

**СУСПІЛЬНО-ГЕОГРАФІЧНІ  
ДОСЛІДЖЕННЯ**

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DOI: <https://doi.org/10.15407/ugz2021.04.039>**Hr.A. Krachunov<sup>1</sup>, Eu. O. Maruniak<sup>2</sup>, S.K. Ovcharova<sup>3</sup>**<sup>1</sup> Technical University of Varna, Varna, Bulgaria<sup>2</sup> Institute of Geography of the National Academy of Sciences of Ukraine, Kyiv, Ukraine<sup>3</sup> Varna Free University, Varna, Bulgaria**LOGISTIC POTENTIAL FOR ENSURING SUSTAINABLE DEVELOPMENT OF BULGARIA AND WESTERN BALKANS\***

Today efficient logistics is an important component of sustainable development of countries and regions. Transport networks have a significant impact on the environment. At the same time, the optimization of their use, the introduction of new technologies allows not only to mitigate the existing and potential consequences of such an impact, but also to reduce the whole range of costs, social, economic and environmental. The article analyzes the main problems of the functioning of transport-logistics systems in Bulgaria, the tasks are identified, the implementation of which will improve the current situation and create conditions for their further development based on the principles of sustainable development. Particular attention is paid to the project “Three Seas Initiative”, its opportunities for Bulgaria related to raising standards in the field of logistics, strengthening cooperation within the Western Balkans.

**Key words:** logistics system; supply chain; sustainable development; economic growth; the Three Seas Initiative.

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Нині ефективна логістика є важливою складовою сталого розвитку країн і регіонів. Транспортні мережі справляють значний вплив на навколишнє середовище. При цьому оптимізація їх використання і впровадження нових технологій дозволяють не тільки пом'якшити наявні та потенційні наслідки такого впливу, а й зменшити весь спектр витрат: соціальних, економічних та екологічних. У статті проаналізовано основні проблеми функціонування транспортно-логістичних систем Болгарії, визначено завдання, реалізація яких покращить поточну ситуацію та створить умови для їх подальшого розвитку на основі принципів сталого розвитку. Розкрито можливості проєкта «Ініціатива трьох морів» для Болгарії, що пов'язані з підвищенням стандартів у сфері логістики, зміцненням співпраці з країнами Західних Балкан.

**Ключові слова:** логістичні системи; ланцюг поставок; сталий розвиток; економічне зростання; Ініціатива трьох морів.

**Introduction**

Nowadays, there is a dynamic development of transport and logistics systems associated with the growing globalization of production, market and competition, which is increasingly manifested in both territorial and sectoral aspects. This trend is based on the use of an integrated approach and appropriate tools in the management of material flows and related information from the place of production, at all stages

of movement (supply, production, distribution), to the end user.

Achieving a higher degree of integration in the management of logistics activities and functions provides opportunities for better coordination of activities of individual participants in the supply chain, optimization of logistics solutions and rationalization of resources' use. The contribution to

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sustainable development should also be noted here, since, in the context of achieving the 2030 Goals<sup>1</sup>, we are talking about reducing greenhouse gas emissions, noise pollution, the balance of consumption, increasing the investment attractiveness of territories, the availability of various goods and services. This creates the potential for significant economic growth, strengthening the country's competitive position, increasing the influence and degree of its socio-economic integration in relation to various macroregions.

### Current state of the researched issue

Managing the complexity of transport flows in a modern society requires highly efficient modes of transport and seamless cooperation between them. Advanced and integrated logistics solutions can help optimize freight transport operations and thereby favour growth and make Europe globally more competitive<sup>2</sup>

The main methodological emphasis is associated with the concept of logistics, which can be defined as "the process of using the existing infrastructure to plan and control the movement of materials from the start to the end point, taking into account the possibilities of reducing costs and improving the quality of services" [1]. Thus, overall transport costs are reduced while providing the required level of service [2, 3]. At the present stage, achieving a balanced combination of these two components to form competitive advantages is possible through the use of information and communication systems and technologies. Suppliers who apply them can significantly improve the analyticity and transparency of logistics processes, access to information in each transport segment and intelligent management of all deviations from preset parameters<sup>3</sup> [4].

In a dynamically changing and highly competitive environment, modern logistics is becoming an integrated process. Over the past fifteen years, it has played a key role in solving complex management and business challenges. Modern approaches, models, methods and multifunctional information

systems allow to quickly and adequately respond to frequent changes in the market situation, which in turn are determined by trends in the development of the world economy [5-8]. They are, in particular, expressed by the influence of the processes of trade liberalization and globalization, in the growing competition, requirements for the level of service, expanding the range and shortening the product life cycle, increasing the degree of specialization and the role of small and medium-sized enterprises in the economy. These trends determine the need for more flexible management in the field of logistics, respectively, better coordination in the implementation of supplies in terms of time and cost, which affects the competitiveness of companies [9, 10]. Thus, the development of logistics, is considered as an evolutionary process, gradually becomes more and more intensive, and, since the 90s of the last century, finds its expression in the widespread concept of "supply chain management", which is also used to ensure economic growth of the country [11-13].

In addition, we should mention studies related to the politico-geographical space and features of geostrategies at the global level, presented in the works of Z. Brzezinski, S. Cohen, A. Mahan, S. Huntington [14 - 17].

Supply chain sustainability is becoming one of the most dynamic and successful fields of research. The number of scientific articles continues to grow from year to year with the introduction of new approaches for modeling theoretical and multidisciplinary perspectives. Authors C.L. Martins, M.V. Patob [18] review key concepts for supply chain management, sustainability prospects and characteristics of the methodological literature. They consider that more of the articles take into account all three aspects of sustainable development, but the social aspect is still underrepresented compared to the environmental aspect.

It is worth to recall the works presented within the Club of Rome, numerous reports of international organizations ("Our Common Future", etc.), materials of national platforms for sustainable development, publications on certain aspects of sustainable development in urban development, agriculture, industrial production. For the EU countries, the main reference point today is the so-called European Green Deal<sup>4</sup>, which, in terms of transport, indicates such guidelines as reducing emissions and pollution,

<sup>1</sup>[https://www.undp.org>SDGs\\_Booklet\\_Web\\_En](https://www.undp.org>SDGs_Booklet_Web_En): Sustainable development goals.

<sup>2</sup>Opinion of the European Economic and Social Committee on European logistics policy:<https://eur-lex.europa.eu/legal-content/BG/TXT/PDF/>

<sup>3</sup> The Network for Computational Modeling for SocioEcological Science.2012.

<sup>4</sup>The European Green Deal <https://eur-lex.europa.eu/legal->

a shift towards balanced and “smart” mobility. Priority is given to the transfer of a significant part of the domestic freight, transported today by road to rail and inland waterway transport.

The aim of this study is to assess the logistics potential of Bulgaria in the context of macro-regional projects, as well as to identify opportunities for the use of similar patterns for cooperation in other post-socialist countries, in particular in Ukraine and Moldova.

### Main issues

Logistics and supply chain management have a big impact on both the global economy and everyday life. Concepts for modern transport, storage activities ensure certain products to be in the right place by the fastest and most efficient way. While the trends of increased globalization, widespread outsourcing, in-depth customer relationships, application of technology, make supply chain processes more flexible, at the same time they adversely affect sustainability. Greenhouse gas emissions, use of fuel and other natural resources, other forms of pollution and increased levels of packaging waste, are only part of all of these damages [17]. Road construction and heavy traffic often lead to disruption of migration routes, contributing to chemical and noise pollution of the surrounding areas. The problem is that not all companies use modern methods and indicators [19] to assess the environmental impact of their activities throughout the logistics chain.

Further operation of logistics centers is a prerequisite for the intensification of economic growth, various industries, which also does not comply with the basic principles of sustainability. In addition, there is an opinion that the direct delivery of goods to the consumer indirectly stimulates further consumption. At the same time, changing approaches to delivery, increasing the complexity of services, modernization and “greening” of vehicles are important measures to support the implementation of certain tasks under the Objectives 2030 (table 1). There is a need to expand cooperation and mutually beneficial relationships between customers, suppliers, competitors and other stakeholders operating in an interconnected global environment.

The Black sea location of Bulgaria creates many advantages for the development of transport and logistics systems, at the same time, their effective

and sustainable use requires the development and implementation of a number of measures aimed at achieving a higher degree of integration in the management of logistics activities and functions. Accordingly, the main tasks of logistics in Bulgaria are:

- determination of the necessary conditions and management actions for the implementation of proven in world practice possibilities of modern logistics for the competitive development of Bulgarian companies,
- identification of advantages, factors and approaches to build the country’s logistics infrastructure as a condition for economic growth,
- need for state policy, indicating guidelines and specific actions in which it can manifest itself at the current stage.

Management of logistic processes is regulated by both national and international legislation, represented by transport conventions, including the Convention on the International Combined Transport of Goods [20]. Studies show that the opportunities of modern logistics for the formation of competitive advantages of Bulgarian companies are still not fully used. This is mainly due to the problems inherited and acquired during the country’s transition period, which stem from uncertainty about property, subsequent decapitalization, deteriorating financial condition and a corresponding limitation of investment opportunities for introducing new approaches and management models, instability of the macroeconomic environment and corruption. [21, 22]. In addition, there is an inappropriate level of training of managerial personnel, a low level of marketing activity, insufficient financial resources and experience to implement development strategies, insufficient flexibility and dynamism of decisions in a changing highly competitive environment [6, 18]. Unlike Bulgarian companies, international companies and their structures, operating mainly in the field of industry and services, use modern approaches and methods in management, and logistics operations, for which they invest in cloud technologies, communications networks, human resources, transportation and warehouse systems. Therefore, solving the above problems and supporting national suppliers of logistics services are of great importance for their competitiveness in the single market of the European Union. Among the necessary conditions are following:

- Reducing the level of corruption, removing administrative and financial barriers through the

Table 1

## The role of transport and logistics systems in achieving the goals and objectives of sustainable development

Goal	Task	Features of the potential impact of transport and logistics systems
Goal 3: Ensure healthy lives and promote well-being for all at all ages	By 2020 reduce halve the number of deaths and injuries from road traffic crashes worldwide. Achieve universal health coverage, including financial risk protection, access to quality essential health services, especially in pandemic Covid-19 By 2030, substantially reduce the number of deaths and diseases from exposure to hazardous chemicals and pollution and poisoning of air, water and soil.	Ensuring road safety Ensuring transport accessibility of medical services Reduced vehicle emissions
Goal 7: Ensure universal access to affordable, reliable, sustainable and modern energy for all	7.b By 2030, expand infrastructure and upgrade technologies for a modern and sustainable energy supply to all in developing countries, in particular least developed countries, small island developing states and landlocked developing countries, taking into account their respective support programs	Expansion of infrastructure and modernization of technologies Renewable energy sources in logistic enterprises
Goal 8: Promote sustained, inclusive and sustainable economic growth, full, productive employment, decent work for all	8.4 Throughout the period until the end of 2030, progressively improve global resource efficiency in consumption and production systems and strive to ensure that economic growth is not accompanied by environmental degradation 8.9 By 2030, develop and implement strategies to promote sustainable tourism that contributes to job creation, local culture and local production	Optimization of logistics processes, increasing the availability of certain areas for organizing the sale of local products
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and innovation	9.1 develop quality, reliable, sustainable and resilient infrastructure, including regional and trans- border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all 9.2 promote inclusive and sustainable industrialization, and by 2030 raise significantly industry's share of employment and GDP in line with national circumstances, and double its share in LDCs 9.3 increase the access of small-scale industrial and other enterprises, particularly in developing countries, to financial services including affordable credit and their integration into value chains and markets 9.4 by 2030 upgrade infrastructure and retrofit industries to make them sustainable, with increased resource use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, all countries taking action in accordance with their respective capabilities 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending 9.a facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, LDCs, LLDCs and SIDS 9.b support domestic technology development, research and innovation in developing countries including by ensuring a conducive policy environment for inter alia industrial diversification and value addition to commodities 9.c significantly increase access to ICT and strive to provide universal and affordable access to internet in LDCs by 2020	Ensuring the development of resilient and Eco sustainable infrastructure, the integration of enterprises into relevant value chains

Continuation of table 1

Goal	Task	Features of the potential impact of transport and logistics systems
Goal 11: Ensure openness, safety, resilience and environmental sustainability of cities and towns	11.2 By 2030, ensure that safe, affordable, affordable and sustainable transport systems are available to all by improving road safety, in particular increased use of public transport, with particular attention to the needs of those in vulnerable situations, women, children, disabled and elderly people 11.a Maintain positive economic, social and environmental linkages between urban, peri-urban and rural areas by improving the quality of national and regional development planning	Ensuring the development of appropriate transport systems, electric cars Polycentric cities Multimodal transport corridors
Goal 12: Ensure the transition to sustainable consumption and production patterns	12.3 By 2030, halve global food waste at the retail and consumer levels, per capita, and reduce food losses in value chains, including post-harvest losses.	Improving value chains Reverse logistical flows Implementing recycling programs.
Goal 13: Take urgent action to combat climate change and its impacts	Incorporate climate change responses into national policies, strategies and planning	Improving technology and transport policy in general
Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system within the World Trade Organization, including through the completion of negotiations on its Doha Development Agenda	Development of transport and logistics systems as a tool to support a fair trading system

introduction of clear legal regulations;

- Development of the country's transport infrastructure that meets modern requirements for the movement of freight traffic within the European network;

- Harmonized national, regional and international transport policy of the country;

- Creation of a network of logistics centers for the provision of integrated services, optimization of the material flow management process in different directions, in terms of time and costs;

- Promoting establishment of an organizational culture with a certain type of inter-company relations;

- Improving the quality of relevant higher education and qualifications of the management staff of companies;

- Increasing the motivation of companies to apply effective strategies, modern management approaches, models and methods with the appropriate type of organizational structures and information and communication technologies.

In addition, one of the important components is the development of macro-regional relations, the realization of geostrategic interests within the Black Sea and other regions. Such opportunities can be considered through the Three Seas Initiative,

discussed below.

**The Three Seas Initiative** is a political project of the 12 European EU member states at the level of heads of state, launched in 2016. It is attended by Bulgaria, Austria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The initiative is developing as a pragmatic platform for cooperation with the main emphasis on deepening the integration of the countries on the Baltic, Adriatic and Black Seas and creating closer North-South links in such sectors as energy, transport, communications, information technology<sup>5</sup>.

The objectives of the Initiative are economic growth, investment, energy security, geopolitical security, digital communications, and the fight against climate change. The goals will be achieved by promoting cooperation in the development of energy, transport and digital infrastructure. An Investment Fund was created for the implementation of individual projects (June 5-6, 2019, Ljubljana, Slovenia). Projects that can be implemented in Bulgaria are: restoration of the design parameters of

<sup>5</sup><https://bbr.bg/bg/three-se%D0%B0s/>

the Ruse-Varna railway, the construction of a tunnel under the Petrokhan pass, the expansion of the gas storage in the village of Chiren and the construction of the Black Sea highway (Varna-Burgas). The mission and principles of the Bulgarian Representation of the Three Seas Initiative are being implemented through the Ministry of Foreign Affairs<sup>6</sup>, which is currently actively working on certain priorities.

It is also necessary to take into account the regional peculiarities of cooperation, which are important for the implementation of the initiative. Thus, in the context of cooperation in Southeast Europe, Bulgaria's priority is to improve infrastructure connectivity in the region. The network of pan-European transport corridors is one of the mechanisms that ensure not only the development of transport infrastructure [23], but also the deepening of common economic relations with the Western Balkans. The cooperation process in South East Europe is the leading political framework for regional interaction and the main regional platform for European and Euro-Atlantic integration in the Western Balkans. Bulgaria is an active and consistent supporter of a European perspective for the countries of the Western Balkans as an engine of democratization and economic transformation, as well as greater stability and security in Europe. Progress in the European integration of the countries of the region after the necessary reforms is in line with Bulgaria's interests in building a region of stability, security and economic growth, in which the values, principles and standards of the EU are guaranteed.

Thanks to the efforts of Bulgaria's presidency of the EU Council (January - June 2018), the Western Balkans have again taken the leading position on the European agenda. The future of the region as an integral part of the Union was confirmed. A key event in this regard was the EU-Western Balkans Summit held in Sofia on 17 May 2018 – the first of its kind since the 2003 Summit in Thessaloniki. The main focus was on integration in all its aspects, finding a joint response to common challenges such as security, illegal migration, organized crime and terrorism, hybrid threats, cybersecurity and disinformation. The Sofia Declaration was signed<sup>7</sup>, confirming the European perspective of the region and highlighting the strategic choices of all Western

<sup>6</sup> <https://www.mfa.bg/bg/3109>

<sup>7</sup> <https://www.consilium.europa.eu/bg/press/press-releases/2018/05/17/sofia-declaration-of-the-eu-western-balkans-summit/>

Balkan partners for EU integration and their desire to carry out reforms to achieve this strategic goal.

A separate focus is put on the process of cooperation in the Black Sea region. Bulgaria is part of the pan-European transport zone of the Black Sea. Ten multimodal transport corridors of European interest are the basis for the development of transport infrastructure in Central and Eastern Europe, with Bulgaria having the advantage of five of them passing through its territory. Of greatest importance is the southeastern main axis, connecting the European Union through the Balkans and Turkey with the Caucasus and the Caspian Sea, as well as with Egypt and the Red Sea. Also planned are corridors connecting Bulgaria with Albania and Macedonia, Iran, Iraq and the Persian Gulf. These are the main sea routes, including those in the Black Sea and the Mediterranean. These include the establishment of links between the ports of Varna and Burgas with the ports of Ukraine, Russia, Georgia and Turkey. Unlike the western and central axes, only in the area between Burgas and Varna is this axis part of the direction of the European transfer corridors No 8 (ETC8), where the construction of the Black Sea highway is planned<sup>8</sup>.

As part of the road infrastructure of ETC 8, which connects the Adriatic Sea with the Black Sea region, the Black Sea motorway is seen as part of the future ring of motorways around the Black Sea, in support of the priority of connecting the Trans-European region. The continuation of this axis to the north, towards Romania, is envisaged as a highway, and to the south, towards Turkey, as a modernization of the existing road. This will also ensure the integration and intensification of logistics flows with Ukraine and Moldova. The development of the motorway is also important for the development of the tourist potential of the coast and the improvement of transport services, the stabilization and sustainable development of already existing urban centers of a lower level.

Today, the poor quality of the complex infrastructure threatens the possibility of Bulgaria to join the trans-European transport network. The main problem identified in relation to the characteristics and qualities of the infrastructure in these areas is the lack of continuous, coordinated and permanent transport networks that ensure fast and safe movement over long distances. For this reason, Bulgaria's favorable transport-geographical position

<sup>8</sup> Транс-Европейски коридори - <https://aebtri.com>

in the trans-European transport network has not been indicated until recently as an adequate spatial organization of the network of settlements due to the lag in the level of development of constituent networks and infrastructure facilities [24].

The directions and guidelines for the development of national transport infrastructure are aimed at achieving the priorities of Strategic Goal 1 “Development of national transport infrastructure as part of the Trans-European Transport Network (TEN-T)”, ensuring integration into the European space and links with the main urban centers of neighboring countries. These proposals concern primarily the most important axes of the Trans-European Transport Network (TEN-T) and communications with neighboring countries and regions, as well as the directions of the Pan-European corridors, which are not covered by the main axes. Implementing these priorities, we can talk about changes on the way to a more rational spatial organization, ensuring communication between different European countries through the territory of the country, Bulgaria’s connections with neighboring countries, between the main urban centers. The transport infrastructure model is based on a currently developed configuration centered in Sofia, in western Bulgaria, and the balancing centers Varna and Burgas, in the east<sup>9</sup>, and will be designed as a “grid” with a well-defined and evenly coverage, with parallel and meridional axes, providing a moderate polycentric development of the system of settlements.

## Conclusions

The network of pan-European transport corridors is one of the mechanisms not only for the development of transport infrastructure, but also for the deepening of general economic relations within Southeast Europe, the Black Sea region and the Western Balkans.

At the same time, the development of logistics networks and the intensification of cooperation

should be carried out taking into account the goals and principles of sustainable development. First of all, this concerns the control of greenhouse gas emissions, ensuring the preservation of valuable ecosystems, both terrestrial and marine, and stimulating models of sustainable production, movement and consumption of goods and services.

Today, the transport and logistics potential of Bulgaria is not fully realized, which is largely due to the problems of the transformation period, certain gaps in legislation and regulatory support, difficulties in its implementation, as well as the lack of financial resources and insufficient development of mechanisms for cooperation with neighboring countries.

The Three Seas Initiative is a European macro-regional project that brings together 12 EU countries and potentially involves the participation of other countries, in particular Ukraine and Moldova. It is important for the Baltic-Black Sea regional development. For Bulgaria, the implementation of the project is associated with additional opportunities for the development of transport infrastructure, raising the standards existing in the field of logistics, strengthening collaboration within the Western Balkans and the Black Sea region.

Most important for balanced development is the southeastern main axis connecting the European Union through the Balkans and Turkey with the Caucasus and the Caspian Sea, as well as with Egypt and the Red Sea. These include the connections of the Bulgarian ports of Varna and Burgas with the ports of Ukraine, Russia, Georgia and Turkey.

Joining the Three Seas Initiative is of considerable interest for Ukraine as well, which is developing under the influence of a number of challenges, both global and national.

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<sup>9</sup>www.bgregio.eu

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## **КИЇВСЬКИЙ МЕТРОПОЛІСНИЙ РЕГІОН: ПРОБЛЕМИ ФОРМУВАННЯ, СКЛАД І МЕЖІ**

Дослідження присвячено розробленню та апробації методологічних підходів до визначення складу та меж метрополісних регіонів. Показані відміни між процесами метрополізації та регіоналізації. Розкрито основні риси міст-метрополісів. Міста-метрополіси разом із територією свого безпосереднього впливу формують високоінтегровані суспільно-територіальні комплекси – метрополісні регіони. У цьому випадку реалізація усієї сукупності метрополісних функцій забезпечується уже не самим містом-метрополісом, а усім метрополісним регіоном. Показано відмінності між міськими агломераціями та метрополісними регіонами. Встановлено, що виникнення міських агломерацій та проходження ними початкових стадій розвитку припадає здебільшого на індустріальну епоху. Подальша трансформація міських агломерацій у метрополісні регіони відбувається на стадії субурбанізації, коли ядро делегує частину функцій (зокрема і метрополісних) своєму передмістю. Проте, далеко не всі міські агломерації мають необхідний потенціал та передумови для отримання статусу метрополісного регіону. В основі визначення складу та меж Київського метрополісного регіону лежить функціональний підхід, який базується на аналізі реальної зв'язаності між метрополісом та територією його безпосереднього впливу. Ключові критерії визначення меж – це міра доступності та зв'язаності міста-метрополісу і території, яка його оточує. Внаслідок вдосконалення транспортної мережі та впровадження швидкісних видів транспорту вони здатні змінюватись. У зв'язку із цим межі метрополісного регіону є нестійкими та «розмитими». Установлено, що зливаючись із соєю субурбією, місто розширює свої реальні межі та формує цілісне функціональне ядро метрополісного регіону. Дослідити ці процеси дозволяють сучасні методи дистанційного зондування Землі. Подальший розвиток Київського метрополісного регіону значною мірою залежить від можливостей його інституалізації, координації та взаємовигідного вирішення спільних проблем Києва та його приміської зони, що виникають в процесі функціонування метрополісного регіону.

**Ключові слова:** процеси метрополізації; міста-метрополіси; міська агломерація; метрополісний регіон; субурбія; субурбанізація; Київ.

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