomings of the topology of polycentricity node theory. Critical analytics provide an explanation for the mathematical contradiction of node theory for the explanation of the concept of "connected" with the need for *the concept of network density* (network density = ratio of actual connections to common possible connections). The risk of an inaccurate definition of a functional polycentric system in cases of an unconnected collection of nodes (Green N., 2007). In the large-scale study of 2008 on "Socio-economic Development Trends of Latvian Cities", the group of scientists identified two polycentric development models for analysis of socio-economic development processes using secondary data processing on previous studies, statistical and document analysis:

- a model of several development centres with the creation of mutually independent development centres and the growth potential of promoting balanced regional development;
- model of urban cooperation network with urban cooperation and capacity for mutually complementary cooperation and growth ("Laboratory of Analytical Research and Strategy, Ltd., 2008).

As a result of empirical analytics, we observe **the contradictions of two approaches** to Green (2007) and IS "Analytical Research and Strategy Laboratory" (2008) defining the polycentric development model, where Green already in 2007 proved the shortcomings of the existing typology and the need for correction

with the introduction of the concept of network freeness, while the other a model with the mutual formation of independent development centres is recognised as a polycentric system. Green (2007) is positioned on the need for the scalability **of functional polycentricity** in the context of the interaction between polycentricity and urban regions.

The author believes that the position of Green's research is the basis **for discourse about reviewing the concept of polycentricity at the national level and defining it with quantifiable indicators.**

IS "Laboratory of Analytical Research and Strategy" (2008) looking at each development model from the paradigm of socio-economic development, polycentric development characterized the indicators of the main features.

The main features of the indicators characterising several development centres:

- developed periphery of the centre, movement of economic activities towards the periphery (Duranton G., Puga D., 2001), with the expansion of the periphery and economic growth, the concentration of people increases significantly (Fujita M., Thisse J. F. 1996).
- improvements to the transport infrastructure system constitute the development and mobility of inclusive areas for the reach of the economic periphery (Duranton G., Puga D., 2001).

Features of indicators characterising the urban cooperation network model:

- synergy and complementarity of urban cooperation (Meyers E., 2005), urban networks with the involvement of surrounding areas are formed, reducing the cost of the services provided, the tensions between competition and dominance are reduced.
- reduced time and distance, the comparative advantages of the benefits of cooperation and the growth and population of the critical mass of value-added services (Meyers E., 2005) are an important factor.
- the expansion of population beyond the periphery, the development of transport and communication networks in cities, the reduction of mutual competition, cooperation and the recognition of common interests are developing in cities. In the model of cooperation, social dialogue with common interests is formed (Romei A., Meyer E., 2016).

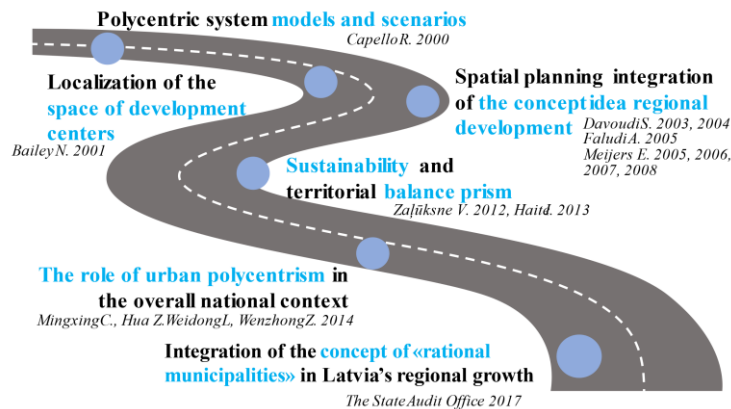
### **Globalisation of spatial development of polycentrism and the dimension of urban evolution**

Global changes in the world have contributed both to spatial transformation at the national level and to the urban evolution of nodes and centres beyond national borders (Scholte J.A., 2005). Davodi (2002) describes, as regards the socio-economic characteristics of the region, the characteristic feature of the term 'polycentrism' in the ability to adapt and to be flexible. The concept has been reduced as a convenient way of Europe's dynamic character, global applicability, and political and societal change in a globalised world.

The author will study the dynamics of the development of empirical theories for the extension of a polycentric concept and the influence of global development in the transformation of the concept of polycentrism.

**A new paradigm of the concept of polycentrism** is defined by Marco Buemi (Buemi, 2021) in the context of the integration of smart technologies into the urban governance model, with minimal state involvement, but providing three main principles – horizontal subsidiarity, cooperation, and polycentrism. In the new theoretical model, the scientist includes six important themes: charisma, collaboration, community, relationships, freedom, and diversity. Finnish scientists Rauhut, Palma, and Kumer (2018), studying the stimulating impact of polycentrism in 25 countries on the provision of social services, noted the impact of the strategic perspective of polycentrism at the national level and in economic development. Haite (2013) pointed out a strong correlation between economic development issues and the development

of regional and urban networks with a consequential impact on the balanced development of the region. The ability of the planning system to direct the spatial division of development on a regional scale, emphasising the importance of growth centres in practice, indicates the policy set by the Latvian government – principles, objectives, and actions in the field of regional development for the development of the country and improvement of the quality of life of the population. Changing political objectives and policy priorities in Europe affects parameters and the scope of spatial planning and the shift in focus from the economic competitiveness of territorial cohesion in European spatial development policy to the development of balanced regional development and polycentrism (Figure 2).



**Source: author's empirical review of the transformation of polycentric theories into space**

**Fig. 2. Spatial development of the concept of polycentrism in time and space**

The cohesion of the regions of the European Union envisaged reducing competitiveness and regional disparities, the initial setting followed by a study of **models and scenarios of police systems** (Capello R., 2000) targeted progress towards regional convergence or reducing disparities. The lack of empirical data of the Polycentric Development Instrument has an impact on a scientific basis for the benefits of police research. **The definition of a polycentric region as a space** appears in the model of van der Berg's life cycle in early 2014 - the dynamics of the Western European city have gradually progressed at the rate of population growth since the population gradually changed from the "core" to the inner-city area and the adjacent suburban "rings", which is a wide area of displacement (Romei A., Meyer E., 2006). Quitman with Mustard (Kloosterman, Mustard, 2001) provided a precise definition **of the territorial concept of North American polycentrism** "The existence of more than one centre in a city, region or other territorial unit" and began the creation of a polycentric territorial model. As a result, such an initiative escalated the collapse of north America's monocentric spatial structuring model. The morphological concept **of polycentric spatial structure** in the context of the growth of surrounding areas accentuates the three levels of administrative territorial division of the spatial dimension (Figure 3). The concept attributes the phenomenon to the morphology of a populated area, under the assumption that there are several urban agglomerations of similar size at different levels of settlement hierarchies.

| Local Level  | Region Level   | State Level  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• <b>coordination of measures</b> for balanced development at a <b>given local level</b></li> <li>• improved living standards of the population and a developed economy, not only in one urban area, but at the local level as a whole</li> </ul> | <ul style="list-style-type: none"> <li>• <b>coordination of measures</b> to promote local level as a driver of <b>regional development</b></li> <li>• synergies with the impact of the growth of a particular city for the development of the surrounding areas and the polycentric structure of the region</li> </ul> | <ul style="list-style-type: none"> <li>• <b>local and regional level contributes</b> to a successor polycentric and <b>balanced development of the country</b></li> <li>• cooperation and exchange of economic growth in the country as a whole</li> </ul> |

**Source: the scheme and empirical review of polycentrism concept in Latvia created by the author**

**Fig. 3. Morphological concept of polycentrism in three levels of administrative territorial division of spatial dimension of the national level of Latvia**

The development of digital transformation contributed to the subsequent transformation of the extension of the concept of polycentrism to the next stage with an emphasis **on a polycentric urban model development scenario** (Hall P., Pain K., 2006) with a successor extension of the concept of spatial planning. A new discourse on **the interpretation of the concept of polycentricism for application in European spatial planning** is launched by Shaw and Sykes (Shaw D., Sykes O., 2004). Arguing that the interpretation of multicentre versatility by spatial scale is an important and insufficiently researched element of the concept. Based on the region's spatial planning initiative in England, the paradoxical link between polycentrism between the concept of polycentric and balanced development has been noted. The statement of the show and Sykes confirms the findings of several authors that the understanding and interpretation of the concept of polycentricity is changing in space and time on the agenda of specific national policymaking. This suggests that polycentricity should be seen as an idea that develops generation abilities (Shaw D., Sykes O., 2004). In 2000, during the 12th session of the European Conference of Ministers of Regional Planning (*CEMAT*), the document "Basic principles for sustainable spatial development of the European continent" was approved. Linda Baltina (2014) calls this approach "dynamic of potential opportunities" and provides for a regular review of the complementarity of resources, including the introduction of a resource-based approach in the strategic management of processes. The dynamism of potential opportunities is linked to the region's ability to create competitive interactions between different resources at their disposal in a changing environment. Social, economic, and environmental objectives set at national level in the context of spatial development (Kramar H., Kadi J., 2013) **establish a link between cities and policies at the micro level of the region concerned. The functional and economic complement of the cohesive functional and economic development strategy for integrated spatial development is set out at two levels:**

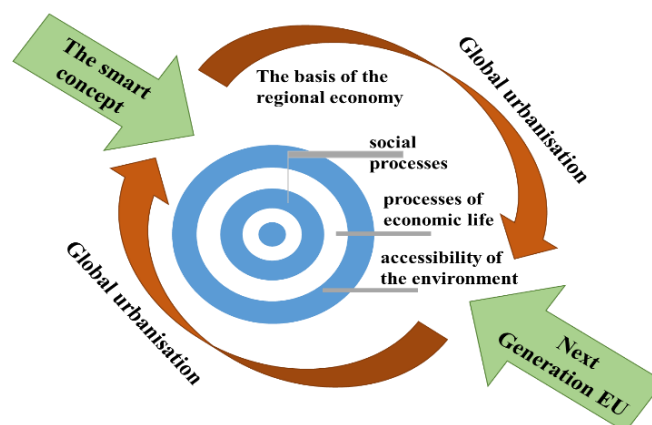
- mesalamine (intercity development in a confined space with a tendency towards a macro-level polycentric network).
- Macro-level (a European or global alternative model for the concept of smooth regional development).

The level approach allows for variations in integration and flexibility depending on the spatial structure and complexity of the region (Kramar H., Kadi J., 2013). Since Latvia is a Member State of the European Union, the concept of spatial planning and development action policy have also been binding on Latvia. The priority set out in *the Territorial Agenda for European Union* is to promote polycentric development and innovation without looking at urban development away from regional development issues. Gradually, with the beginning of the 21<sup>st</sup> century, regional development planning from three-dimensional – social, economic, and environmental, expands the scope with the integration of the territorial dimension into the development policy agenda with an emphasis on sustainable development. The issue of regional

development, including ensuring the sustainable and balanced development of the territory, the most effective solution is the integration of a **"regional division"** into all, including the common development priorities of individual sectors and the country already at the stage of their planning. In 2017, the State Audit Office (2017) started the discussion cycle on the concept of "The concept of rational local government" to reduce differences between local governments and to create a system in which each local government is economically permanent and self-improvement oriented. The results of audits of the State Audit Office in 2016 in 22 municipalities identified the risk of a decentralised approach and a lack of a common understanding for the promotion of economic growth. The State Audit Office points to the impact of the transformation of economic processes on the flow of rapid migration in the direction of development centres and invites to develop long-term guidelines for the development of the regional system with an economic equivalent effect and reducing the difference between local governments.

In addition to the agenda for a rational long-term action policy, the growing importance for the expansion of uncontrolled areas and the increase in resource efficiency are taken up by **the impact of global urbanisation** and the pressure on territorial cohesion with a broader national context for the interaction of urbanisation with the European Commission's long-term initiative *NextGeneration EU* " aspects such as the economy of a neutral CO<sub>2</sub> balance, the integration of innovation, the reassessment of climate change, water and biodiversity resources. Cekule (2010) under the influence of global urbanization transforms the extension of the concept of **"polycentric spatial structure"**, looking at the dynamics of urban expansion in space and time. The results of the study confirm the influence of nature and other factors on the functional and spatial structure of the city and confirm the thesis put forward by the scientist that the decisive factor of the spatial concept of polycentrism is political and economic changes, which are reflected in the spatial structure of the city, municipality, region and national.

Autor, using a systemic analysis of the impact of urbanisation of empirical studies, combined with the goal of sustainable development of the territory - to strengthen the regional and territorial dimension, created **her own concept of regional development** (Figure 4) , where the dynamism of potential possibilities is linked to the region's ability to create competitive interactions between different resources at their disposal in a changing environment of urbanisation (Young J., 2005) and spatial development in a smart perspective of political and economic change.



**Source: author's empirical research and synthesis of the concept of urban dimension and sustainable polycentrism in Latvia**

**Fig. 4. The concept of regional spatial development theory based on sustainability aspects of the urban dimension**

Active research activities within the globalization and urban dimension of polycentric perspectives were analysed by Chinese scientists (Chen, Zhang, Liu, 2014; Zhen Liu, Shenghe Liu, 2018) confirming the role of urban polycentrism planning in the overall national context.

Adapting the region to dynamism over time poses new challenges to sustainable and inclusive policies with a multidimensional approach to global reality and a realistic balance between demographic expansion, social and economic momentum, and the region's sustainable development vector.

## Conclusions

- 1) The empirical findings confirm the synergies between the theoretical and normative environments of the concepts of 'polycentricity', 'polycentric', 'polycentric', 'polycentric spatial structure' and demonstrate the synergies between the spatial concept during extensions and transformations of the concept.
- 2) Policies and trends of polycentric development appear simultaneously with perceptions of spatial and economic development successively escalating the morphological and theoretical interpretation of the concept of polycentrism.
- 3) Ongoing political and economic changes increase the impact on the trends of globalisation and urbanisation of elements of interacting spatial systems, determining the nature of the evolution of changes and the dynamics of growth.
- 4) The gradual transition of the 21<sup>st</sup> century from the three-dimensional prism of regional development – social, economic, and environmental – expands the scope with the integration of the sustainable concept of the territorial dimension to balanced regional development.
- 5) The empirical findings confirm the closeness of the link between urbanisation rates and GDP per capita, demonstrating a correlation between the global model of change, urbanisation, and economic growth.
- 6) By collecting urban dimensions and aspects of future generations (sustainability) based on the perspective of smart political and economic changes in spatial development, the author proposes her concept of regional development, where the dynamism of potential opportunities is associated with the region's ability to create competitive interaction of different resources at its disposal in a changing environment of urbanization.

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