

## DEVELOPMENT OF REGIONAL INFRASTRUCTURE: PUBLIC AND MANAGEMENT ASPECT

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**Abstract.** The academic paper is devoted to the study of theoretical and methodological aspects of public infrastructure management at the regional level. It has been determined that the regional infrastructure is an organizational and economic system; it includes a territorial and sectoral complex of facilities and areas of activity that meet the needs of the region in resources, products and services necessary for functioning, reproduction and development of economic entities. It has been substantiated that the foundation of economic growth and sustainable development lies in effective state management of regional development. It should be noted that the important role of ensuring competitiveness is set on the public management, which in turn depends on the level of infrastructure development, market, financial and other levers of influence. According to data of the European Commission in 2019, it has been established that the first place in Europe in terms of regional infrastructure is occupied by London, which indicates the effectiveness of state measures for infrastructure management. A conceptual model of the public management system of regional infrastructure has been developed. As a result of the research, it has been found that the long-term development of the regional infrastructure is determined by the balanced functioning of all its elements, as well as the formation of a favorable environment for generating and maintaining the potential of the territory needed to find new factors of production on the basis of innovative approaches, increasing the rate of economic growth of the regional economy, and ultimately, improving living standards.

**Keywords:** regional infrastructure, public management, management system model, management assessment methodology.

**JEL Classification:** O18, R10

**Formulas:** 0; **fig.:** 4; **tabl.:** 1; **bibl.:** 15

**Introduction.** Under the conditions of innovative development of the world economy, the attention to the issues of regional infrastructure is explained by the fact that it, firstly, occupies a larger part of the reproduction process; it absorbs a significant part of capital investments and labor resources. Secondly, further division of labor resources and strengthening of integration processes increases the burden on the economy. In theoretical terms, the development of regional infrastructure is an understudied area of economies. Due to the global crisis caused by the Covid-19 pandemic, public infrastructure management at the regional level is of key importance towards supporting economic growth, facilitating trade and increasing resilience to climate change.

The efficiency of production and the social-political situation depend on the level of development of regional infrastructure. The higher the level of infrastructure development is, the faster the region receives investment, labor force flows into the region, economic development accelerates, and the life and health of the population improves. Conversely, the lower the level of infrastructure development is, the slower the production and the lower the standard of living is. The level of infrastructure

development in the region also plays an important role in creating the image of the territory. And this in turn affects the investment attractiveness of the region.

The presence of a direct link between the development of the regional economy and the degree of infrastructural development of a particular region is a common norm for modern economists. Nowadays there is a clear understanding of the need to implement infrastructure development for the successful operation of various areas of activity. Infrastructure is an essential part of any economic system. Infrastructure facilities are locally connected to each other, but most of them function in order to meet the needs of a specific area, business and population. Consequently, the problem of effective management of regional infrastructure by the state acquires special significance and relevance.

The purpose of the academic paper is to study approaches to the development of regional infrastructure, based on theoretical and methodological provisions relating to its public and management aspect.

**Literature Review.** The development of regional infrastructure is of great importance for the sustainable development of the economy and is of interest to many scholars who have considered various aspects of this problem. Since 1990, an active study of the issues of the influence of regional infrastructure on economic growth and living standards of the population has begun. The researcher Aschauer D. in his research linked the decrease in economic growth in the United States with reduced infrastructure costs [2]. Scientists Karras G. and Evans P. continued to study this issue, defining satisfactory conditions for economic development as an analysis of the interrelationship of microeconomic infrastructure with the nature of the production process. Subsequently, scientists discovered a link between increasing the efficiency of regional development, financing infrastructure and public management of this process [6].

Husin A. notes that infrastructure plays an important role in supporting sustainable development; the scholar proposes to use the System Dynamics simulation model in demand forecasting, which will provide an assessment and generate scenarios for comparing the feasibility of a regional infrastructure project [8].

Estache A. adheres to the position that the importance of the influence of infrastructure on economic growth is easy to underestimate. In order to avoid underestimating its impact, infrastructure and public capital should be separated, as well as national payments and regional infrastructure investments [4].

Morgenroth E. considers infrastructure as an important driver of regional development. State regional institutions attract centralized investments for the development of regional infrastructure facilities, which will increase employment, economic growth and improve social integration [13].

In our viewpoint, the development of individual infrastructure facilities will not provide sufficient economic development; only systemic development and high quality services of the entire regional infrastructure will ensure the competitiveness of the region and business; and for this it is necessary to build an effective system of governance and regulation.

There are numerous examples of regional infrastructure development. In particular, Chile has a national SNI system, which includes a harmonized structure for the identification, coordination, evaluation and implementation of infrastructure projects. This system provides standardization and methodological guidance for the assessment of regional infrastructure facilities by allocating institutions that manage these projects and their budget funding [3]. A 2016 CBI / AECOM infrastructure survey has found that a lack of strategic regional governance and permanent decision-making are considered as major obstacles towards improving local infrastructure.

Kaufmann D., Kraay A. and Mastruzzi M. Have developed 6 indicators of regional infrastructure management efficiency, namely: indicator of responsibility, political stability, efficiency of public management, quality regulation, rule of law, and control over corruption [10]. The OECD has also developed the “Proper Infrastructure Development” Program, which includes an infrastructure vision strategy, risk management principles, regulatory support, and coordination of infrastructure policies between levels of government [14].

In 2016, the McKinsey Global Institute provided information on the development of a new methodology for assessing the quality of public infrastructure management in the analytical review “Bridging the gaps in global infrastructure” [11]. The outlined diagnostics includes such elements as “infrastructure quality” and “public management in the construction and logistics of infrastructure projects”.

From this brief review of the literature on infrastructure development, it can be understood that most scientists and organizations have studied the impact of infrastructure on the overall economic situation. Herewith, insufficient attention is paid to the management aspects of regional infrastructure development. In the present academic paper, we consider public and management aspects of regional infrastructure development as one of the most important factors of long-term economic growth and competitiveness of the region.

**Methodology.** The methodological basis of this study is a set of methods of scientific knowledge, general and special research methods. Scientific investigations in the field of methodology for assessing the development of regional infrastructure have been analyzed and systematized in order to develop a model of an infrastructure management system at the regional level.

**Results.** At present, the world, having entered the third millennium, is faced with the global economic problem of building a competitive economy. Regions are understood not only as a spatial, infrastructural, natural-resource and economic category, but also as a social space that has an ecological, historical and social-cultural component forming the attractiveness of the territory. In our viewpoint, the development of the region’s infrastructure should be understood as a system of actions aimed at solving the problems of social-economic development of the state, taking into account the rational contribution of the regions to their development.

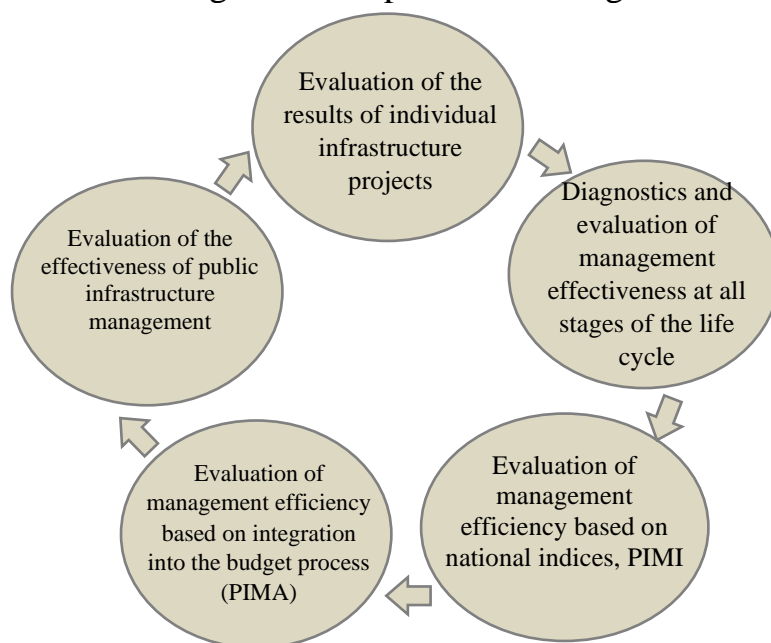
Covid-19 pandemic crisis has worsened regional infrastructure development prospects for Central, Eastern and Southeastern Europe. Due to the unforeseen costs of national budgets in the coming years, it is important to invest in infrastructure as efficiently as possible, as well as accelerate the transition to digital innovative

technologies. Expanding investment scales in infrastructure development can be an important tool to support recovery activities [1].

The methodology for assessing the effectiveness of regional infrastructure management is developed and applied by the IMF and the World Bank, as well as large consulting companies, in particular, the McKinsey Institute. The present assessment allows identifying weaknesses in public management of infrastructure investments and developing reforms in order to overcome them.

The effectiveness of public management in this area can be assessed in different ways, namely: as the effectiveness of the implementation of the infrastructure facility; as the effectiveness of public investment management in infrastructure based on the project life cycle; as the effectiveness of public management in the field of infrastructure created by public or private investment.

The latter type of assessment is the most comprehensive. Each of them is characterized by its own system of criteria and indicators, and it can be applied independently. The stages of development of the international methodology for assessing infrastructure management are presented in Figure 1.



**Figure 1. Stages of development of methodology for assessing regional infrastructure management**

*Source: compiled based on [3; 9]*

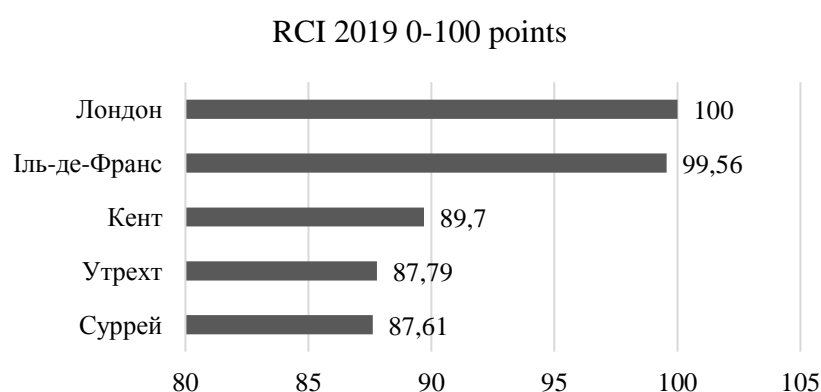
Experts of McKinsey company in their study “Infrastructure Efficiency: How to Save 1 Trillion USD per a Year” have concluded that reducing costs by 40% with this amount of infrastructure or increasing infrastructure efficiency by 60% is possible through widespread use of leading experience in the field of selection and implementation of new infrastructure projects and getting more benefit from existing infrastructure [12].

The main problems of infrastructure development are the problems related to the purely economic approach to the development of the region and the issues connected

with poor coordination of management and operation of infrastructure facilities due to the multi-sectoral composition of the infrastructure.

In 2018, the European Commission has proposed to create the InvestEU program within the multi-year MFF programs for 2021-2027. It combines 13 financial instruments and is aimed at mobilizing investments of at least 650 billion EUR (about 4,5% of EU GDP in 2019) in four basic sectors, namely: sustainable regional infrastructure, research, innovation and digitalization, small and medium business, social investment [5].

According to the Regional Competitiveness Index (RCI) Methodology (Figure 2), which defines more than 70 indicators, including: the level of governance in the region, infrastructure, digital, healthcare, human capital, labor market and innovation, in 2019, the five leaders in the European Union in terms of regional infrastructure development were as follows: London (the UK), Ile-de-France (France), Kent (the UK), Utrecht (the Netherlands), Surrey (the South-East UK). These regions have a developed transport infrastructure, communications, housing and communal services, education, medicine, social security, culture and recreation.

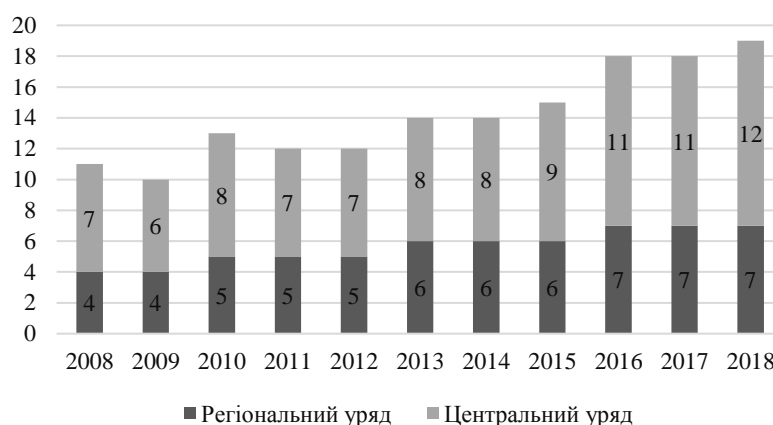


**Figure 2. Ranking of regions according to the level of infrastructure development in 2019**

*Source: compiled according to data of the European Commission*

In Figure 2, it can be observed that London is in the 1st place; consequently, we can conclude that the methods of public management of regional infrastructure development used by the UK government are quite effective. The London National Infrastructure Commission (NIC) has conducted a study on infrastructure sustainability in 2020, which defines how government, regulators and relevant sectors can provide sustainable and reliable infrastructure that is able to meet the future needs of the state. The role of the UK government is not limited to funding; first of all government institutions direct investments in profitable infrastructure projects and support private investment through various management mechanisms.

Three forms of regional infrastructure funding are used in the United Kingdom, namely: public funding; private funding; mixed form of public-private funding. During the period 2008–2018, most of the funds for the development of regional infrastructure came from the central government (Figure 3).



**Figure 3. Public investment in infrastructure in 2008–2018, GBP billion in current prices**

Source: compiled based on [15]

The key measures for public management of regional infrastructure conducted by the UK government are listed in Table 1.

**Table 1. Measures on public management for development infrastructure at the regional level**

Sector of regional infrastructure	Measures
Automobile	Maintenance and development of strategic highways is funded directly by the state through the Road Agency. Local authorities are responsible for the management and maintenance of local roads; capital modernization and repair of local roads is financed by the central government.
Railway	Passenger transportation services are provided to carriers through government-approved deductibles. It maintains the Network Rail infrastructure network, which is partly funded by government subsidies and funds of freight and railway companies.
Aviation-related	The state promotes competition and ensures a level playing field and high security standards in a predominantly privately owned sector. The development of the aviation-related sector is considered a priority area of industrial policy.
Electric-power related	Investments come from the private sector, the state energy program lies in minimizing energy costs for consumers in the long run perspective.
Telecommunication	The government provides an effective regulatory framework for the management of the sector and seeks to ensure wider coverage and accessibility of the broadband network for consumers and business entities.
Water supply	The role of the state lies in ensuring a safe and acceptable standard of water supply and prices.
Science and innovations	The state considers this sector as the main vector of economic growth. Public funds are invested in research through bodies that fund higher education (Technology Strategy Board).

Source: compiled based on [1]

The basic recommendations concerning the management aspect of regional infrastructure development are as follows:

- as a result of constant climate change and digitalization processes, greater pressure is created on the infrastructure system and necessary long-term investments in the field of water supply, energy and telecommunications. In order to do this, it is necessary to define long-term priorities for these areas and provide regulators with

new functions, including allowing companies to invest in infrastructure while protecting the interests of consumers;

- in order to protect the interests of the private sector investing in infrastructure, the regulatory system should fairly balance risk and reward between consumers and investors, as well as increase competition in the design and construction of regional infrastructure networks and facilities;

- the government will set clear standards of sustainability and stress test regional energy, water and transport infrastructure in order to address vulnerabilities and prevent potential threats.

Infrastructure is of great importance for the livelihood of the population and production facilities, forasmuch as it provides the necessary level of services, starting from water supply and energy supply and ending with social sphere facilities. Public management and regulation supports the entire life cycle of these structural elements of regional infrastructure.

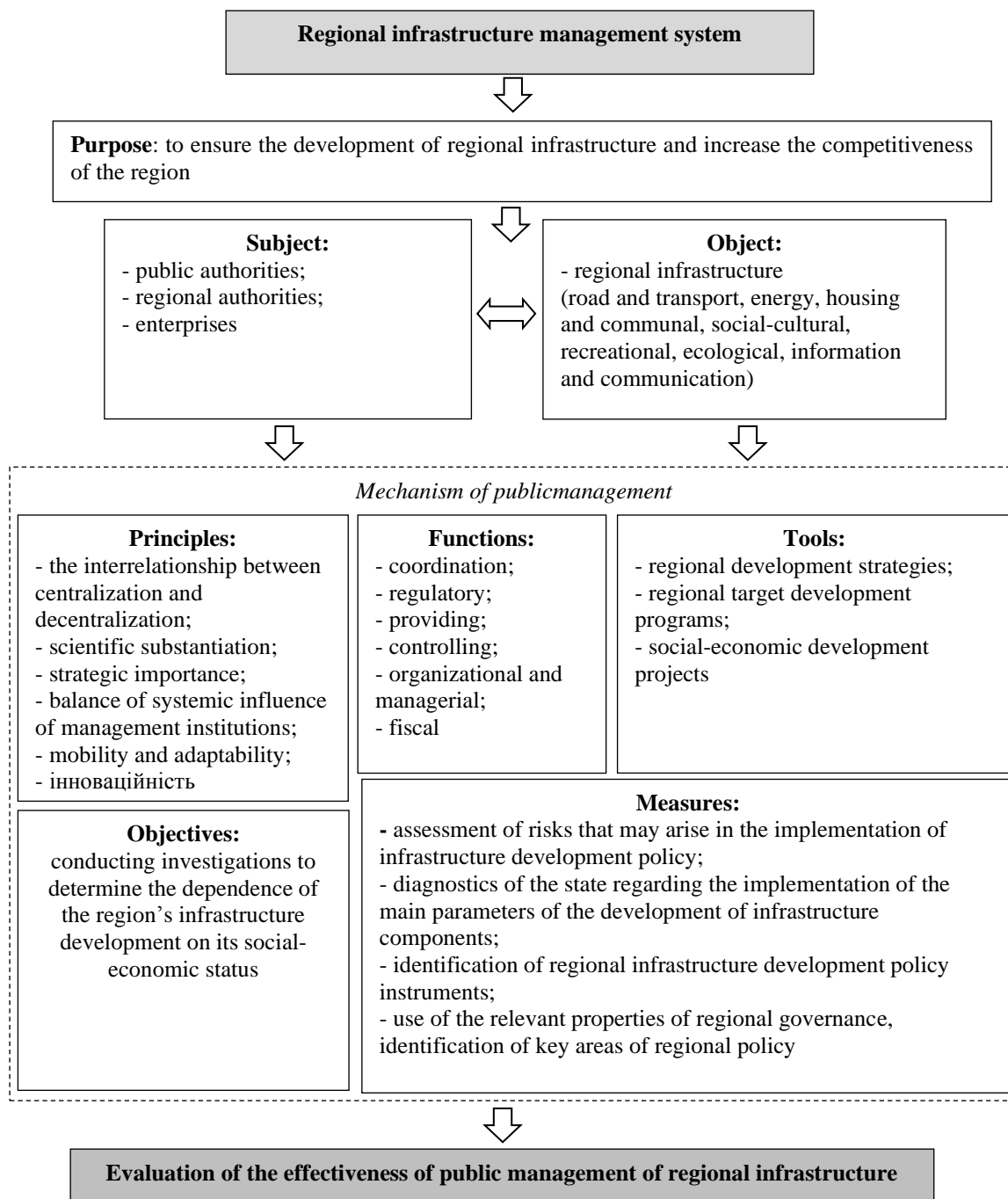
We believe that infrastructure management should be understood as the processes, methods and tools of interaction, decision-making and monitoring used by the authorities in order to implement available infrastructure services to the society. Regional infrastructure management and improvement at all stages of the infrastructure cycle is extremely important towards ensuring sustainable economic growth. However, this requires a careful assessment of the capabilities and strengths of public institutions and depends on numerous institutional and social-economic aspects, strategic planning, and the creation of environmentally sustainable infrastructure throughout the life cycle and at all levels of government.

The conceptual model of the state management system of regional infrastructure can be presented in Figure 4.

In our viewpoint, the management system of regional infrastructure should be understood as a complex set of elements, including as follows: public authorities, strategic directions of development, objectives, functions, technologies and methods, tools, structures that create a mechanism for influencing the infrastructural and regenerative potential of the region, determining the social-economic processes in order to improve the economy of the region.

Public management of regional infrastructure is necessary for planning, selection and provision of timely necessary infrastructure within the budget. The development of regional infrastructure should meet the requirements of modern development principles by introducing new technologies that allow improving the technical level and quality of products and resource-saving technologies that ensure a high level of competitiveness of products.

**Discussion.** The present research correlates with the results of Kumari A. (2017), namely: “studies on the development of regional infrastructure are empirical in nature; most of them are devoted to financing infrastructure, public-private partnership is considered as a priority source of funding of regional infrastructure”. Public management of regional infrastructure is necessary for planning, selection and provision of timely necessary infrastructure within the budget, as well as on the basis of private funding and public-private partnership.



**Figure 4. Model of state management of regional infrastructure**

Source: compiled by the author

The development of regional infrastructure should meet the requirements of modern development through the introduction of new technologies; they allow improving the technical level and quality of products and resource-saving technologies ensuring a high level of products' competitiveness.

Extended regional infrastructure includes various elements of systems, namely: economy, politics, government and science. These subsystems are independent; thus, the key task is to coordinate such subsystems, as: the formation and configuration of



structural communication (Kuch B., 2016). This means that public management and regulation should support the potential and the entire life cycle of these structural subsystems of regional infrastructure.

Currently, the management of regional infrastructure faces numerous challenges towards ensuring its sustainable development. Lack of effective management strategy leads to complete destruction of infrastructure facilities and high costs for infrastructure (Olufemi, 2015). Therefore, regional infrastructure management and improvement at all stages of the infrastructure cycle is extremely important in order to ensure sustainable economic growth. This definitely requires a careful assessment of the capabilities and strengths of public institutions and depends on many institutional and social-economic aspects, strategic planning, and the creation of environmentally sustainable infrastructure throughout the life cycle and at all levels of state governance.

**Conclusions.** Management of regional infrastructure's development is a set of specially organized systemic actions aimed at ensuring sustainable and balanced reproduction of social, economic and natural potential of the region with a positive dynamics of the parameters of the level and the population's life quality. Competitive and dynamic development of the region is possible only due to the full implementation of the existing specific regional potential, the main element of which is the infrastructure of the region. State regional policy should focus on improving the spatial development of the national economy by identifying and disclosing the benefits of each region, the formation and promotion of new agglomerations of dynamic economic growth throughout the country. We are talking about the multipolar development of the state's territory and the creation of effective regional facilities for innovation-oriented social-economic progress. Methodological approaches to managing the development of infrastructural support in the region should always have an idea of the infrastructure's own potential, opportunities, conditions and ways to implement it. Modern regional policy should be a clear, well-coordinated system of development and implementation of priority areas of regional infrastructure, including a set of flexible provisions of organizational, legal, methodological and informational nature. The policy of the central government should be aimed exclusively at joint development and coordination of strategic and program documents for development of regional infrastructure, as well as coordination of their implementation.

The objectives of regional governance are as follows: intensifying and updating the use of all types of available resources, creating stimulating conditions, opening new markets and social opportunities, and creating favorable conditions for efficient management and improvement of living standards. There is a certain dependence between the full implementation of the accumulated potential and the quality of regional management. It is manifested as follows: the higher the professional level of regional management is, the better the existing infrastructural potential of the region is used and multiplied. Thus, the degree of implementation of the region's own infrastructural potential is determined by the level of use of modern management

methods. This dependence constitutes an important regularity of the modern management of regions.

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