

THE CONCEPT OF THE SOLIDARITY AIRPORT- CENTRAL TRANSPORT HUB FOR THE DEVELOPMENT OF PASSENGER AIR TRANSPORT IN POLAND

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***Abstract:** The presented article is an attempt to assess the concept of the Solidarity Airport – Central Transport Hub for the Republic of Poland and its potential impact on passenger air transport in Poland. The article presents the basic assumptions regarding the CTH, indicated the potential benefits and possible risks associated with the creation of a new airport. The analysis of stakeholders was also carried out, and the positions of experts in the field of transport were summarized. Similar projects have also been established in other European countries for comparative purposes. The quantitative data used to assess the emergence of the CTH were taken from the website of the Ministry of Infrastructure and the Civil Aviation Office in Poland. The quantitative method has been used to present current and capacity at international airports. Based on the source data, the concept of the Solidarity Airport was assessed, including the financing of the entire undertaking as well as the achievement of the break-even point. The areas of influence of CTH were also indicated..*

***Key words:** Solidarity Airport, capacity, CTH*

***JEL codes:** R41, R42, R58*

1. Introduction

International airports, acting as major airports, located in a given territory, play a key role in servicing passenger air transport (Alaerad, Khoshnood, 2016). An airport is defined as an airport of public use used for commercial flights. The number of airports in an administrative area such as the state depends, inter alia, on the number of potential passengers located at a specified distance from the airport. The largest airport in the world, Hartsfield-Jackson in Atlanta, which served over 107 million passengers in 2018, is located at a distance of 11 km from the central business part of Atlanta. A significant part of the population of the United

States of America is within two hours of flight to the Atlanta Airport (Cohen, Coughin, 2009). In turn, the second largest airport in the world, Beijing Airport is located 20 km northeast of Beijing.

The basic features of international airports can also include a close connection of road and rail infrastructure, the purpose of which is to enable access to the airport within a specified time interval. An important feature is also the cooperation of the airport with a specific dominant airline. In the case of Atlanta Airport (Henriques, Feiteira, 2018) the dominant airline is Delta Air Lines, which is also the largest airline in the world in terms of the number of aircraft owned. An important feature is also the capacity of the airport, which can be defined as the number of passengers served during the year. It is the capacity that is an important measure by which the operational capacity of airports is determined. The throughput of international airports is linked to the profitability of the airport owner companies. If the airport conducts air operations within acceptable capacity limits, port operations should be profitable and bring specific profits to owners or investors (Jiang et al, 2017).

Aviation market forecasts presented by Boeing in the Current Market Outlook report, CMO - Current Market Perspectives, for the next two decades 2014-2033, anticipate a 2.5-fold increase in air transport and the purchase of 36.8 thousand aircrafts with an estimated market value of USD 5.2 trillion. The number of currently used aircraft will increase from 20,910 units to 42,188 aircraft. 15.5 thousand older generation vessels will be withdrawn, airlines will purchase a total of 36 770 airplanes, which will cause that annual aviation companies will produce 1840 new aircrafts. New aircraft and the increase in their size among airlines will require airport operators to take specific measures to adapt the port infrastructure to a new type of aircraft or rebuild certain elements so that a given port can provide a certain level of capacity (Liwinski, 2014).

The largest international airport in Poland is the Chopin Airport in Warsaw. According to the government representative for the Solidarity Airport, the Warsaw airport will not be able to handle the increasing traffic, because its capacity reaches the limits of operational capabilities.

The article undertakes to assess the construction of CTH with emphasis on the aviation component. Documents on the basis of which the Solidarity Airport is to be created have been analyzed and pointed out. One of the criteria on the basis of which the success of the Solidarity Airport investment was assessed is a financial criterion which may pose the greatest challenge for stakeholders involved in the creation of the Solidarity Airport.

On November 7, 2017, the Council of Ministers adopted Resolution No. 173/2017 on the adoption of the Investment Preparation and Implementation Concept: Solidarity Airport-Central Hub for the Republic of Poland. The new airport is to be built in Stanisławów in the Baranów commune near Grodzisk Mazowiecki. The new port will be located between Łódź and Warsaw. It is assumed that after the first phase of development, the airport will be able to handle around 45 million passengers per year and the port will eventually be able to handle 100 million passengers a year. The new port will be about 40 km away from the Polish capital.

2. Methodology and Data

The presented article is a criteria analysis of a case study on the concept of CTH with significant consideration of aviation component. Particular attention was paid to the proposals for financing the project of the new port. The source material was the Resolution No. 173/2017 on the adoption of the Investment Preparation and Implementation Concept: Solidarity Airport-Central Hub for the Republic of Poland and statistical data of the Civil Aviation Office regarding the number of passengers served by airlines operating in Poland. The basic statistical analysis was also used to forecast the capacity of the ten largest international airports in order to illustrate the scale of the undertaking facing potential contractors and investors.

3. The concept of the Central Transport Hub

The Central Transport Hub is a project aimed at establishing a transport hub that will integrate the air hub and railway junction together with the necessary road infrastructure. The main purpose of establishing the Solidarity Airport is the creation and use of a profitable and innovative communication hub, which will be in the top ten of the best airports in the world. The purpose of the port's creation was preceded by three basic assumptions (Resolution No 173/2017) such as:

- The development of air transport based on a hub can greatly contribute to Poland's economic growth - as part of the assumption, the authors of the Solidarity Airport concept point to the economic dimension of airport operations, and the relation of GDP per capita and the development of the aviation market in Poland:
- an increase in the connectivity index of 10 percentage points., defining as the available number of direct and indirect air connections, taking into account the quality and time of travel in relation to a given aviation market, causes an increase in GDP per capita

- by an additional 0.5 percentage point. and an increase in the average work performance by 0.07 percentage point,
- every first job in the aviation market contributes to the creation of three jobs in other branches of the economy,
 - Each 1 EUR contributes to the creation of 3 EUR GDP growth in other sectors of the economy,
 - The hub is attracting new airlines, mainly national airlines, as it has adequate technical facilities for E and F type aircraft. Increasing the attractiveness of the airport as a hub may contribute to the opening of new intercontinental transfer connections, which in turn may have tangible benefits both for airlines operating on the basis of a standard model and for airports.
 - The Chopin Airport in Warsaw is not able to handle the increasing demand of passengers for air travel:
 - it is estimated that the largest international airport in Warsaw at the turn of 2019/2020 will reach a daily limit of 600 operations a day,
 - there is no physical possibility to expand the Warsaw airport in terms of the construction of an additional runway and a significant expansion of the port infrastructure. This is confirmed by the analysis of satellite images of the Warsaw port, whose development is located very close to the highly urbanized area of Warsaw,
 - introducing the so-called core night, the ban on air operations from 23.30 pm to 5.30 am. As the basis for the prohibition, the noise generation limit in the zone of impact of the airport at night was recognized. The ban may contribute to restricting the slots offered by the port in Warsaw, and the limited time intended for air operations may potentially reduce the level of aviation safety due to the accumulation of take-offs and landings,
 - at the turn of the 70/80 years of the twentieth century, a housing estate was built in Ursynów, it was assumed then that the Warsaw port will be moved to a more convenient location,
 - in the years 2010-2013, the southern Warsaw bypass road was built in close proximity to the airport, which resulted in the lack of physical possibility to expand the port,
 - limited number of flight operations,
 - the risk of excluding one of the runways from use - there are two intersecting runways at the Warsaw airport. The emergency landing of an aircraft or the modernization of
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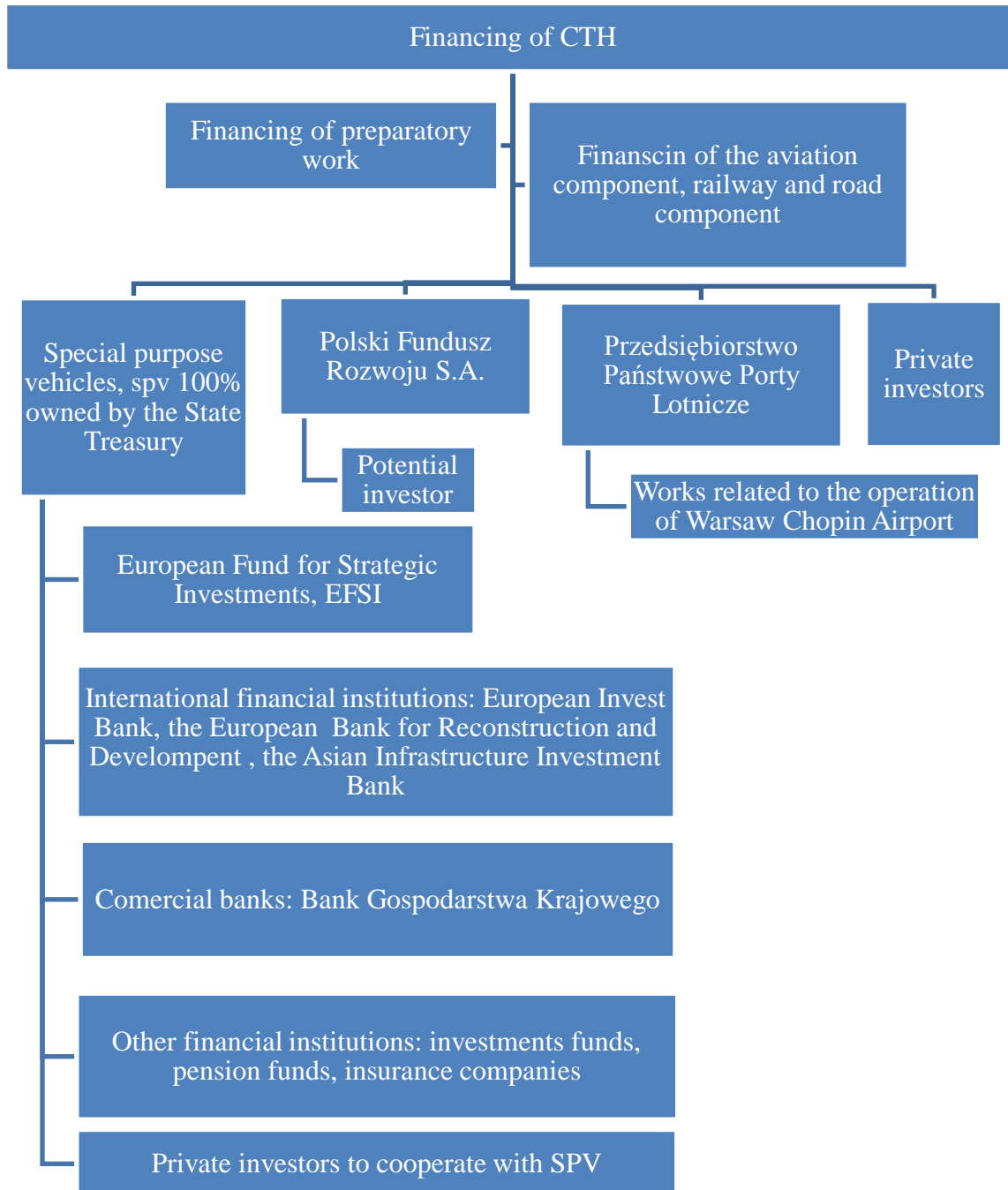
one of the runways significantly affects the port's capacity. Confirmation of this assumption was the emergency landing of the aircraft of Lot Polish Airlines, piloted by the captain Tadeusz Wrona. As a result of blocking one of the runways, some of the aircrafts were transferred to alternate airports, also the take-offs of aircrafts from the Warsaw Airport were canceled,

- a small number of parking stands and E-type control posts, which interferes with the development plans of Lot Polish Airlines (www1), which want to acquire new long-distance planes such as the Boeing 787 Dreamliner,
- insufficient capacity of the Non-Schengen zone, the lack of the possibility of allocating Schengen and Non-Schengen gates, the capacity of the arrival area for the Non-Schengen zone is 1,300 passengers per hour, and for departures 1,600 passengers per hour,
- the introduction of new control procedures does not correspond to the possibilities of architectural changes in the airport building, it is planned to reduce the passengers served from the current 110-120 to 80-90 per hour per one document control station,
- baggage sorting restrictions.
- The current state of the railway network in Poland is a systemic limitation for rail transport, which translates into a low level of competitiveness in relation to other modes of transport.

A necessary condition for the CTH to be created is economically justified to ensure port profitability, understood as the airport's ability to generate a certain level of profit, on the basis of which the enterprise's economic activity will be profitable for future owners and investors. Until the construction of a new port, air transport will focus on the development of transfer traffic, the development of intercontinental connections, taking steps to increase the capacity of the airport for Chopin Airport in Warsaw. In order to achieve this goal, the whole of general aviation services and the activities of low-cost carriers to the airport located in Mazowsze will be transferred. It can be assumed that the capacity at the Warsaw airport will be increased to the border, where it will be possible to safely perform air operations. Apart from a specific reconstruction of the port infrastructure, in order to ensure an optimal, safe level of air operations, in order to ease the Warsaw airport, a helpful role on the principle of complementarity of services will be able to perform Modlin Airport and other regional airports, where changes in infrastructure so that in the last phase of CTH development, they could ensure effective passenger traffic in Poland. The key element of the construction of the Solidarity

Airport is the appropriate level of financing for the new port project. It is estimated that the cost of the whole Solidarity Airport project is estimated on PLN 34.87 billion.

Fig. 1 Financing model of CTH



Source: own elaboration based on Resolution 173/2017

In the case of financing the aviation component, the important information is the lack of financing of this component from EU funds. Each component will have a financing method and, according to the Resolution, it may change depending on the stage of the project. It can be

assumed that ensuring an optimal level of financing, i.e. one for which the concept of the CTH can be implemented, is the basic problem that the future contractors of the project will face.

Fig. 2 General assumptions in the aviation sector of CTH



Source: based on Resolution No 173/2017

Tab.1 Costs, type of financing and sources of financing of CTH

	Aviation component	Railway component	Road component
Estimated costs PLN	16-19 billion	8-9 billion	6,871 billion
Source of finance due to Resolution	the State Treasury, SPV, Polski Fundusz Rozwoju S.A, Przedsiębiorstwo Polskie Porty Lotnicze, EU		
Possible source of finance, author's proposal	Maintaining the majority of shares by the State Treasury, rest of shares in possessions of foreign airlines	Maintaining the whole shares by the State Treasury	
Type of financing	Project finance	Update of the National Railway Programme, UE funds	Update of the National Road Construction Programme, UE funds

Source: own elaboration based on Resolution 173/2017

4. Implementation of international airport projects

The Resolution, on the basis of which work for the CTH is to be prepared, also referred to several examples illustrating the course of specific investments in new international airports around the world. Reference was made to the construction of the Berlin Brandenburg International Airport (Augustyniak, 2017), the construction cost of which is estimated at EUR 6.8 billion. The port's construction works were commenced in September 2006 and the expected date of putting the port into service is the period falling in the autumn of 2020. The airport will initially have a capacity of 27 million passengers, and the target bandwidth is expected to reach 50 million passengers annually. The new Berlin airport will replace three airports, such as Tempelhof, Tegel and Schönefeld.

One of the conditions necessary for the creation of CTH is the gradual extinction of the operation of the Chopin Airport in Warsaw. This will not be an easy process, as the Warsaw airport is the main hub for Lot Polish Airlines. The Polish national carrier focuses on increasing the operating range, opens new connections and also extends its fleet of medium- and long-distance aircraft (Nita, 2014). It can be assumed that there may be significant problems in the establishment of CTH that may interfere with the operational activities of PLL Lot, especially since the Polish national carrier began a strong development oriented to the American and Asian markets.

One of the goals of the CTH port is its striving to be one of the ten largest airports in the world. It can be assumed that this assumption is justified from the point of Poland's development in relation to the development of the aviation branch of transport. It is believed that operating airports contribute to economic growth directly through the creation of new jobs, indirectly providing sub-suppliers of services and goods to direct suppliers, inducing revenues for specific

stakeholder groups and catalyzing the activities of other sectors of the economy and may be verified by diversity of tool index (Kilkis, Kilkis, 2015).

Tab.2 Airports that served the largest number of passengers in 2018 compared to Chopin Airport

Rank	Airport	Location	Country	Total passengers	Rank change	% Change
1.	Hartsfield-Jackson Atlanta International Airport	Atlanta, Georgia	United States	107,394,029	-	3,3 % ▲
2.	Beijing Capital International Airport	Chaoyang-Shunyi, Beijing	China	100,983,290	-	5,4% ▲
3.	Dubai International Airport	Garhoud, Dubai	United Arab Emirates	89,149,387	-	1% ▲
4.	Los Angeles International Airport	Los Angeles, California	United States	87,534,484	1 ▲	3,5% ▲
5.	Tokyo Henada Airport	Ota, Tokyo	Japan	87,131,973	1 ▼	2% ▲
6.	O'Hare International Airport	Chicago, Illinois	United States	83,339,186	-	4,4% ▲
7.	London Heathrow Airport	Hillingdon, London	United Kingdom	80,126,320	-	2,7% ▲
8.	Hong Kong International Airport	Chek Lap Kok, New Territories	Hong Kong Sar, China	74,517,402	-	2,6% ▲
9.	Shanghai Pudong International Airport	Pudong, Shanghai	China	74,006,331	-	5,7% ▲
10.	Paris-Charles de Gaulle Airport	Roissy-en-France, Ile de-France	France	72,229,723	-	4,0% ▲
11.	Chopin Airport	Warsaw	Poland	17,737,231	-	12,8% ▲

Source: (www2)

The authors of the Resolution refer to the example of Canadian airports, which concerns the failure to maintain two airports, located in close proximity to Montreal. In order to develop air connections and relieve the port of Dorval, the Canadian authorities decided to build a new port at Mirabel. However, due to protests from trade unions and poor infrastructure, ensuring convenient access to the port, the new airport was closed and, consequently, the Dorval port was extended. In turn, the examples of cities around which international airports are located on the basis of complementarity are both London and New York. In relation to the British capital, you can distinguish such airports as London-Heathrow, London-Standsted, London-Luton,

London City and Gatwick airports. In reference to New York, air traffic is served by John F. Kennedy, La Guardia and Newark. The close location of ports allows for effective handling of air traffic.

5. Conclusions

Based on the Resolution and statistics of the Civil Aviation Office (www3), it can be assumed that there is a need for a new international airport in Poland. There is no physical possibility to expand the architectural infrastructure of the Warsaw port. The Concept of the Central Transport Hub contains very significant information on the plans for the development of the new port, as it was indicated that a significant part of the plans has already been developed in previous years and needs to be updated for the needs of the current investment. The Resolution also referred to various case studies in order to support and justify the new undertaking.

It can be assumed that the Polish air transport market shows a need for a new international airport with a capacity of up to 50 million passengers per year (www4). Ultimately, the infrastructure of the new CTH port is to provide capacity of 100 million passengers a year (Fiedorowicz, Fiedorowicz, 2009) Currently, the aspirations for CTH to be one of the ten largest airports in the world in a decade seem to be very ambitious. The development of CTH should be strongly related to the development of Lot Polish Airlines, especially since the national carrier is ranked second after the Irish low-cost Ryanair carrier in terms of the number of passengers transported in Poland. One of the key issues remains the method of financing the entire project, the costs presented in the CTH Concept are indicative and there is currently no information on securing a certain amount in the budget for the investment objective related to the construction of a new port for Poland.

The success of Solidarity Airport or a new, international airport for Poland depends on the proper, long-term financing of the project, with strong support from stakeholders who work for the development of civil air transport in Poland.

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(www4) <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2015:598:FIN>