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STRATEGIC MANAGEMENT OF AIRPORTS EFFICIENCY AND SAFETY IN THE PROCESS OF AIR AND MULTIMODAL LOGISTICS TRANSPORTATIONS DEVELOPMENT

Dmytro Bugayko, Yuliya Ierkovska, Danylo Bugayko. *«Strategic management of airports efficiency and safety in the process of air and multimodal logistics transportations development».* The airport is a complex system that focuses on the intersection of the interests of different players in the transport market and different activities related to the performance of air transportation. The airport has an independent position in relation to partners and users of air transport. Therefore, the role of the airport, above all, is to unite the efforts of the air transport system and find a balance between their economic interests in order to maximize the efficient and safe use of air transport. In addition to effective cooperation with its partners, the airport must meet the requirements of international standards for aviation security, the appropriate state of infrastructure and efficiency of technological processes. States are also interested in developing, increasing the capacity of airports, expanding opportunities in the process of operation, as the airport contributes to the revival of ties between countries and the development of the global economy, tourism. Bringing the air transport infrastructure in line with international requirements is an important component of Ukraine's strategy aimed at ensuring the competitiveness of the national economy on the world market. Solving the problems of airport development is a nationwide problem that hinders the use of the high transit potential of the state. The complex and diverse challenges facing airports require rational, integrated and flexible solutions in business process management and active cooperation of air transport system participants, which is manifested in the coordination of strategic, tactical and operational decisions. The article is devoted to improving approaches to

strategic management of airport efficiency and safety in the process of ensuring the implementation of international air and multimodal logistics services.

Keywords: airport, air transport, security, multimodal transport, regulation, operation, infrastructure.

Дмитро Бугайко, Юлія Єрковська, Данило Бугайко. «Стратегічне управління ефективністю та безпекою аеропортів в процесі розвитку авіаційних та мультимодальних логістичних перевезень». Аеропорт – це складна система, яка зосереджує місце перетинання інтересів різних суб'єктів транспортного ринку та різних видів діяльності, пов'язаних із виконанням авіаційних перевезень. Аеропорт займає незалежне становище відносно партнерів та користувачів авіаційним транспортом. Тому роль аеропорту, перш за все, полягає в тому, щоб об'єднати зусилля суб'єктів повітряної транспортної системи та знайти баланс між їхніми економічними інтересами з метою максимально ефективного та безпечного використання повітряного транспорту. Окрім ефективною взаємодії зі своїми партнерами, аеропорт має виконувати вимоги міжнародних стандартів щодо забезпечення авіаційної безпеки, відповідного стану інфраструктури та ефективності технологічних процесів. Держави також зацікавлені в розвитку, збільшенні потужностей аеропортів, розширенні можливостей у процесі експлуатації, оскільки аеропорт сприяє поглибленню зв'язків між країнами та розвитку глобальної економіки, туризму. Приведення авіатранспортної інфраструктури у відповідність до міжнародних вимог є важливою складовою стратегії України, спрямованої на забезпечення конкурентоспроможності національної економіки на світовому ринку. Вирішення проблем розвитку аеропортів є загальнодержавною проблемою, яка стримує використання високого транзитного потенціалу держави. Складні та різноманітні завдання, які постають перед аеропортами, потребують раціональних, інтегрованих і гнучких рішень при управлінні бізнес-процесами та активної співпраці учасників повітряної транспортної системи, що проявляється в узгодженні стратегічних, тактичних й оперативних рішень. Статтю присвячено удосконаленню підходів щодо стратегічного управління ефективністю та безпекою аеропорту у процесі забезпечення виконання міжнародних авіаційних та мультимодальних логістичних перевезень.

Ключові слова: аеропорт, авіаційний транспорт, безпека, мультимодальні перевезення, регулювання, експлуатація, інфраструктура.

Дмитрий Бугайко, Юлия Ерковская, Данило Бугайко. «Стратегическое управление эффективностью и безопасностью аэропортов в процессе развития авиационных и мультимодальных логистических перевозок». Аэропорт – это сложная система, сосредоточивающая место пересечения интересов разных субъектов транспортного рынка и разных видов деятельности, связанных с выполнением авиационных перевозок. Аэропорт занимает независимое положение по отношению к партнерам и пользователям авиационным транспортом. Поэтому роль аэропорта прежде всего состоит в том, чтобы объединить усилия субъектов воздушной транспортной системы и найти баланс между их экономическими интересами с целью максимально эффективного и безопасного использования воздушного транспорта. Кроме эффективного взаимодействия со своими партнерами аэропорт должен выполнять требования международных стандартов по обеспечению авиационной безопасности, соответствующего состояния инфраструктуры и эффективности технологических процессов. Государства также заинтересованы в развитии, увеличении мощностей аэропортов, расширении возможностей в процессе эксплуатации, поскольку аэропорт способствует оживлению связей между странами и развитию глобальной экономики, туризма. Приведение авиатранспортной инфраструктуры в соответствие с международными требованиями является важной составляющей стратегии Украины, направленной на обеспечение конкурентоспособности национальной экономики на

мировом рынке. Решение проблем развития аэропортов является общегосударственной проблемой, сдерживающей использование высокого транзитного потенциала государства. Сложные и разнообразные задачи, стоящие перед аэропортами, нуждаются в рациональных, интегрированных и гибких решениях при управлении бизнес-процессами и активном сотрудничестве участников воздушной транспортной системы, что проявляется в согласовании стратегических, тактических и оперативных решений. Статья посвящена совершенствованию подходов к стратегическому управлению эффективностью и безопасностью аэропорта в процессе обеспечения выполнения международных авиационных и мультимодальных логистических перевозок.

Ключевые слова: аэропорт, авиационный транспорт, безопасность, мультимодальные перевозки, регулировка, эксплуатация, инфраструктура.

Introduction. The airport is a complex system that focuses on the intersection of the interests of different players in the transport market and different activities related to the performance of air transportation. Therefore, the role of the airport, above all, is to unite the efforts of the air transport system and find a balance between their economic interests in order to maximize the efficient and safe use of air transport.

States are also interested in developing, increasing the capacity of airports, expanding opportunities in the process of operation, as the airport contributes to the revival of ties between countries and the development of the global economy, tourism. Solving the problems of airport development is a nationwide problem that hinders the use of the high transit potential of the state. The complex and diverse challenges facing airports require rational, integrated and flexible solutions in business process management and active cooperation of air transport system participants, which is manifested in the coordination of strategic, tactical and operational decisions.

The study of the efficiency and safety aspects of airport operation is carried out on an ongoing basis by leading organizations in the field of aviation transport such as the International Civil Aviation Organization (ICAO) Secretary General, the Airports Council International (ACI), the Civil Air Navigation Services Organisation (CANSO), the International Air Transport Association (IATA) [1,2]. The article is a logical continuation of a

number of publications devoted to the development of airports safety, effectiveness, regulations, operations and infrastructure aspects of Ukrainian scientists D. Bugayko [3 – 12], Y. Kharazishvili [3 – 5], M. Hryhorak [4, 10], Y. Ierkovska [6, 7], V. Lyashenko[5], V. Sokolovskiy [5], V. Baranov[5], Anna Tereschenko [11, 12] and other, Polish scientist Z. Zamiar [4.10], Azerbaijan scientists F. Aliev [7,9] and scientists of other countries.

The purpose of the article is to provide structural analysis of contemporary approaches to strategic management of airport efficiency and safety in the process of ensuring the performance of international air and multimodal logistics transportations.

Presentation of the main results. *Logistic aspects of international airport development.*

In addition to its main functions, the airport must perform an additional function - to optimize the entire air transport system, to find a balance between the interests of different users, as well as between business and the environment. Given the global trends in the development of hub airports with heavy passenger and freight traffic, airports are trying to maximize the demand for transshipment operations and create a convenient schedule for transfer passengers and cargo.

The increase in air traffic is directly related to improving the economic efficiency of cargo and passenger complexes of airports. This can be achieved through the use of the latest technologies to ensure the transportation

process that meets modern requirements and high international standards. Currently, the world's leading airports use a logistical approach to organizing their activities to achieve the desired effect.

When using logistics, modern transport companies achieve greater stability,

predictability, competitiveness, manufacturability in transportation, which is especially important in international transportation.

The main directions of development of world airports are shown in Fig. 1.

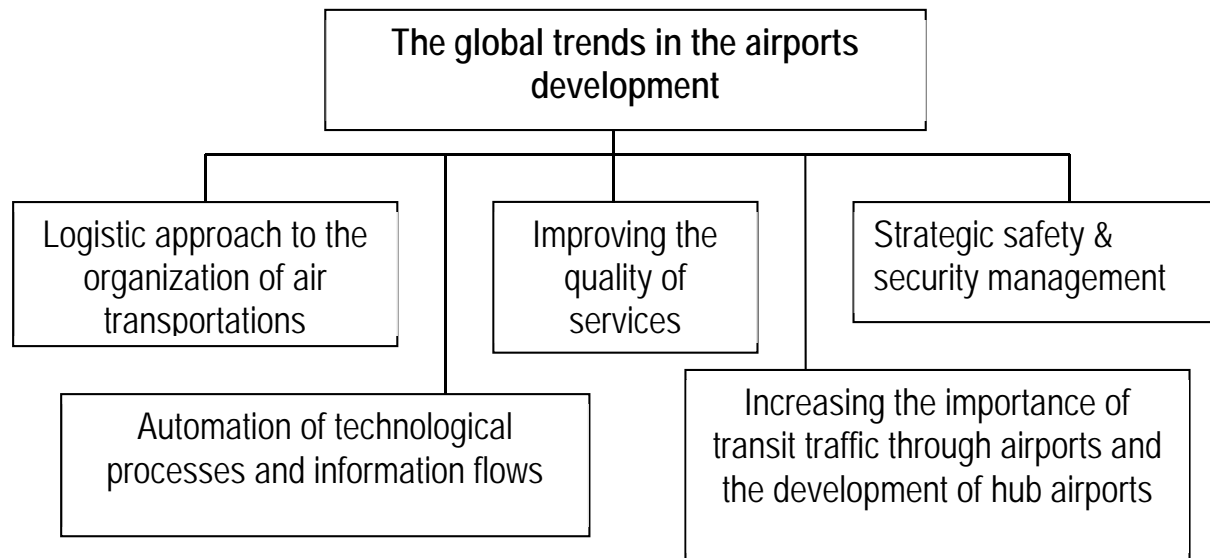


Figure 1 - The main trends in the development of airports around the world
Source: developed by the author.

However, to take full advantage of logistics we need:

1) to improve the legislative and regulatory framework - need to clarify and adjust transport and customs mechanisms and procedures for registration of goods when crossing borders, mechanisms to ensure optimal through tariffs, etc.;

2) make changes to the terminal technologies and technical base used in the service of modern international transport, in particular at airports. Airports should be considered as logistics centres;

3) strengthen operational control over the transportation process, which should involve modern electronic, communication and information technologies. Such technologies will increase the safety, reliability of transportation, possession of reliable information about the movement of goods on the route.

Logistics tasks should be considered in combination with a systematic approach. The system approach involves the coordination of information, resource characteristics and reliability characteristics in the interaction of all participants in the air system, which are related to a single goal - the organization of efficient air transportation. The fundamental difference between the logistical approach to the management of the transportation process from the traditional one is the integration of all participants in the transportation process and individual links in the transportation chain into a single system (Fig. 2). In the diagram, the airport acts as a transport hub or, in other words, a logistics center. The main processes at the airport are loading and unloading, passenger, luggage, mail and cargo. All activities related to these processes must be performed quickly and in a timely manner to ensure a short waiting time and transfer, and to take place during the

short stay of the aircraft on the ground, as well as to ensure the efficient operation of the entire transportation system. Airport operations services should coordinate and optimize the activities of various companies and organizations involved in the implementation of flights, as well as provide

them with appropriate assistance. All organizations involved, although they can compete with each other, must work closely with each other to ensure a high standard of service quality.

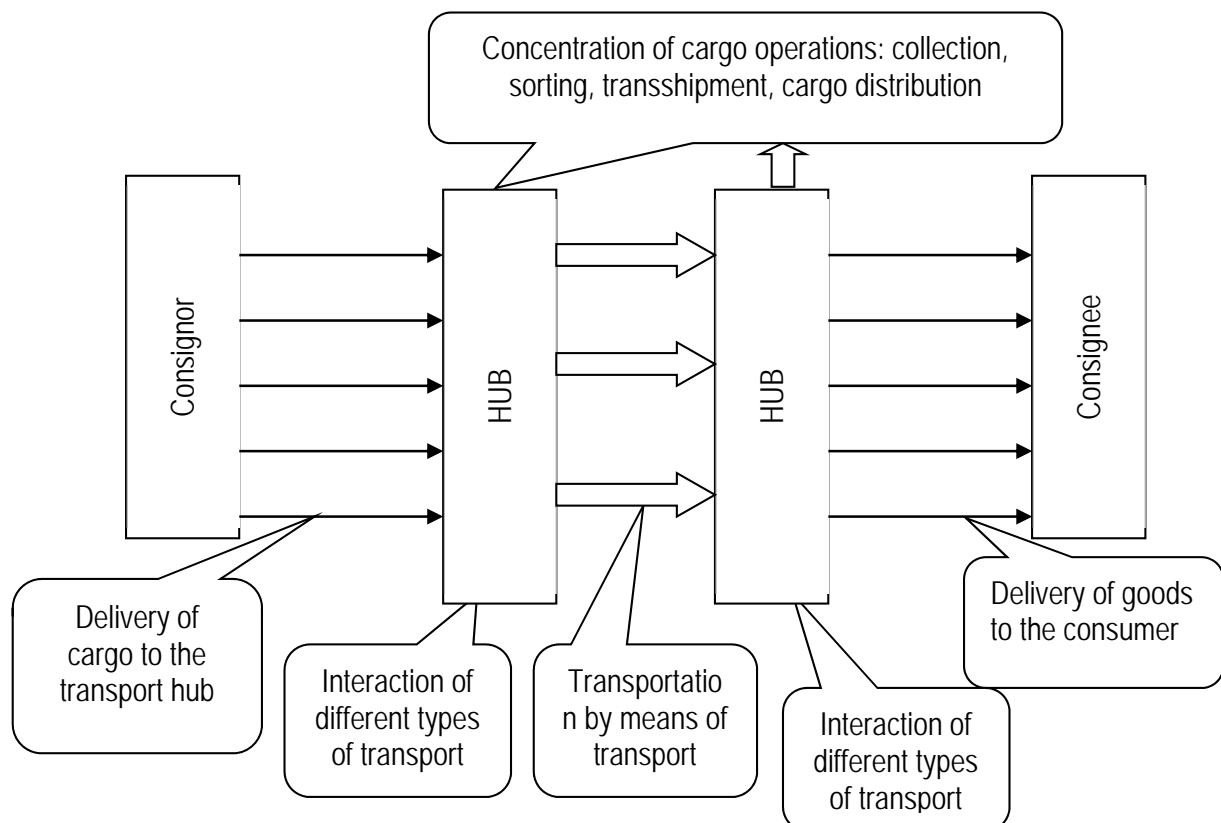


Figure 2 - Logistic approach to the cargo transportation organization

Source: developed by the authors.

Among the effective methods of solving problems of transport logistics should be singled out the method SCM (Supply Chain Management) - supply chain management. SCM is a highly interactive, integrated and systematic approach, which together with the information support system helps to solve the tasks of coordination, planning and management of processes of supply, warehousing and transportation.

The organization of transport and logistics processes within the SCM is based on the consideration of the entire supply chain, which unites several enterprises through information technology. The significant potential that different supply chain management options have today can also be

used at airports. The systematic combination of all processes between enterprises in the value chain contains integrated information on all activities within the logistics chain - from forecasting the needs of shippers, distribution of orders and transportation [11].

The application of the supply chain management method involves the establishment of schedules of transportation. Customers (shippers) coordinate delivery schedules with freight forwarding companies; freight forwarding companies coordinate their activities with airport terminal complexes, specifying the scope of loading and unloading operations, inform airlines about the planned amount of cargo, its type and properties.

Supply chain management allows satisfy the economic interests of all participants in the transportation process (Fig. 3).

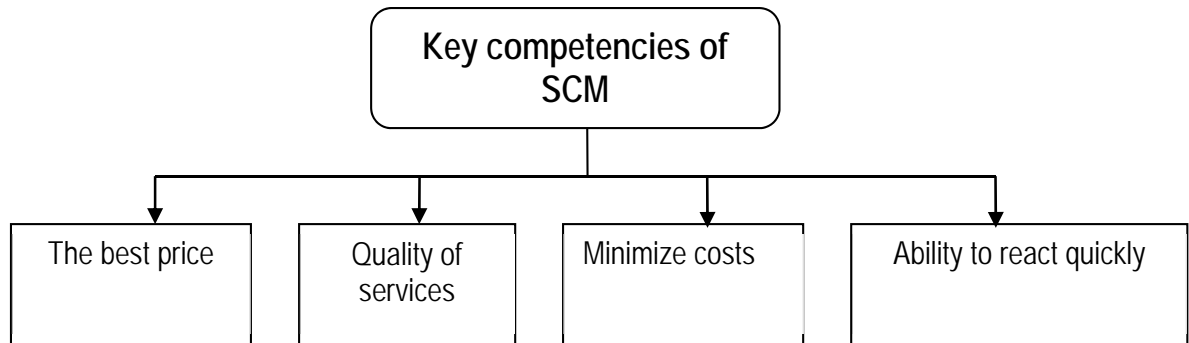


Figure 3 - Elements of the SCM method
 Source: developed by the authors.

During transportation, the information flow passes through various subjects of the transport market (Fig. 4). The task of logistics is to ensure that the movement of

information so that each entity has the necessary information to fully perform its functions.

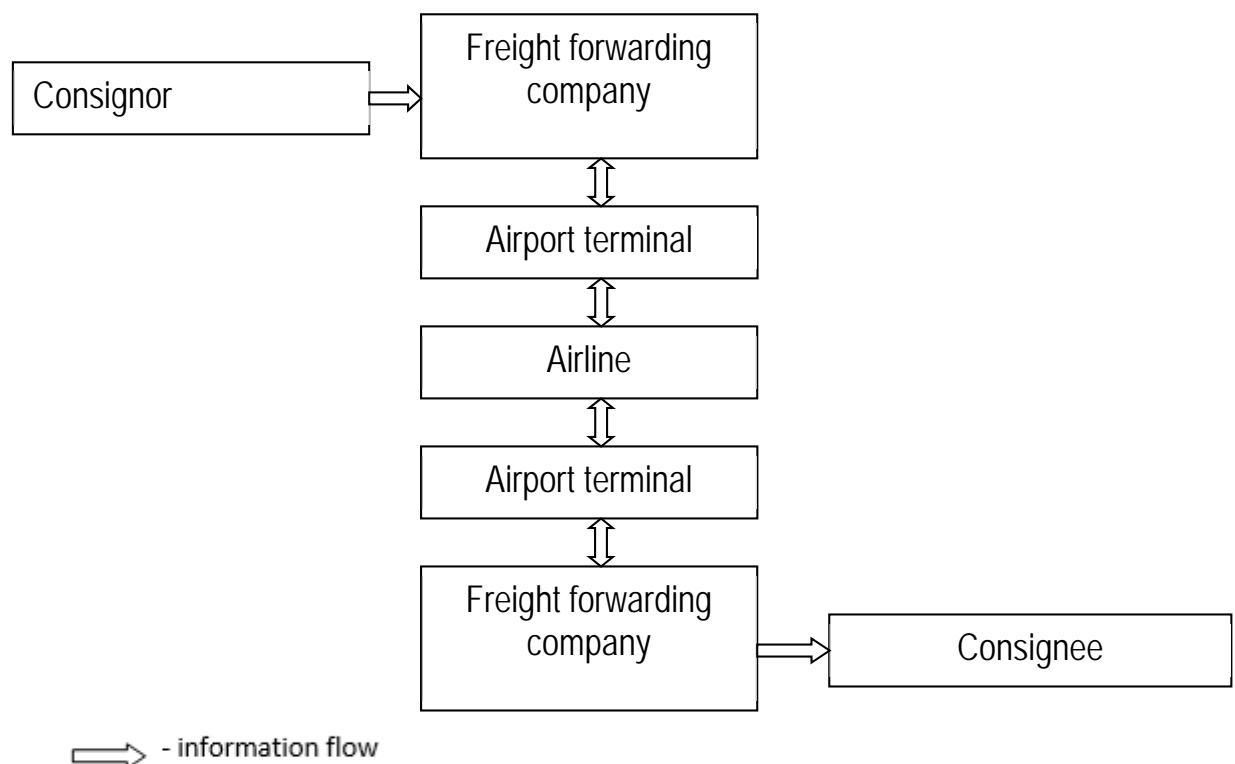


Figure 4 - Movement of information between transport market participants
 Source: developed by the authors

SCM is used by airports and airlines for a large number of transfer services. In this case, it is extremely important to coordinate their

activities to fully meet customer requirements. When organizing connecting flights, where efficiency, speed and

coherence of actions are required, the use of SCM becomes necessary, as SCM allows considering and taking into account a large number of actions in the process of joint activities both within and outside the organization (Fig. 5). The transportation

process at SCM is not divided into sections performed separately by the airline, separately by the airport, separately by land modes of transport, handling companies, but is considered as a single process.

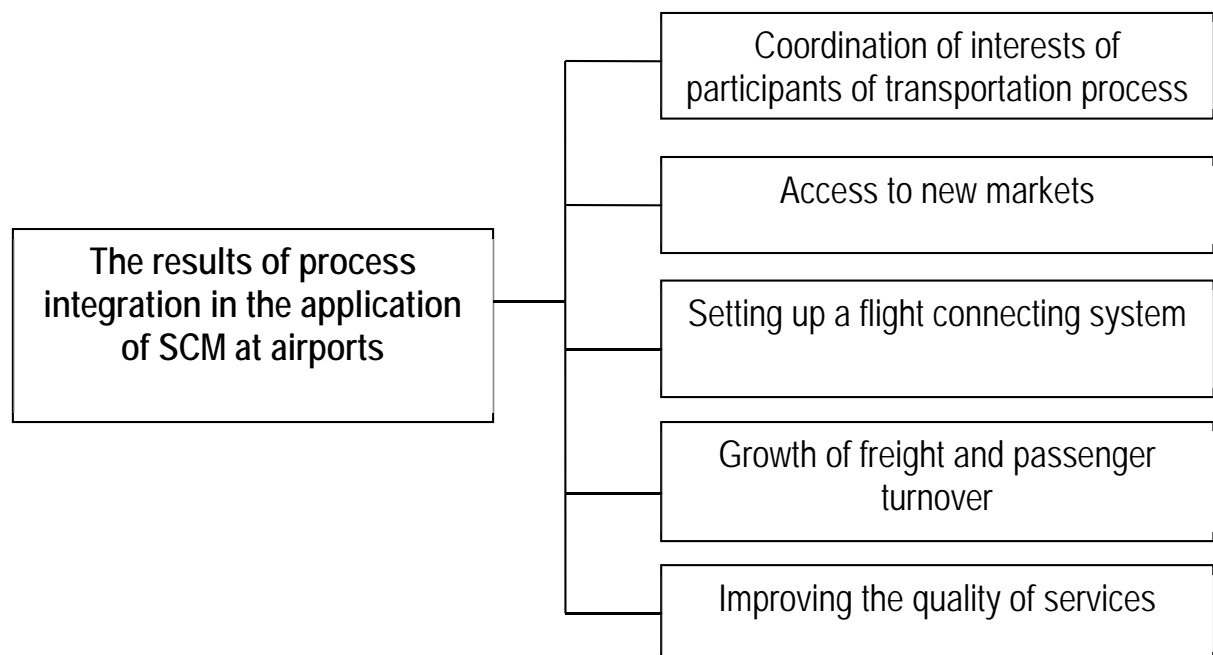


Figure 5 - Results of SCM principles application
Source: developed by the authors

The main results of SCM application:

- 1) a single focus on the process of planning and managing all flows (information, transport, material, financial) throughout the value chain;
- 2) integration of all partners in the chain and creation of common strategic objectives;
- 3) elimination of information barriers between the agreed areas of planning, management and creation of tools for modern information and communication systems (networks) to ensure uninterrupted and end-to-end movement of information flow in accordance with market needs.

SCM implementation involves identifying the supply chain participants with whom it is important to establish links, the processes to be associated with each key actor, and the types or levels of integration for each process.

SCM's goal is to achieve maximum competitiveness and profitability of the company, including the end user. That is, the integration and reengineering of supply chain processes should be aimed at improving the efficiency of all participants in the system.

Thus, air supply chain management is the integration of key business processes that cover the transportation process. The use of SCM is especially effective not only in the organization of airports or airlines - within one company, but by all participants in the transport. In order to use SCM technologies and successfully implement them in the system of cooperation of transport market participants, it is necessary to determine the general goals and potential of enterprises, to build a system of mutual enterprise.

Reconciling the interests of transport market participants in the process of air transportations

Different types of transport that participate in the transportation process, interact and complement each other. Execution of the transportation process is based on the coordinated work of all participants in the transportation process, including both transport organizations and shippers, consignees and reduce downtime at transshipment points. The transport process includes not only the movement of goods from sender to recipient, but also the performance of loading and unloading and forwarding services. According to the classic firm, the key economic interests of enterprises are associated with maximization of profit (from the theory of income of the time factor - net income). Economic interest is manifested in increasing profits and (or) guaranteeing a stable position in the market (in uncertain conditions of survival) when considering the long term, in the short term it can be supplemented (replaced) by the volume of work.

The relationship between transport organizations, shippers, consignees and intermediaries should be used from the standpoint of the logistics system, as a complex organizational economic system consisting of interdependent elements, the set of which, boundaries and objectives are combined internal and external purposes. Elements of the logistics system are: airlines, airports, airline agents and partners, partner organizations of airlines and service airports, freight forwarders, customs brokers and service providers. The various elements of the logistics system affect the growth of the variety and complexity of the relationship between them and the content of their economic interests. But it should be aimed at a single global goal - the implementation of the entire system for the client with minimal time and minimal financial costs [11].

Legal regulation of the interaction of enterprises involved in the transportation and

trade of goods carried out at the national and international levels. At the national level, it is state regulation. These include: licensing and certification of airlines, airline sales agents, issuing licenses for brokerage and warehousing activities, etc.

At the international level - bilateral conditions between the relevant agencies of the contracting states, the provisions of international air and trade law, the recommendations of various intergovernmental and international non-governmental organizations.

Relations between airports and airlines, airlines and intermediaries of economic companies and intermediaries are regulated by bilateral commercial international agencies that provide the opportunity to sell transportation, the system city for mutually provided services, liability of the parties and dispute resolution. At the same level, relations with the freight clientele are regulated.

Economic factors influencing the interaction of transport market participants:

managed - market demand, competition, machinery and technology, general air transport infrastructure;

unmanageable - the state of the world air transport market, the state of macroeconomics, the level of scientific and technological progress in all fields, demographic factors, natural and geographical features of countries and regions, socio-economic level of development of individual countries, military and social conflict, natural disasters [11].

The state is not a direct participant in the transportation process, but requires effective organization of transportation. The state not only sets requirements for transportation, but can also stimulate and encourage participation in the transportation process (for example, by reducing toll airports).

Interests of the state: meeting the needs for quality air transport services; protection of trade and economic interests of the country (tariff and non-tariff regulation, customs regulation); increase in budget revenues due to cash deductions and tax deductions;

ensuring the development of a competitive situation in the air transportation market and protection of the population of the air transportation market; ensuring the country's competitiveness in the world economy, economic and other security of the country; creation of stable conditions for the development of enterprises in the aviation industry and air transport.

Satisfied customer interests are of the utmost concern to all participants in transportation. The main interests of clients: establishment of the economic substantiation of tariffs for air transportation at guaranteed maintenance of safety of transportation; minimization of costs of delivery time of cargo at maintenance of its full safety; guarantees of compensation for losses in case of delay or relocation of flights due to various reasons; in case of damage or lack of cargo when reloading it from one mode of transport to another; reduction of persons of documents which are issued; simplification of the procedure of tariff and non-tariff regulation, reduction of customs and other duties; providing real-time download information.

Interests of airlines: meeting market needs, conquering new markets as a result of increasing carrying capacity; brand strengthening and development; increase in profits, including through the development of a separate service; providing information support along the entire route of the cargo; reduction of operating costs; observance of safety norms and control of the accepted cargo on danger; simplification of document circulation with the use of acceleration of cargo handling at transit points; development of e-commerce.

Interests of airports: increase of efficiency of processing of cargoes with use of minimization of expenses and increase of profit; compliance with safety requirements; compliance with the requirements of state bodies when crossing the border and joint

planning of the transport process with the warehousing process; ensuring the technological unity of the transport and warehousing process and the definition of rational delivery routes [11].

Interests of warehousing complexes: increase of capacity according to efficiency of cargo processing with use of minimization of expenses and increase of profit; introduction of modern means of automation of warehousing processes; introduction of cargo handling and tracking systems; introduction of services such as repackaging, labeling, etc.

Interests of customs brokers: access to information; transition to electronic document management; reduction and increase of profit; simplification of formalities at customs posts.

Interests of forwarding agencies: development of end-to-end service (door-to-door delivery) and establishment of a partner network; increase increase in orders; strengthening the brand and conquering new markets; simplification of document flow and development of a single information field within the logistics system; increase profits and reduce operating costs; reduction of transit time of cargo passage; risk reduction deficiency.

Moving the load of the logistics system is the result of making some of our decisions and performing a set of technological operations. The effectiveness of a set of real business processes depends on the degree of coordination of the interests of transportation participants. Reconciliation of interests is a process of coordination, combination of actions of subjects that provides support of stability of logistic system and achievement of the maximum effect. The creation of a logistics center and strengthen the process of reconciling the interests of transport market participants create conditions for the effective realization of interests (Fig. 6).

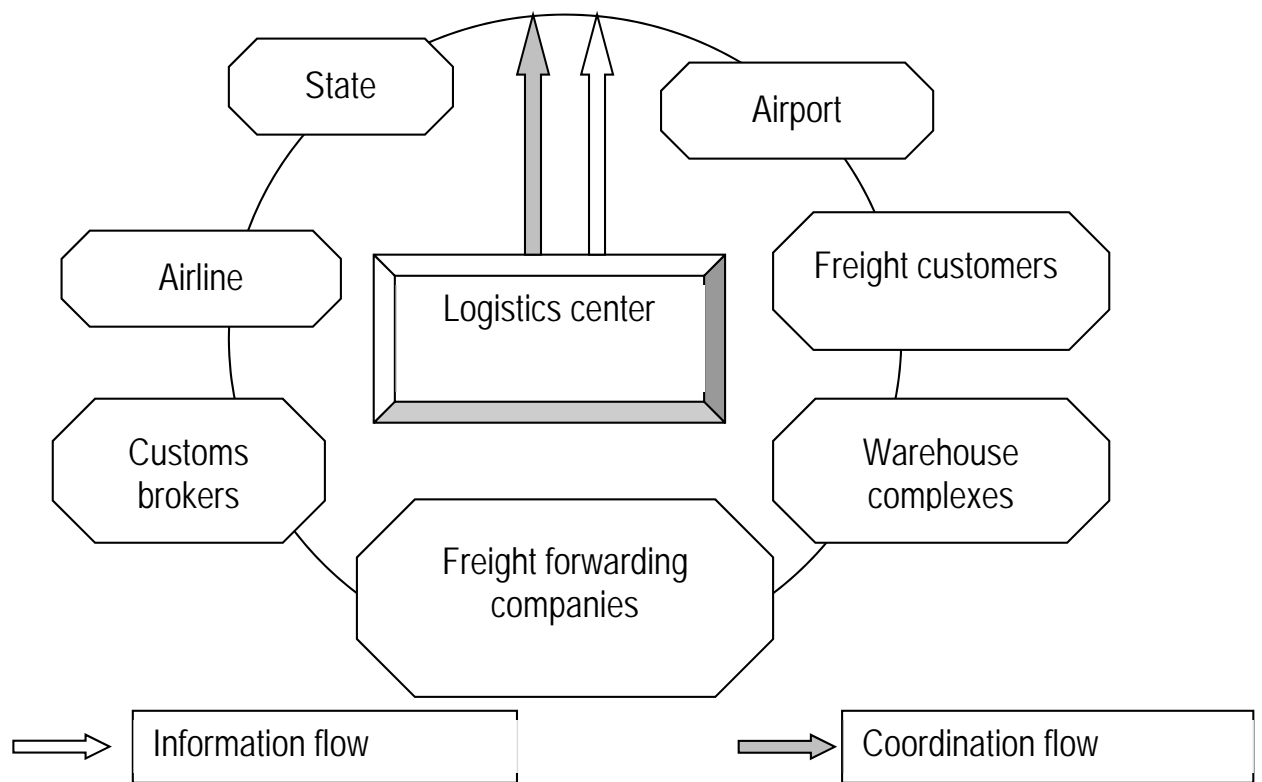


Figure 6 - The place of the logistics center in the coordination of economic interests

Source: developed by the authors

The creation of a logistics hub on the basis of the airport will allow to ship goods over long distances and to develop multimodal transportation of passengers and cargo using air transport.

The main functions of the logistics center: coordination of the elements of the logistics system in order to ensure a single technological process in the node; coordination of economic interests; information flow management; formation of harmonious and productive relations between all participants in the transport process.

An effective mechanism for reconciling economic interests should include the following elements:

- cooperation and integration to achieve a common goal;
- development of an effective mechanism for resolving disputes;

- creation of a managing logistics center;

- equal access to information and transition to a single information field (electronic document management, standardization of data transmission);

- creation of effective state and international governance with regulatory procedures and mechanisms for resolving market access issues, disputes and conflicts;

- development of the transport industry in accordance with the trends of the world economy;

- ensuring the feasibility of interaction, based in part on the material interest of all participants in an effective incentive mechanism, which provides for the optimal distribution of the effects of interaction.

An important condition in satisfying their own interests and the interests of partners is

to maintain the quality of transport services (Fig. 7).

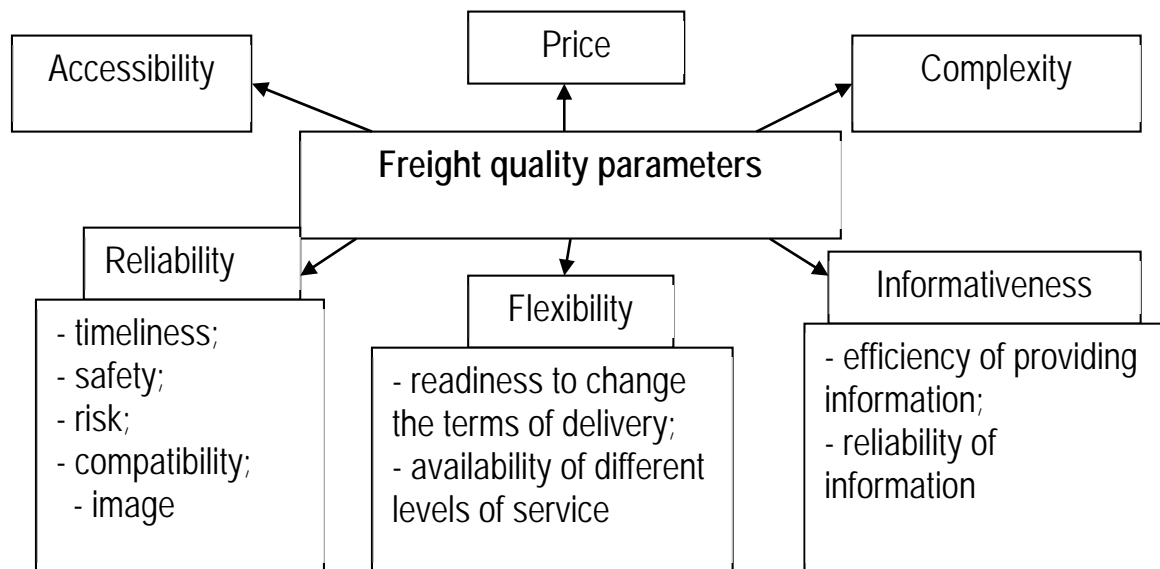


Figure 7 - Components of the quality of freight
Source: developed by the author

Quality is a set of properties and characteristics of services that provide the ability to meet specified requirements and needs. The quality of the delivery system depends not only on the level of quality of each of its participants, but also on the degree of synchronization of their interaction in the customer service process. Under the interaction of participants in the delivery system should be understood as the presence of certain types of connections that are found in the implementation of the function of the system.

Conclusions. Strategic management of airport efficiency and safety in the process of ensuring the implementation of international air and multimodal logistics is one of the main components of sustainable development of

the air transport industry. The study of theoretical aspects of interaction of transport market participants allowed to determine the main directions and principles of interaction of airports with their partners, based on a systematic approach, anticipation, adaptation, continuous improvement of interaction technologies. The system approach involves the harmonization of information, resource characteristics and reliability characteristics in the interaction of all participants in the air system, which are related to a single goal - the organization of efficient and safe air transportation. Cooperation of transport market participants, as well as any other enterprises, is based on economic interest, which is formed as a result of joint activities.

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