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CREATION OF AVIATION TRANSPORT AND LOGISTIC CLUSTERS NETWORK

Sergiy Gritsenko, Olga Karpun. *«Creation of aviation transport and logistic clusters network». In the transport and logistics systems of the Ukrainian regions, the constituent elements of different types of vehicles, airports, seaports, railway junctions, logistics centers are separated and aimed at achieving individual goals. They do little to achieve common goals, which limits the access of Ukrainian products to the world transport market. The current state of the Ukraine transport system requires research on the formation of aviation transport and logistics clusters. The purpose and objectives of the research are to substantiate the theoretical and methodological foundations and develop practical recommendations for the formation of aviation transport and logistics clusters network as an organizational and economic form of effective interaction of all its participants.*

The intensification of Ukraine's activities on the development of international cooperation in the field of transport services, adaptation of national legislation to EU norms and standards, as well as countries that are members of international associations, has been considered. The main goal for all participants of the aviation transport and logistics cluster is to provide a competitive service to customers with optimal total costs. The network of aviation transport and logistics clusters is considered as a basis for productive cooperation of partners with a balance of conflicts of interest. The peculiarities of the advantages of membership in aviation transport and logistics clusters are identified.

A network of aviation transport and logistics clusters in Ukraine has been proposed, which can be introduced by seven international leading airports – «Lviv» named after Danylo Halytsky, «Dnipro», «Odesa», «Kharkiv», «Kyiv» named after I. Sikorsky (Zhulyany), «Boryspil» (Kyiv) and «Zaporizhzhia International Airport», which serve about 98% of the total passenger, mail and cargo flows and provide six transit routes. The potential of Ukraine's leading international airports has been described. The principles of formation and coordination of management of different types of transport within aviation transport and logistics clusters has been defined: voluntary partnership, innovation, transparency and stability of «rules of the game», multimodality, satellite navigation, intelligent transport systems, information technologies, electronic document management and

corporate social responsibility. The components of the competitiveness of the aviation transport and logistics clusters network in the global environment has been identified in order to create an effective management system for transportation safety and productivity.

The formation of the aviation transport and logistics clusters network as drivers and catalysts for economic development in the regions will allow maximizing the transport potential of Ukraine. This will make it possible to create a customer-oriented system of transport services and obtain a synergy effect from the optimal coordination by the leading airports of potential of all transport modes on the basis of partner-competitive principles during the implementation of traffic.

Keywords: transport and logistics cluster, transport potential, aviation industry, international airport, synergistic effect.

Сергій Гриценко, Ольга Карпунь. «Створення мережі авіаційних транспортно-логістичних кластерів». У транспортно-логістичних системах українських регіонів складові елементи різних видів транспортних засобів, аеропортів, морських портів, залізничних вузлів, логістичних центрів розрізнені і спрямовані на досягнення індивідуальних цілей. Вони мало сприяють досягненню загальних цілей, що обмежує вихід української продукції на світовий транспортний ринок. Сучасний стан транспортної системи України потребує дослідження питань формування авіаційних транспортно-логістичних кластерів. Мета і завдання дослідження полягають в обґрунтуванні теоретико-методологічних основ і розробленні практичних рекомендацій щодо формування мережі авіаційних транспортно-логістичних кластерів як організаційно-економічної форми ефективної взаємодії всіх її учасників.

Розглянуто активізацію діяльності України щодо розвитку міжнародного співробітництва у сфері транспортних послуг, адаптації національного законодавства до норм та стандартів ЄС, а також країн, що входять до міжнародних об'єднань. Визначено основну мету для всіх учасників авіаційного транспортно-логістичного кластера – це надання конкурентоспроможного сервісу клієнтам з оптимальними загальними витратами. Мережа авіаційних транспортно-логістичних кластерів розглядається як основа для продуктивної співпраці партнерів з рівновагою конфлікту інтересів. Ідентифіковано особливості переваг членства в авіаційних транспортно-логістичних кластерах.

Запропоновано мережу авіаційних транспортно-логістичних кластерів в Україні, яку можуть запровадити сім міжнародних провідних аеропортів – «Львів» ім. Данила Галицького, «Дніпро», «Одеса», «Харків», «Київ» ім. І. Сікорського (Жуляни), «Бориспіль» (Київ) та «Міжнародний аеропорт Запоріжжя», які обслуговують близько 98 % загальних пасажиропотоків, пошто-вантажопотоків та забезпечують шість транзитних напрямків. Охарактеризовано потенціал міжнародних провідних аеропортів України. Визначено принципи формування та координації управління різними видами транспорту в межах авіаційних транспортно-логістичних кластерів: добровільної партнерської взаємодії, інноваційності, прозорості та стабільності «правил гри», мультимодальності, супутникової навігації, інтелектуальних транспортних систем, інформаційних технологій, електронного документообігу, корпоративної соціальної відповідальності. Виокремлено складові елементи конкурентоспроможності мережі авіаційних транспортно-логістичних кластерів у світовому середовищі з метою створення ефективної системи управління безпекою перевезень та їх продуктивності.

Формування мережі авіаційних транспортно-логістичних кластерів як драйверів та каталізаторів економічного розвитку в регіонах дозволить максимально використовувати транспортний потенціал України. Це дасть можливість створити клієнтоорієнтовану систему транспортного обслуговування і отримати синергетичний ефект від оптимальної координації провідними аеропортами потенціалу усіх видів транспорту на основі партнерсько-конкурентних засад під час здійснення перевезень.

Ключові слова: транспортно-логістичний кластер, транспортний потенціал, авіаційна галузь, міжнародний аеропорт, синергетичний ефект.

Сергей Гриценко, Ольга Карпунь. «Создание сети авиационных транспортно-логистических кластеров». В транспортно-логистических системах украинских регионов

составляющие элементы различных видов транспортных средств, аэропортов, морских портов, железнодорожных узлов, логистических центров разрознены и направлены на достижение индивидуальных целей. Они мало способствуют достижению общих целей, что ограничивает выход украинской продукции на мировой транспортный рынок. Современное состояние транспортной системы Украины требует исследования вопросов формирования авиационных транспортно-логистических кластеров. Цель и задачи исследования заключаются в обосновании теоретико-методологических основ и разработке практических рекомендаций по формированию сети авиационных транспортно-логистических кластеров как организационно-экономической формы эффективного взаимодействия всех ее участников.

Рассмотрено активизацию деятельности Украины по развитию международного сотрудничества в сфере транспортных услуг, адаптации национального законодательства к нормам и стандартам ЕС, а также стран, входящих в международные объединения. Определена основная цель для всех участников авиационного транспортно-логистического кластера – это предоставление конкурентоспособного сервиса клиентам с оптимальными общими затратами. Сеть авиационных транспортно-логистических кластеров рассматривается как основа для продуктивного сотрудничества партнеров с равновесием конфликта интересов. Идентифицированы особенности преимуществ членства в авиационных транспортно-логистических кластерах.

Предложено сеть авиационных транспортно-логистических кластеров в Украине, которую могут внедрить семь международных ведущих аэропортов – «Львов» им. Данила Галицкого, «Днепр», «Одесса», «Харьков», «Киев» им. И. Сикорского (Жуляны), "Борисполь" (Киев) и «Международный аэропорт Запорожье», которые обслуживают около 98% общих пассажиропотоков, почто-грузопотоков и обеспечивают шесть транзитных направлений. Охарактеризован потенциал международных ведущих аэропортов Украины. Определены принципы формирования и координации управления различными видами транспорта в пределах авиационных транспортно-логистических кластеров: добровольного партнерского взаимодействия, инновационности, прозрачности и стабильности «правил игры», мультимодальности, спутниковой навигации, интеллектуальных транспортных систем, информационных технологий, электронного документооборота, корпоративной социальной ответственности. Выделены составляющие элементы конкурентоспособности сети авиационных транспортно-логистических кластеров в мировой среде с целью создания эффективной системы управления безопасностью перевозок и их производительности.

Формирование сети авиационных транспортно-логистических кластеров как драйверов и катализаторов экономического развития в регионах позволит максимально использовать транспортный потенциал Украины. Это позволит создать клиентоориентированную систему транспортного обслуживания и получить синергетический эффект от оптимальной координации ведущими аэропортами потенциала всех видов транспорта на основе партнерско-конкурентных основ при осуществлении перевозок.

Ключові слова: транспортно-логістический кластер, транспортный потенциал, авиационная отрасль, международный аэропорт, синергетический эффект.

Introduction. The transport sector is one of the basic sectors of the economy, which creates the necessary preconditions to meet the needs of transport users in the provision of transport services and business development. Ukraine plays the role of a transit bridge connecting the countries of Europe and Asia. There is a differentiated network of direct and transit air connections. Aviation transit through Ukraine is mainly

provided by the Boryspil hub airport [1]. To improve the management of state assets in the aviation infrastructure, it was expedient to create networks of aviation transport and logistics clusters. In our opinion, transport and logistics clusters are naturally interconnected and interdependent parts of the logistics system with the key status of a transport intermediary, which carries out inter-organizational coordination and provides a

synergistic effect [2, p. 118]. The use of the key status of transport intermediary by Boryspil International Airport in the creation of a multimodal transport and logistics cluster will increase its competitiveness as a leading hub airport in Eastern Europe. In particular, it can be done by expanding the network of air connections, attracting more air carriers, creating passenger, freight and logistics infrastructure complexes with rail, road, air and water transport at hub railway stations, ports and airports with inter-organizational coordination of leading airports.

Many foreign and domestic scientists have dedicated their works to solving the problem of ensuring the economic development of transport and logistics enterprises, in particular on the basis of clustering.

The processes of clustering of enterprises and the functioning of clusters in the economy are devoted to the work of world famous scientist M. Porter [3]. This issue is considered in the studies of many other foreign and domestic authors, in particular in the works of M. Voynarenko [4], S. Sokolenko [5] and others.

Despite the depth of scientific research on the problems of clustering, the current state of the transport system of Ukraine requires research on the formation of aviation transport and logistics clusters.

The purpose and objectives of the research. It consists in substantiating the theoretical and methodological foundations and developing practical recommendations for the formation of the aviation transport and logistics clusters network as an organizational and economic form of effective interaction of all its participants.

The main material and results of the research. In Ukraine, there are 19 airports and airfields, which currently operating and servicing commercial flights of domestic and foreign airlines. Passenger traffic through the airports of Ukraine is about 13 million people [6]. The network of aviation transport and logistics clusters in Ukraine can be introduced by seven leading international airports –

"Lviv" named after Danylo Halytsky, "Dnipro", "Odesa", "Kharkiv", "Kyiv" named after I. Sikorsky (Zhulyany), Boryspil (Kyiv) and Zaporizhzhia International Airport, which serve about 98% of the total passenger, mail and cargo flows and provide six transit routes.

The main goal for all participants of the aviation transport and logistics cluster is to provide competitive service to customers with optimal total costs.

The network of aviation transport and logistics clusters is considered as a basis for productive cooperation of partners with a balance of conflict of interests. Advantages of membership in aviation transport and logistics clusters: reducing the risk of loss; the possibility of using best practices; joint creation, implementation of innovations and new initiatives; fastest contacts; high level of partners trust; a tool for counteracting crisis phenomena; the fastest possible interaction with local authorities to agree on priorities for action to reduce the impact of negative economic trends; effective balancing of priorities in the field of transport services; leadership in supporting and stimulating the economy of the regions and the transport industry; better coordination, communication and cooperation of participants and curators – partners of cluster development; quick adaptation to changes.

In the transport and logistics systems of Ukrainian regions, the constituent elements of different types of vehicles, airports, seaports, railway hubs, logistics centers are separated and directed at achieving individual goals, do little to achieve common goals, which limits Ukrainian products to the world transport market. Therefore, to establish strong relationships between the elements of the transport system requires the formation of a "strong" core, which will create conditions for competition and active interaction of participants. Due to the low level of development of transport and logistics technologies, intermodal, multimodal transportation and transport logistics, the transport industry of Ukraine is used insufficiently.

The individual potential of each airport will be used comprehensively in the network of aviation transport and logistics clusters in the process of joint operation of transport and logistics infrastructure.

"Lviv" International Airport named after Danylo Halytskyi [7] is the largest airport in Western Ukraine in terms of passenger traffic and route network, located at a distance of 6 km from the city center to the south. The airport's route network consists of 50 destinations (47 international and 3 domestic).

In 2018, "Dnipro" International Airport celebrated its 100th anniversary. The last reconstruction of airport infrastructure was made in 1996, so now "Dnipro" is preparing for major changes. According to plans, the reconstruction will last until 2022 [8]. The new airport will be able to accommodate up to 3 million passengers a year (now – less than 1 million people a year). The reconstruction project also envisages the construction of a new modern parking for 500 cars, the construction of a new single complex with a VIP-terminal and a passenger terminal with cafes, restaurants and a large Duty free zone.

"Odesa" International Airport is one of the largest airports in Ukraine, a member of the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), the International Airport Council (ICI Europe) and the Association of Ukrainian Airports. The passenger terminal, with a total capacity of 400 passengers per hour, is designed to serve international and domestic flights [9]. The aerodrome is equipped with the necessary air traffic control devices and meets all the necessary requirements of the legislation for civil aerodromes of Ukraine.

"Kharkiv" International Airport is the largest air hub in eastern Ukraine. In preparation for the Euro 2012 World Championships, the airport complex underwent reconstruction, which included the construction of a new terminal that meets all modern standards for the international airport, construction of a new runway with a length of 2500 m, reconstruction of the old

terminal, construction and overhaul of the platform and improvement of the station area. Upon completion of the reconstruction, the airport can accept without restrictions aircraft of class A, B and C, and by agreement it can accept aircraft of class D. The airport serves 3 domestic and more than 40 international scheduled and seasonal flights of 15 airlines flying to major cities in Europe and Africa. The annual passenger traffic at the airport has exceeded 1 million people, and it is constantly increasing [10].

"Zaporizhzhia" International Airport is one of the main air transport companies serving the eastern and south-eastern regions of Ukraine. The airport is operated by the "Zaporizhzhia" International Airport Municipal Enterprise. The need to create a high-tech regional airport has been determined by the Zaporizhzhia City Administration, on the initiative of which a comprehensive modernization of the airport is underway. A key element of this modernization is the start of construction of a new European-style passenger terminal. The airport covers areas with a population of more than 4 million people, which is a basic market potential that will develop in the future [11]. Zaporizhzhia city and the surrounding areas remain an attractive destination for business, which demonstrates the growing demand for air transportation in the airport coverage area.

The unique geographical position of the Kyiv city at the crossroads of three Pan-European international transport corridors № 3, 5, 9, approved by the European Community Cretan Conference, the existing transport and logistics infrastructure create the necessary preconditions for increasing transit of goods and passengers in the "North-South" and "West-East" directions, motivate the conception of a multimodal transport and logistics clusters network with a key status of airports "Kyiv" named after I. Sikorsky (Zhulyany) and Boryspil (Kyiv).

"Kyiv" International Airport cooperates with 43 airlines, operating flights to approximately 140 cities in 48 countries. About 2,500 flights are made monthly, and

almost 2 million passengers are served annually. The most popular international destinations since the beginning of 2020 are Minsk (Belarus), Warsaw (Poland), Vienna (Austria), Berlin (Germany), Memmingen (Germany), Tallinn (Estonia), Frankfurt am Main (Germany). The most popular domestic destinations since the beginning of 2020 are Zaporizhzhia, Odesa, Lviv.

"Boryspil" International Airport is the largest and most powerful in Ukraine. It provides about 65% of Ukraine's air passenger traffic, and annually serves more than 8 million passengers.

"Boryspil" Airport is successfully located at the crossroads of many air routes connecting Asia with Europe and America. About 50 national and foreign airlines carry passengers and cargo from "Boryspil" on more than 100 regular routes.

The airport has two runways and three passenger terminals. The technical capabilities of "Boryspil" Airport aerodrome remain unique for Ukraine, the CIS countries and Eastern Europe. The runway with a length of 4000 m and a width of 60 m allows you to receive aircraft of all types around the clock, including in conditions of limited visibility. "Boryspil" is also the only airport in Ukraine from which transcontinental flights are operated [13].

The activity of the largest international airport in Ukraine "Boryspil" testifies to its sustainable development and modernization. The airport management plans to reconstruct the airport infrastructure, build a new cargo terminal and all this together creates favorable conditions for the organization of a transport and logistics cluster based on the airport.

The network of aviation transport and logistics clusters has the opportunity to develop multimodal transportation, provide high-speed land transport by various modes of public transport between airports and settlements, create logistics centers and simplify formalities, reduce the negative impact of vehicles on the environment through the introduction of new technologies

and with priorities defined by the standards and recommended practices of the International Civil Aviation Organization (ICAO) and the requirements of Eurocontrol.

To create favorable conditions for the development of an effective competitive multimodal national transport system in Ukraine, it is necessary to use a comprehensive approach to the reconstruction of airports. Taking into account the requirements of European regulations on the certification of civil aerodromes for the unrestricted acceptance of aircraft by airports, there is a need for reconstruction with the provision of category I or II instrument landing system (ILS) and 7th category of fire protection with appropriate equipment and ground equipment.

Since air transport is characterized by a global trend – the growing role of cheap "low-cost" air transportation for direct interregional connections, it is advisable to involve other airfields and airports in the network of air transport and logistics clusters for "low-cost" passenger traffic. This will significantly increase their investment attractiveness for international commercial lending.

In a multimodal transport and logistics cluster, taking into account international experience, it is possible to introduce a "single transport ticket" for intermodal passenger transport as well as to transport goods under one contract with the optimal choice of transport for air, rail and other modes of transport. This requires the adaptation of national legislation to the norms and standards of the EU, as well as countries that are members of international associations. The carrier-operator (cluster coordinator) is responsible for the entire transportation route, optimizes the processes of interaction in coordination with other participants providing a particular service, as well as rationally coordinates the provision of transport accessibility for the population, high mobility of labor, increasing distance and reducing the travel time of passengers in megacities [6].

In terms of air freight in the aviation transport and logistics cluster system, it is expedient to take into account additional opportunities from the combination of aviation with the sea, road and rail within the New Silk Road between China and Europe via Ukraine, introduction of electronic document management at airports using the experience of Ukraine and recommendations of the International Port Community Systems Association (IPCSEA) [6].

Increasing the volume of export-import traffic between Europe and the countries of South Asia and the Middle East, first of all, with China and India will contribute to the creation of an integrated into the world transport network safely functioning and efficient transport complex of Ukraine on the way of the main transit flows, as well as the prospects of expanding Ukraine's foreign trade relations with these countries and the European Union.

The development of the transport complex is becoming one of the key issues in supporting the sustainable development of Ukraine and its achievement of a regional transport hub with the integration of transport technologies and regional mobility projects in the form of transport and logistics clusters with the coordination mission of leading airports.

Effective management of the aviation transport and logistics clusters network is based on the principles of formation and coordination of management different types of transport: voluntary partnership, innovation, transparency and stability of "rules of the game", multimodality, satellite navigation, intelligent transport systems, information technology, electronic document management and corporate social responsibility. These principles ensure the creation of equal conditions for the provision of transport services, prompt receipt of key performance indicators, accumulation, systematization, processing, analysis and interpretation of data, provision of timely information and its effective use by transport and logistics cluster members to make business decisions based on facts.

Today it is necessary to implement these principles in the transport sector as conceptual "rules of the game" in the development of aviation transport and logistics clusters, which provide for integration with scientific, educational institutions, chambers of commerce and industry of Ukraine and relevant executive bodies. It is important to have a sound state policy to support the consolidation of aviation transport and logistics clusters in the country's top management structure: the Cabinet of Ministers of Ukraine – Ministry of Infrastructure of Ukraine – Supervisory Boards, the Board of various modes of transport on the basis of relevant legislation.

The competitiveness of the aviation transport and logistics clusters network in the global environment is influenced by the implementation of transport safety measures in order to create an effective transport safety management system. Achieving the target level of air traffic management performance at the level of aviation transport and logistics cluster requires the appropriate development of communication, navigation and surveillance (CNS) infrastructure in accordance with the European Master Plan for Air Traffic Management (ATM) [14]. The target level of ATM productivity for Europe is achieved at local level and will also depend on local conditions. Significant productivity growth can be achieved in Europe in several key areas, namely, environmental protection, capacity, cost-effectiveness, operational efficiency, and security and safety. These areas will be crucial for the subjects of the aviation transport and logistics cluster. Why is the Master Plan important for global engagement? Because aviation is a global industry and synergies with global management coherence are key components for its safe and sustainable growth. The EU-US Memorandum of Cooperation (MoC) provides the basis for a coordinated approach by SESAR and the US Federal Aviation Administration's NextGen project, namely, under the joint coordination of the

International Civil Aviation Organization (ICAO).

The SESAR-supported target level of productivity is quite impressive and is linked to the productive capacity that will be achieved if SESAR solutions are implemented through timely and, if necessary, synchronized and fully synchronized research. An important component in this direction is the creation of aviation clusters and technology parks for aviation in higher education institutions. In the Kropyvnytskyi city on the basis of the Flight Academy of the National Aviation University it is planned to implement an investment project of the Flight City Technopark in the following areas: unmanned aerial vehicles, small aircraft, simulators based on artificial intelligence, virtual and augmented reality [15].

The globalization of transcontinental air transportation in the framework of powerful global alliances encourages the creation of an integrated into the world transport network safely functioning and efficient network of aviation transport and logistics clusters to ensure the competitiveness and efficiency of the Ukraine transport complex. Further use of the key status of transport intermediary by Boryspil International Airport as a leading international hub airport of Eastern Europe in creating an aviation transport and logistics cluster involves expanding the network of air connections, building a modern transit infrastructure, applying a flexible approach to attracting business models and increase in revenues from non-aviation activities.

Since the leading Boryspil airports and others carry out inter-organizational coordination of cluster entities on the basis of mutual trust, they should also promote: the development of modern terminal passenger and cargo complexes (multimodal logistics centers) at airports through their owners and mechanisms of state private partnership with ICAO standards; streamlining of legal and operational relations between balance

holders and actual operators of aerodromes regarding their maintenance, operation, repairs, etc.

Conclusions. Today, the strategic priority of Ukraine's development is active European integration, which is accompanied by the effective development of the national economy, acceleration of production digitalization, change of supply chains, and coordination of various modes of transport. The key source of improving the level of economic development of Ukraine, reducing the gap with developed countries is to stimulate Ukrainian exports and the development of domestic production and trade to improve the efficiency and quality of transport services.

Ukraine's active integration into the European Union requires an appropriate transport and logistics infrastructure of clusters, services for participants. Aviation transport and logistics clusters can be developed together with the world [16] on the European Cluster Collaboration Platform. This platform is the main tool for information and cluster collaboration in the EU. It contains a lot of information about the existing clusters in the EU (as well as associated countries, including Ukraine), events and tools of the platform and partners, current initiatives and projects.

The formation of the aviation transport and logistics clusters network as drivers and catalysts for economic development in the regions will allow maximizing the transport potential of Ukraine. This will make it possible to create a customer-oriented system of transport services and obtain a synergy effect from the optimal coordination of the leading airports of the potential of all transport modes on the basis of partner-competitive principles during transportation.

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