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Airline hub as a source of competitive advantage

Abstract: The development of airport infrastructure and creation of airline hubs, which have a great importance for the economy, encourage to thorough analysis of their role for airlines. Hub airports are the fundamental source of the competitive advantage of full service network carriers. This article explains their role for airlines. The paper presents also the most important properties of airline hubs, which affect the competitiveness of air carriers. It also presents major challenges related to the functioning of hub airports, which have to be addressed by airlines. These issues are very current due to planning of the new central transport hub in Poland.

Keywords: Hub airport; Airlines; Competitiveness; Network carriers

Introduction

In the light of the growing competition in the air transport sector, it is worth looking at the operating mechanisms of carriers and the areas in which they compete with each other particularly strongly. Airport infrastructure investments carried out all over the world, especially those considered as projects of strategic economic importance, motivate to consider the role played by the main communication nodes for airlines.

In this study, the presentation of a hub as a source of competitive advantage of an air carrier was considered justified and purposeful, both for cognitive and utilitarian reasons. While remaining in their intention, the authors showed the impact of the carrier's operations based on a hub port on the improvement of its competitiveness, while meeting certain conditions resulting from the closer and further environment, business model, and principles of cooperation with the airport being the main node in the carrier's network.

Achieving the main goal of the publication required the formulation and implementation of partial goals, which included:

- a query of the literature relating to the subject scope of the study, including in particular the business models of airlines and discussions on their evolution,
- determination of the main features of the network model, enabling competitive advantages
- determining the conditions for gaining competitive advantages of carriers operating based on a transfer port,
- identification of the characteristics of the transfer airport affecting the competitiveness of the air carrier.

Studying the literature, the authors identified a research gap, recognizing that the studies and publications to date mainly refer to the relationship between regional ports and the development of low-cost carriers. Transfer ports and their relationships with the development

of network carriers appear mainly in the context of descriptions of a hub and spoke systems and strategic alliances. [9, 10, 14] Relatively little attention was paid to the role of these ports in building the competitive advantages of individual network carriers, assuming in advance that such a relationship and impact exists, without taking into account the conditions for obtaining positive effects of their functioning based on transfer ports, or also the threats that may arise here.

Competition means rivalry between entities interested in achieving the same goal. Its intensity depends on the specificity of the products offered, the structure of the sector in which the entities operate, the tools used to compete, as well as the recipient profile of the activities undertaken. [12] The primary goal of air carriers is, above all, to generate and increase profits from the transport activities and those that support them, and thus to maximize the financial benefits for their owners. There is no doubt that the airline sector has a very large group of stakeholders, especially due to its economic importance, prestige, global reach, and the number of customers. For this reason, competition between carriers is subject to strong political influence in many regions of the world. It is particularly visible in the segment of large network carriers, which create transport nodes important for the economy as part of their operations. Their development is often part of government economic programs. [7]

Competitiveness, in turn, is the ability to compete effectively with other entities, and therefore to resist competition. Therefore, the strengths of the organization create a certain potential for competitiveness, and the possibility of positively distinguishing itself from competitors and exceeding them with the results of one's own activity creates a competitive advantage. [12] It is worth noting that the very business model of an enterprise can be a source of competitive advantage in many respects. This is clearly seen when considering different approaches to how airlines operate and generate profits.

Several major business models dominate the sector: Full Service Network Carriers (FSNC), also referred to as traditional carriers, Low Cost Carriers (LCC), charter carriers, regional carriers, hybrid carriers (combining features different models), as well as cargo carriers that specialize only in freight transport. The operators of specific segments are characterized by different fleet needs, as well as a different approach to the development of the network of connections and their range. Network carriers represent a model that can certainly be considered the most complex in terms of organization and trade. Its name derives from the network connection grid system, which is also referred to as hub and spoke system or transfer port system. It consists of providing passengers with a connection offer with a transfer, which is most often carried out in the main node of the carrier's network, which plays the role of a transfer port. Such an airport is usually also the main operational base of a network line. It is worth noting that the consequence of using this solution is a significant interdependence of the flights performed by the operator [13]

Importance of a hub airport

An air carrier's network can be visualized as the lines connecting all pairs of cities in its network of connections that generate the demand for passenger transport. They form the so-called O&D Markets (i.e. Origin & Destination). It is theoretically possible to serve each such market using direct connections (referred to as point-to-point), but this is most often not practiced. Firstly, only some of the global O&D markets generate sufficient demand for direct cruises within a given city pair to be profitable.

Secondly, the obvious limitations are related to the range and technical capabilities of airplanes. Decisions on the methods of delivering a transport offer to passengers are therefore one of the basic issues in the design of airline networks by airlines. [8] Each O&D market can be served in different ways, ie by direct connections or with a transfer at a transfer port.

Other, less common solutions are also possible, such as direct flights with a stopover (for commercial or technical purposes), as well as flights with a change to connections of cooperating carriers.

Effective operation of a transfer port also requires that it is located as close as possible to the theoretical direct route connecting the departure and destination airports for as many passengers as possible. [9] Otherwise, the journeys would be extended and, consequently, the carrier's offer would be less attractive. Therefore, it is worth noting that some connections with a transfer within a given city pair may be unfavorable for passengers due to the unacceptably long total flight time. This is especially true when the distance from the starting point of the journey to the final destination makes it possible to use a faster, alternative direct connection. For this reason, direct connections bypassing the carrier's main transfer port are also quite often offered by network lines, especially when the transfer reduces the attractiveness of the offer for passengers from a given city pair. This relationship is also confirmed by econometric studies. [16] The market is currently showing a tendency to launch an increasing number of direct routes by network carriers. [17] The provision of direct flights by a network carrier is also justified in a situation where at least one of the airports in a pair of cities is characterized by high local demand and servicing such an O&D market using a transfer connection would adversely affect the competitiveness of the offer. In addition, direct connections are attractive to business customers, whereby network lines can usually achieve higher margins. The architecture of the connection network is therefore an individual matter of each carrier, partially independent of the business model because each operator operates in the local market specificity to which it must adapt its offer. However, there are other prerequisites for the competitive functioning of the transfer port system that should be looked at more closely.

It is worth noting that network lines compete with each other on the market also when the routes they offer do not overlap at all. For example, one line flights on the route Madrid - Warsaw and Warsaw - Singapore with a conveniently scheduled transfer in Warsaw are competition for a pair of Madrid - Dubai, and Dubai - Singapore connections with a transfer in Dubai offered by another carrier. The aforementioned cruises are a response to the demand on the same O&D market (ie Madrid - Singapore). However, many factors affect the competitiveness of each carrier's offer to a given O&D market. One of the basic issues - apart from the ticket price - is, for example, the timetable of connections from the transfer port and the number of seats available on flights, which allow passengers to transfer conveniently while maintaining an attractive transfer time. It is therefore related to the total travel time. The standards of the offered product are also particularly important.

Network model as a source of the carrier's competitive advantage

The strength of the network model lies in the scale of operations and the effective concentration of traffic in the transfer port. The addition of one new destination to the connection network from a transfer port adds only one route, but in practice, it means a completely new offer for each of the airports served by the carrier and is tantamount to serving new O&D markets. Thanks to this, the transfer port system enables carriers to make their offer available to passengers from a wide geographic area. [13] It should be underlined that many O&D markets can only be profitably served using the network model. It is related, inter alia, with network carriers' fleet strategies that guarantee significant operational flexibility. These strategies most often take into account the handling of some connections with smaller types of aircraft. This is why the network carrier can successfully serve airports with less local demand, managing supply appropriately, and using smaller planes on routes with lower demand. It also shows the possibility of adjusting the supply on an ongoing basis (i.e. the available seat-kilometers - ASK) on selected flights, depending on the seasonal

fluctuations in demand, and allows the operator to optimally match the right size of the aircraft to handle a given connection, following real demand. [13] This proves a completely different approach of network lines to the conducted activity. Carriers of other business models are unlikely to choose to operate an airport that generates less demand as they would normally not be able to fill enough seats to ensure the profitability of their aircraft on flights from that airport. They usually have the so-called homogeneous fleet, most often composed of medium-sized machines of the same type (and therefore with the same or a similar number of passenger seats and transport capacity). Therefore, the network model and coordinated transfers at a transfer port allow for profitable connection with the world also locations with relatively low local demand. [4] At the same time, it enables the creation of a distinctive offer and reaching airports that are not of interest to competitors. In addition, passengers starting their journey in these places gain access to other destinations offered from the carrier's transfer port.

However, it is worth noting the consequences of applying the above solutions. The use of smaller machines for some connections, although it makes it much easier to obtain the load factor (so-called LF) at the level necessary to maintain the profitability of the operation, at the same time is associated with significantly higher unit costs of a passenger-kilometer. On the other hand, the higher unit costs of servicing some of the transfer connections to the transfer port with smaller planes are compensated by the use of larger machines on more profitable medium to long-haul voyages, and therefore those operated with machines with a lower unit cost, using locations that ensure the profitability of the operation. [4] It is directly related to the most basic source of a network carrier's competitive advantage, which is also the foundation of this business model.

It is the so-called the economies of traffic density and it gives sense to the functioning of the network of connections in the hub and spoke system. The benefits of congestion are based on the dependence that the marginal cost of transporting each subsequent passenger on a direct route decreases with increasing passenger-kilometers on a given route. [1] This explains why it is beneficial to concentrate the traffic coming from different departure airports at the transfer port. Given the above, network carriers usually strive to serve some of their destinations - especially long-haul destinations - with the largest aircraft possible while achieving high seat utilization. In recent decades, there has been a trend towards the use of larger aircraft by network carriers along with their market expansion, so with the development of the airline, the average number of passenger seats for their aircraft has increased. [2] In recent years, however, this has ceased to be the rule. However, it is a very extensive issue that deserves separate analyzes and publications.

Along with the increase in the number of passengers served at a hub airport, it is possible to increase the frequency of flights to individual destinations, including smaller airports. As already mentioned, smaller types of aircraft are usually used, which on the one hand are characterized by higher unit costs of a passenger-kilometer, but on the other hand - they allow for an easier way, with a lower number of passengers, to obtain profitability on flights. The higher frequency of flights allows shortening the average connection time at the hub, which makes its offer more attractive to passengers [4] It also allows passengers to make one-day trips, which is usually impossible in the case of using the services of a carrier representing, for example, the LCC model, and is often important in the case of business trips. It is also another source of the competitive advantage of network carriers, obtained thanks to the existing transfer system. There is also a dependency that with the increase in the number of passengers transported, it usually becomes justified and cost-effective to use larger and larger planes on an increasing number of routes. This allows, in the long run, to increase the carrier's margins, which results in an overall increase in revenues from the transport activity.

In addition to the above-mentioned issues, a wide range of connections from a transfer port and gaining a dominant position at the airport fulfilling this function are also conducive to increasing revenues by increasing transport tariffs for local passengers. It is possible thanks to building a local monopolistic position by the carrier. In the longer term, this leads to an increase in the profitability of all operations performed by the carrier. [5] The above considerations show that the significant sources of competitive advantage of network carriers already lie in the business model itself and the related nature of the offer made available to passengers.

Features of the hub airport affecting the competitiveness of the carrier

The functioning of an airport as a hub airport and its competitiveness are directly related to the size and market expansion of the network carrier that has a base there. Competition between hubs can therefore be reduced to competition between network carriers that use the airports concerned as the main nodes of their network. An airport serving a specific location can be viewed as a natural monopoly. However, when a given airport does not constitute the base of a network line, it is likely to compete with other airports in the region for the launch of a transfer center in it by a potentially interested carrier. [15] In research and scientific analyzes, the results of which are presented in the literature, it is stated that the competitiveness of a hub airport is highly dependent on the number of destinations and the frequency of connections to them, the number of available transfer connections, as well as the average waiting time of passengers for a transfer. [15] It is worth noting that some factors influencing the competitiveness of a transfer port and a network carrier are, for natural reasons, beyond the control of stakeholders. As already mentioned, the transfer port should be located as close as possible to the theoretical direct route connecting the departure and destination airports for as many passengers as possible. So there is a geographical factor here. The local climate is also an important factor, as frequent unfavorable weather conditions can cause traffic disruptions that hinder the operation of the network carrier. [11] One of the most important factors determining the development of network lines in a given port is also the local regulatory conditions and the condition of the infrastructure, which must allow for maintaining the desired product standards and create development prospects.

The source of competitive advantage of a network carrier may also be a favorable policy of the entity managing the airport, which is its main base and transfer port. [13] Usually, the strategic interests of the port manager and such a carrier are similar, ie both sides aim at increasing traffic. From the airport's perspective, the most important tools stimulating development are undoubtedly infrastructure investments, as well as marketing activities aimed at attracting new carriers and facilitating the opening of new routes by those already present. Marketing activities of the airport aimed directly at passengers are also important - they are also partly used by carriers. Airport charges play a particularly important role in the area of airport management and stimulating the development of the desired traffic structure. This aspect has a significant impact on the competitiveness of the network carrier that uses the airport as a node of the connection network. Therefore, there is the cost aspect of building a competitive advantage. It is possible to support a specific carrier or group of carriers by differentiating the number of airport charges collected and developing a structure of charges that is favorable to them. In the face of competition protection, this differentiation should be based on objective criteria that can be met by each interested operator, and therefore obtaining a given level of fees may depend on meeting certain conditions related, for example, to the structure of the fleet (size of airplanes) or traffic structure (length trass). [9] It is also possible to exempt carriers from charges for transfer traffic. The acquisition of a local dominant position by a single carrier and the functioning of its base of operations may also justify reduced parking fees.

There are also other aspects of the network carrier's operation, as well as its hub, which significantly affect the competitiveness of its services. The hub and spoke system requires planning the so-called wave structure of arrivals and departures at the connection network node, which is related to their synchronization and efficient passenger and baggage handling at this airport and providing an attractive transfer time for passengers. Each wave of arrivals and departures is characterized by several parameters, of which the so-called minimum connecting time (MCT). This is the minimum time that must elapse between the scheduled arrival of one flight and the scheduled departure of another, allowing tickets to be sold for both flights as one connecting journey. [9] The timing depends on several factors, not all of which, however, are under the control of the air carrier. This parameter depends, among others, on the turn-around time of each aircraft (which is the ground handling time upon arrival and before the next departure) and the time required to handle passengers and baggage at the terminal. Therefore, it is a parameter dependent on the speed of ground handling and the efficiency of the airport, i.e. it results mainly from the standard of the airport product provided by the airport managing body and local contractors of the carrier (e.g. handling companies). To ensure the desired, low MCT values, all traffic of a given carrier (and its partners, services which its passengers can also use) should be handled in one terminal. [8] Moreover, the carrier usually has a direct impact on the quality of service of transfer passengers in the airport terminal zone dedicated to it - for example, by running its own information points or business lounges.

Service at the airport is independent of the carrier's onboard product, on the other hand, it should be noted that the transfer at a transfer port as part of a trip based on one ticket also becomes an integral part of the network carrier's transport service. The passenger's transfer experience at the transfer airport is, therefore, part of the airline's product. [13] It should also be remembered that the airport which serves as a hub and the main base of the carrier is also the place where a journey begins or ends for a certain group of travelers. Their impressions also significantly affect the overall experience of traveling with the given lines. The quality and standards of the airport product obviously affect the competitiveness of the carrier, as passengers assessing their travel experience also evaluate the airport product they have used. It has a dual nature, just like an on-board product. It consists of the physical infrastructure made available to travelers as well as the services provided to them. [6] Important aspects that should be considered, apart from the parameters influencing the functioning of the transfer system, include: transparency of the passenger information system, waiting times in the queues for security and passport control, the walking distances passengers must cover in the terminal, as well as waiting times for baggage collection. Undoubtedly, important aspects are also the standard of business lounges and waiting rooms provided to passengers, the availability of shops and service points, as well as the general cleanliness of the terminal. The importance of the above issues is also confirmed by passenger surveys conducted by industry organizations. [6] It can therefore be seen that the attractiveness of a transfer port and, consequently, the competitiveness of a network carrier is influenced by many complex factors.

Summary

Building an effective hub airport system is an essential element in the development of every network carrier. It is a complex process that takes years. It is worth noting that virtually every airline business model allows you to gain a competitive advantage in specific fields. In the case of network carriers, the very functioning of an interchange port is its key source, which is mainly due to the phenomenon of traffic concentration. In addition, this model allows you to build a competitive advantage also in other areas - among other things, it creates unique opportunities for market expansion for operators. However, it should be remembered that

handling traffic within a transfer port is associated with the greatest organizational and strategic challenges. It is also burdened with great risk in situations of global crisis and collapse of demand.

The issues presented in the article are at the center of interest of carriers, airports, market regulators, and public administration. This issue is particularly topical due to the plans to build a Central Communication Port in Poland. In future research, it is worth attempting to analyze the evolution of the role of transit airports in the light of the hybridization of airlines' business models, as well as the increasingly emphasized problems of the impact of air transport on the environment and the social responsibility of the functioning of this sector..

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