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STRATEGIES FOR FUTURE DEVELOPMENT OF HUB AIRPORT IN UKRAINE

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Modern approach analysis results for organizational performance of several Ukrainian airports are presented.

Keywords: International airport, hubbing, logistics, networks.

Наведено результати аналізу сучасних підходів до організації роботи деяких українських аеропортів.

Ключові слова: міжнародний аеропорт, логістика, мережа.

Problem statement

Aviation industry plays an important role in the transport system of a country, it plays a significant role in the international transport links. Recent years shows that Ukraine is possible to develop and implement new designs, technologies and equipments in airports. Airports are asset-intensive businesses that require many years to recover the significant capital investments in runways and terminals. The increasingly deregulated and liberalized aviation environment has induced many airports to re-examine their traditional business model and focus on new commercial activities with a view to achieving self-reliance and financial independence and to help support the development of their airport in line with the needs of all its customers from airlines to passengers.

Transport strategy of Ukraine until 2020 years indicates regulations which are should be implemented due to European standard [1]. One of the performance requirements is the increase of local and transit passenger transportations and cargo turnover in Boryspil International Airport. Considerations about Boryspil International Airport development as future hub airport are absent. Hub airport provide local consumers with a much wider network scope at higher frequency than would be possible based on local origin-destination demand alone. In other words, they generate connectivity for local consumers travelling to and from the hub's metropolitan area

The possible strategies for future development of hub airport in Ukraine are considered in the article.

Analysis of recent research and publications

Even though there is a great potential to the hubbing development in Ukraine, there are few particular research on this topic [2]. Literature relevant to the effect of hubbing and cost-effective methods of carrying out hub network design is investigated but not enough. According to the first consideration, hubbing is a cost-minimizing option for airlines and rout networks of Ukraine.

Following to this theory opening of hubs in Ukraine is one of the most important step in airline industry development. To get a complete information about hubbing process in Ukraine it is ought to know and take into account the possibilities of the main competitive hubs. In our case there are two main hubs — Istanbul and Moscow [12]. There is a thought about opening four hubs in Ukraine [14], [15]. But there is a profound error because of political, economical and geographical reasons. Of course we have an opportunity for the development of this idea but not in the claimed scope.

Other estimation is about hubbing in Ukraine is rather different from the first. For passenger transportations — hubbing is optimal solution except aerotropolises but it is early and not advisable to talk about this in our situation [6]. But when we are talking about cargo transportations there is a judgment, that there is no opportunity and no need for the hubbing development process in Ukraine, and alternative way of airline industry development exists — aviation logistical center formation on the basis of cargo knot. This opinion is supported by the peculiarity, that development of air transport and logistics centers in Ukraine is one of the main directions of improving the efficiency and quality of air service, primarily in international traffic. But to the problem of studying the process of logistics centers in the economic literature is given insufficient attention [5].

Scientists left unattended process of logistics centers based on cargo airports, due to the geographical position of Ukraine and development of multimodal transportation is of strategic importance.

Main material

Airport hub and logistics centers based in airports are a new evidence for Ukraine and research has not shown the alternative option for Ukrainian airports yet. The following investigations will show possible strategies for Ukrainian airports development.

Development of air transport and logistics centers in Ukraine is one of the main directions of improving the efficiency and quality of air service, primarily in international traffic. Air Freight Logistics is an integral part of the development of international relations and the economy of Ukraine.

Now in Ukraine there is a huge interest in the logistics service quality and, in particular, the creation of large multi-modal transport centers.

When we are talking about air logistics center (ALC), we propose to understand the complex of structural and organizational business entity that operates on a cargo airport in a particular macro area, implements certain logistic functions to reduce the time of handling, minimize cost and best match the needs of consumers [3]. In Ukraine, the obvious leader is Kyiv region on which we can create an experimental air logistics center, which has following advantages. The advantage of air logistics center is a mere node distribution, it means the collection of cargo, repackaging and the new distribution. Large airports are not able to serve more cargo flows because of its busy with passenger flows. In such cases at the state level this problem is solved by opening or refurbishment of existing airports, directing them to the cargo. Airport "Boryspil" is in transition to international "hub", cannot withstand airflow download. An alternative, which would be dumped to the airport "Boryspil" may open a new cargo terminal in the Kiev region In 2011 a grant agreement was signed to fund a feasibility study on the project to create an international air cargo center in the city Bila Tserkva.

To make ALC development more complex is providing of permanent and flexible logistics networks. Permanent networks are set up for unlimited time in order to serve a long lasting demand.

The continuity of the demand and the size of the orders determine the network into three main fields.

To the first type belong permanent or fixed logistic networks which consist of logistic stations at fixed locations, such as receiving stations, transshipment points and logistics centers that are connected with each other by a permanent transport net.

Many logistic network provider, e.g. freight forwarders, railways, postal, courier, express and parcel services and airlines, are owner of a permanent logistic network.

The procurement networks of retail companies with dedicated logistic centers and regional warehouses are also fixed logistic networks.

However, the flexibility of a fixed network is generally rather low. Hence, for seasonal or stochastic peak demand that exceeds by far the basic demand, a flexible network is opportune.

The second type is flexible or virtual air logistic networks are networks with changing stations, interaction with other transport links and altering partners involved.

The operating costs of a flexible network are generally higher as for a fixed network.

According to the demand, a fixed regional or national network can be connected with flexible local or global networks thus resulting in combined networks:

The third type is combined networks which consist of a number of fixed stations connected by regular main transports in combination with flexible local networks and international objects. In our case we should talk about not only creation of new ALC and close interconnection with "Boryspil" airport but also about the opportunity of working with 3-rd enterprises to provide efficient services to unpredictable clients.

In Euro-logistic network global logistic service providers, such as international freight forwarders, airlines and shipping lines, operate with combined logistic networks. They connect their own fixed global network with flexible local networks of contract partners or sub contractors. By this means, they can offer a complete logistic network that covers the whole globe [4].

After the realization of assigned ideas according to the building of new logistic center we should consider the possibility of opening similar centers in other regions with significant traffic (Chernivtsi / Khmelnitsky, Odessa, eastern and western regions). ALC distribution will be considered in future research.

On the other hand hubs are defined as collection points that serve the purpose of consolidating traffic flow. The concentration or consolidation of flow can reduce movement costs through economies with air network, mail delivery systems and in telecommunications. Hubs are defined in two general ways : one denoting whether an airport represents a hub within a carrier-independent system of air transport and the other denoting its role within carrier-specific network [7].

Classification of hubs is following [7]:

By scope:

- Operational — merely an operational base, no connecting services offered.
- Marketing — operational base, connecting services.

By route structure:

- Hinterland — hub serves as a distribution point for air travel to and from its surrounding catchment area. Interface between short- and long-haul flights.
- Hourglass — directionalised routing.

By strength of local market:

- Weak — relatively few originating passengers.
- Strong — relatively many originating passengers.

By size:

- Most important airport of an airline, focus on intercontinental traffic (if applicable).
- Second most important airport of an airline, focus on intercontinental traffic (if applicable)

There are some **advantages** of hubbing.

The first and the most essential advantage is economies of traffic density — economies of scale occur when the average unit cost of production declines as the amount of traffic increases between any give set of points served. The usual argument is that a hub-and-spoke (H&S) network, through increased traffic density on the links to the hub, allows airlines to use larger, more efficient aircraft and to spread the fixed costs over more passengers, thus exploiting economies of scale [10]. Besides empirical evidence of improved returns from traffic density, other empirical studies underscore the cost advantage of hubbing. Some researchers suggest that a 10 % increase in hubbing associated with a 1,1 % The second advantage of hubbing is a better capacity allocation. Hubbing has the added advantage of better allocation of capacity under demand uncertainty. Hubbing by pooling passengers from several markets into the same plane allows the firm to adjust the allocation of capacity once the demand conditions are revealed. This flexibility means that if the demand in one market turns out to be low, thereby creating excess capacity, the firm can increase sales in other markets. Moreover, if the demand in one market ends up being with consequent binding capacity constraints, especially during peak seasons, hubbing allows a more profitable allocation of capacity since the firm can first price out the low-rate travelers on several markets before eliminating travelers with higher willingness to pay.

The third advantage of hubbing is improvement of service quality. Hubbing offers flight frequencies and thus better-quality service and consumer value, necessary qualities used to measure prolonged customer satisfaction and on-going propensity to utilize products and services [9]. The existence of the economies of scale (market) provides the consumer with a larger set of services to choose from (non-stop or with a connection), generated by greater traffic flow for the carriers.

The fourth advantage is a high average yield. Hubbing allows airlines to have a high average yield due to a wider ‘market power’, which is the ability of a market participants to control sufficient / essential facilities, to set prices profitably above, or reduce supply below, those which would occur in a fully competitive market. Hubbing was a preffered option once an airline’s size and network structure had grown to a certain scale. The fact that the airline can engage in very sophisticated demand-management and pricing schemes, effectively micro-managing the yiel from the contents of the flight, based on the passengers’ ability and willingness to pay [9].

There are also marketing advantages. Hub networks for airlines need little effort in marketing because airlines and readily associated with flights to and from the countries whose names they carry [10]. Besides increased production efficiency, adds that an airline with a large presence in a hub airport gains significant customer loyalty advantages through marketing devices such as frequency flyer programs and travel agency commission overrides, it allows an H&S airline to exercise some monopoly power at the hub.

Another advantage is the stimulation of job creation – hubs stimulate job creation, statistical calculations done worldwide and it was indicated that having a hub airport in a region improves the economy through the employment of more than 12 000 personnel. The bright examples are hubs in USA. This does not mean that all hub regions benefir by this amount, but it was an average calculated across hub cities. Hub airports in general is higher than traffic at other airports which gives dramatic rise of employment [11].

On the other side there are a lot of **disadvantages** of hubbing.

The first disadvantage is additional running cost. An additional costs of landing and handling at an intermediate point is avoided and more importantly, it doesn’t add to unproductive ground time of the aircraft and crew. On product appeal, the seasoned traveler prefers the most direct itinerary, non-stop is possible without a change of an aircraft and flight at intermediate point. Hubbing operations increase rout frequencies, which in turn negatively effect of the flight costs.(extra fuel consumption, extra cruise time, ect.)

The second disadvantage is an additional travel time The need to go via hub imposes additional costs on a travel in terms of actual travel because of the added segment length involved and the transit time spent at the hub. In a hub network, direct flight don't exist, except if a passenger's final destination is the hub at which the aircraft first lands. This means that that hubbing inconveniences passengers by adding extra travel time through the hubs and the transit time at hub airports before passenger reach the final destination.

The third disadvantage is congestion at hub airports. For airlines there is a restriction to expansion at congested hub airports due to lack of slots in which planes can land. As a result, there is reduced flexibility on scheduling, which increases susceptibility to delays emergency situation. Conversely, argue that large hub-based carriers enjoy economies of market presence and can offer more efficient network services because of scope, scale and density advantages and therefore have a greater incentive to press for additional infrastructure for runways, gates and slots at the hub airports.

Airlines that provide connecting services that flow through hub airports schedule their flights to arrive and depart in "banks", which are periods of time in which many planes arrive and depart over a short time-span to facilitate connections. This inevitably means that there are considerable numbers of both passengers and aircraft congregated at the hub during these banks. [11].

The fourth disadvantage is limiting of competition. Hub carries limit competition through the excessive market power enjoyed at their hubs because they are free from competitive pressures. It is argued that the interest, which is real test of competitiveness, is the degree of choice available to customers between their origin and desired destination. Hub carriers do face competition from specialized airlines, such as low cost carriers, and from technology changes, such as preferred use of regional jets and new aircraft like the "extended range" aircraft that fly over longer distances without the need to refuel. All these factors encourage competition on routs in hub networks.

The fifth advantage is the environmental cost implication of hub networks. The effect of hubbing networks on the environment has been an area of growing concern. This is because hubbing networks are characterized by longer travel distances though hubs and higher frequencies. The social cost impact of the noise and emissions from the routes and networks in which hubs were by passed was found to be significantly lower than that of the hubbing networks. The difference in the environmental costs per passenger ranged from 25 % to 71 %. This was found to be dependent on the concentration of population around the airports and the degree to which the hub routing involves extra mileage.

Analysis of the structure and geography of freight traffic showed a significant potential of the Kiev region. Research prerequisites for the development of transportation service possible to conclude whether the creation of primary air logistics center at the existing airport, which will expedite the movement of cargo between Ukraine and other countries.

Under the new strategic concept cargo airport in Bila Tserkva is positioned in the market as the main air logistics center in the country that can compete in the international market and turn Ukraine into a powerful transit center.

Airport "Boryspil" is in transition to international "hub", cannot withstand airflow download. An alternative, which would be dumped to the airport "Boryspil" may open a new cargo terminal in the Kiev region.

On the other hand the development of airport "Boryspil" to the level of international hub has significant role, as Ukraine is interested not only in the cargo transportation but in the passenger turnover too. Two types of hubs were proposed — at the airport level and at the airline level. In the case of "Boryspil" airport we propose to use hubbing of the second type because of opportunity to develop and to attract new carries.

Conclusions

Analysis of the aviation situation in Ukraine shows as a significant but not realized potential for the Airline Industry development. Ukrianian airport system is a complex system.

Ukrianian diverse airports range in size from small general aviation airports to huge airports, such as "Boryspil" international airport and other six strategic airports.

An analysis of each airport and an overview of national transport system should be provided according not only to the current needs but also for the next decades.

Ukrainian airport system study must include identification of each airport's functional role within the system and evaluation of each airport's performance relative to its functional role.

There are two strategies for the development process for the main national airports as hub or formation of new logistics center on the basis of the cargo knot.

Creation and development not only of the permanent but also of the flexible logistics networks is rather critical in Ukraine in our days.

Taking into account advantages and disadvantages of proposed variants we can consider, that Ukraine has a potential to actualize both strategies. Which one will be most suitable for Ukraine we will define in out further researches.

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