

## **Economic Simulation of Flight Routes Which Connect Central European Market with Middle East's**

**S. Szabo<sup>1</sup>, S. Mako<sup>2</sup>, M. Pilat<sup>3</sup>, P. Hanak<sup>4</sup>, A. Tobisova<sup>5</sup>**

<sup>1</sup>*Technical university of Kosice, Faculty of aeronautics, Rampova 7, 04001, Kosice, Slovak Republic, E-mail: [Stanislav.Szabo@tuke.sk](mailto:Stanislav.Szabo@tuke.sk)*

<sup>2</sup>*Technical university of Kosice, Faculty of aeronautics, Rampova 7, 04001, Kosice, Slovak Republic, E-mail: [marek.pilat@tuke.sk](mailto:marek.pilat@tuke.sk)*

<sup>3</sup>*Technical university of Kosice, Faculty of aeronautics, Rampova 7, 04001, Kosice, Slovak Republic, E-mail: [sebastian.mako@tuke.sk](mailto:sebastian.mako@tuke.sk)*

<sup>4</sup>*Technical university of Kosice, Faculty of aeronautics, Rampova 7, 04001, Kosice, Slovak Republic, E-mail: [peter.hanak@tuke.sk](mailto:peter.hanak@tuke.sk)*

<sup>5</sup>*Technical university of Kosice, Faculty of aeronautics, Rampova 7, 04001, Kosice, Slovak Republic, E-mail: [alica.tobisova@tuke.sk](mailto:alica.tobisova@tuke.sk)*

### **Abstract**

Creating new flight routes is a complex process which is preceded by the analysis of the competitive environment. The main purpose of this paper is the use of this economic analysis to point out the possibilities of creating a connection between Bratislava Airport and cities in the Middle East. Demand for this line is particularly noticeable in the Bratislava airport competitors, those being airports in Budapest and Vienna. By using economic analysis, we pointed out new possibilities for air carriers to expand their network lines. We point out the possibility of uniting the flight ticket and transfer in one complex product for the customer. In this article we analyse several possible transfer lines in the given catchment area. In a tough competitive environment, where every customer is important for the company, the complementary product may be a decisive factor that affects the customer's decision about which product they will prefer.

**KEY WORDS:** *Economic simulation, Airline, Central European market, Middle East, Transport*

### **1. Introduction**

The reason for creating the following analysis is the fact that Slovakia does not have its flag carrier and, at the same time, we can see in the given area the increasing demand for transportation to the Middle East. Air transport is a type of business that shows a high level of competition. For this reason, it is difficult for the company to create new connections which would be profitable and attractive for them. Economic analysis plays an important role in this process. At the same time, it creates space for the company to evaluate its future development and avoid mistakes that could lead to economic destabilization. The analysis we created in this article points to the possibility of creating new connections between Bratislava airport and destinations in the Middle East. We also took into consideration the possibility of creating of intermodal transport that would be offered as a complementary product when buying a ticket. Supplying a complementary product to the customer is one of the key factors that can greatly influence the customer's decision about which product they will prefer. Several authors have dealt with the subject and, as an example, the issue can be mentioned Comparing China's urban systems in high-speed railway and airline networks where authors said that the Chinese high-speed railway entered the transportation market in a late stage of 2003, its networks became the world's largest and are currently growing faster than airline networks [1]. Key determinants of airline pricing and air travel demand in China and India: Policy, ownership, and LCC competition where authors dealt with two of the fastest-growing economies, China and India share so many similarities. However, the air transport sector of the two countries exhibits substantial differences even 30 years after deregulation. Private and low-cost airlines became dominant players in the Indian airline market while the state-owned airlines still have a dominant status in the Chinese market [2]. Changes in air transport connectivity of Russian cities in 1990-2015 where authors dealt with changes in air transport connectivity of Russia's territory in the period of 1990-2015 by aggregating of adjacent airports and air hubs in 20 air clusters. The dynamics of air passenger traffic between large cities is considered as an indicator of changes in the territorial structure of the economy and population distribution in the country [3]. Low-Cost Carriers in Oceania, Pacific: Challenges and opportunities where authors said that small Pacific island states face considerable challenges due to their small size and population, geographical isolation, lack of natural resources and limited domestic demand. These factors made it difficult to develop a viable aviation service, an element of a successful tourism economy [4]. Integrated assessment of vehicle-level performance of novel aircraft concepts and subsystem architectures in early design where authors said that future technology-integrated commercial transports are expected to have fuel saving and performance improvements which are beyond the capability of today's conventional aircraft designs. Advanced concepts such as the hybrid wing-body configuration are predicted to have fuel benefits over the conventional tube-and-

wing configuration. Meanwhile, aircraft subsystems are also evolving towards more electric architectures which may achieve fuel saving through more efficient secondary power usage. While vehicle performance over the design mission is an important consideration in the design process, off-design mission performance also influences real-world airline operations [5]. The effects of perceived service quality for customer loyalty in airlines where authors said that tourism makes a major contribution to the global economy. It directly contributed about \$2 trillion to world GDP in 2015 and provided over 105 million jobs globally by the help of development in transportation features [6]. A novel multi-criteria decision data analysis system for energy conservation in civil aviation where authors dealt with air transport growing demand in energy along with continuously rising fuel costs is endangering civil aviation's optimistic outlook, besides, concerns have focused more on addressing aviation's impact on greenhouse gas emissions [7]. The Influence of Purchase Date and Flight Duration over the Dispersion of Airline Ticket Prices where authors said that for many years, the air travel market has been the most regulated sector of the economy. Within the last few years, it has undergone profound change, which is largely a consequence of changes in the law [8]. Subsidies in aviation where authors said that relatively little attention has been paid to the existence of subsidies in aviation. As the sector's importance for economic development is often highlighted, their study seeks to provide a conceptual overview of the various forms of subsidies in aviation, as a contribution to a more holistic understanding of economic interrelationships [9]. Flight delay impact on airfare and flight frequency: A comprehensive assessment where authors presents a comprehensive empirical analysis of flight delay impact on airfare and flight frequency in the US air transportation system. Authors modeled airfare and flight frequency as functions of cost and demand characteristics, competition effects, and flight delays at origin, destination, and intermediate hub airports [10].

## 2. Analysis of Suggested Lines

In our case, a fictional airline is a company that operates flights to the Middle East from the Bratislava airport. This company has been operating on the market for 3 years and operates flights to 6 other destinations. The company focuses on direct flights to popular destinations where it can compete with large companies on the market. The company uses Airbus A319 aircraft, which is also used in pricing. All calculations for this type of aircraft and that are used in this article come directly from the manufacturer. Pricing shows us the potential of price competition, which is supported by the complementary product in the form of transferring the passengers to the final destination. The overall cost and profitability calculation of the connections is supported by a comprehensive cost analysis for the given lines. The calculations for each line are made for 1 rotation.

Table 1  
Suggested lines

Destination	Average competitor price	Our price	Travel time	Stops	Weekly frequency
Baghdad	788,90€	551€	7:55	0	2
Kuwait	649,47€	435€	9:25	0	3
Tel Aviv	335€	337€	3:55	0	2

The Table 1 describes suggested connections to the Middle East. The above destinations and their prices are explained in the table below. Flight time is fixed in this case and the passengers do not need to use any transfer due to the operation of direct flights. The price is for round trip not one-way. The attractiveness of the offered lines is higher compared to its competitors and that is because of shorter flight times and not needing to change planes.

Table 2  
Calculation of available seat kilometres and ACMI

Destination	Block Hours	ASK		ACMI			
		Rotation	Yearly	Aircraft	Crew	Maintenance	Insurance
BGW	2930	726 640	76 297 200	€3 964	€1 117	€5 009	€867
KWI	3528	874 944	136 491 264	€4 694	€1 322	€6 067	€1 027
TLV	2446	606 608	63 087 232	€3 379	€952	€4 387	€739

The Table 2 shows us block hours per year for individual destinations. ASK - available seat kilometres tells us the capacity per rotation and per year. This factor is important because it is used to calculate other variables important for the carrier.

For the ACMI calculation, we used the formula -  $ACMI = Aircraft + Crew + Maintenance + Insurance$ , which tells us how much the cost of these variables contributes to the total cost of the flight.

- BGW Total ACMI – 10 957€
- KWI Total ACMI – 13 110€
- TLV Total ACMI – 9 457€

Table 3

## Calculation of direct operation costs

Destination	DOC		
	Fuel	Overflight	Airport
BGW	€10 995	€2 171	€5 000
KWI	€13 200	€2 614	€5 000
TLV	€9 268	€1 813	€5 000

The Table 3 shows direct operation costs quoted for all three destinations. The formula is used to calculate these costs -  $DOC = Fuel + Overflight + Airport\ fee$

- BGW Total DOC – 18 166€
- KWI Total DOC – 20 814€
- TLV Total DOC – 16 081€

Table 4

## Calculation of Total cost per rotation

Destination	Bus Transfer	Crew Per Diems	Overhead ASK	Additional Insurance	Total cost per rotation	Catering
BGW	€1 932	€175	€2 161	€15 000	€48 391	€1 712
KWI	€1 932	€190	€2 602	-	€38 648	€1 712
TLV	€1 932	€240	€1 804	-	€29 514	€1 712

We determined the bus transfer as the highest possible amount if all passengers needed a transfer. This is because it does not negatively affect indicators such as profit or revenue in our calculations. Crew per diems is an amount determined by the state government and we cannot affect it in any way. Overhead ASKs are calculated overheads for individual lines. We have determined the price for catering as the highest possible, this means that there will be 124 passengers on board. This is because the possible increased cost of catering has not adversely affected revenue or profit.  $Total\ cost\ per\ rotation = ACMI + DOC + bus\ transfer + crew\ per\ diems + overhead\ ASK + additional\ insurance$  (Table 4).

Calculation (Table 5):

- Revenue = Initial ticket price x 124
- Profit/Loss = Revenue - Total cost per rotation - Catering
- Cost per seat = (Total cost per rotation + Catering)/124
- Yield per ASK = Revenue/ ASK per rotation
- Cost per ASK = (Total cost per rotation + Catering)/ASK per rotation
- Operating Margin = Profit/Revenue

Operating profit is calculated for a fully loaded aircraft.

Table 5

## Calculation of economic indicators

Destination	Revenue	Profit/Loss	Cost per Seat	Yield per ASK	Cost per ASK	Operating Margin
BGW	€68 324	€18 221	€404,06	€0,0940	€0,0690	26,67%
KWI	€53 940	€13 580	€325,48	€0,0616	€0,0461	25,18%
TLV	€41 788	€10 562	€251,82	€0,0689	€0,0515	25,28%

## 2.1. Transfer from the Airport

The main objective is to provide a complex product for the customer with a transfer to selected places. The main advantage lies in the onward transfer for a passenger who has the status of a passenger arriving at the Bratislava airport. Upon arrival, a transfer is provided to strategically important cities such as Vienna, Budapest and Brno (Table 6).

Table 6

## Transfer distance and travel time

Arrival	Destination	Distance	Travel time
BTS	VIE	86 km	1:00
BTS	BUD	202 km	2:02
BTS	BRQ	144 km	1:25

The aforementioned destinations are only a few kilometres away from Bratislava airport and the transport does not last more than 2 hours. In some cities, the transfer from airport to the address of the destination takes more than an hour. In this case, the inclusion of an airport transfer covers a huge catchment area and several important cities within a single product.

### 2.1.1. Transfer Market Research

Based on the market survey, we selected several companies that offer the product. The first company is L & Limousine, where we have recalculated the prices for a half occupancy of 49 seats on the bus (this simplified calculation gave us the average price per person for half-occupancy) (Table 7). We chose the conversion based on the prices listed for the entire bus. The advantage is the direct connection from the airport to the airport as well as the flexibility of the schedule based on orders.

Table 7

#### Limousine services

Arrival	Destination	Price per person
BTS	VIE	11€
BTS	BUD	23€
BTS	BRQ	14€

Another very interesting competitor on the market is FLIXBUS. It is noteworthy, however, that in this variant the exact times of departures and arrivals of buses are given. It is often very difficult to schedule the arrival of aircraft with a transfer service. Services provided on board of the line carrier are average (Wi-Fi, Toilet, simple catering and other). Data and prices for one passenger were provided to the public. The FLIXBUS Carrier provides transportation directly from the airport to the airport (Table 8).

Table 8

#### FLIXBUS services

Arrival	Destination	Price per person
BTS	VIE	4,99€
BTS	BUD	26,49€
BTS	BRQ	14,50€

REGIOJET, another interesting competitor on the market, provides transport to Vienna and Budapest, directly to the selected airports. A major drawback is the beginning of the travel from Bratislava, because the customer has to board the bus from Einstein's street or Main Station. This very fact does not give the customer a direct transfer from the airport to the airport and it is a big disadvantage of this product. Airport Brno is similarly accessible only from the Hotel Grand or Main Station. Prices are interesting but because of these minuses the product loses its attractiveness (Table 9).

Table 9

#### Regiojet services

Arrival	Destination	Price per person
BTS	VIE	5€
BTS	BUD	8€
BTS	BRQ (Hotel Grand or Main Station)	7€

Bratislava Airport Taxi, as the main transfer partner of Bratislava Airport, should also be mentioned. As can be concluded from the Table 10, prices are significantly different and Brno is not in their offer despite the fact that it is a strategic catchment area. This company focused on a more attractive airport in Prague.

Table 10

#### Bratislava airport taxi services

Arrival	Destination	Price per person
BTS	VIE	15€/os
BTS	BUD	55€/os
BTS	BRQ	-

## 3. Discussion

The aim of our article was to point out the possibility of offering the passenger an additional product that will facilitate their travel to the destination. Considering the connection of Bratislava with the destinations Brno, Bratislava,

Budapest, the distance between these places is short. In this case, passengers cannot even choose flights directly to the destination because they are expensive or unattractive due to many transfers.

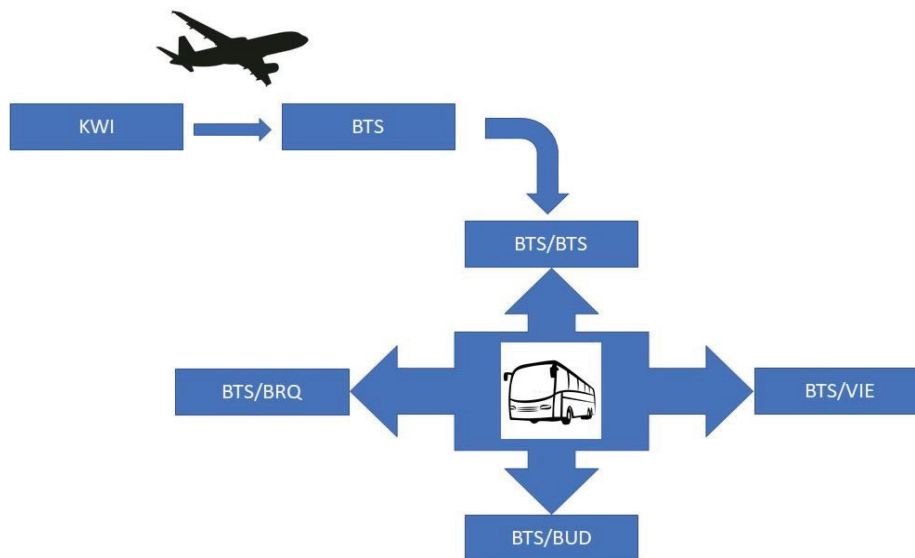


Fig. 1 Transfer from the airport offered when buying a ticket

For example, we have chosen the Kuwait - Bratislava airline which is shown in the picture. Upon arrival, passengers will end their travel in Bratislava or use a complementary product with a transfer to selected locations (Vienna, Budapest and Brno). This type of complementary service offered with flight ticket to the passenger will facilitate travel to the destination. Passengers would have the option of picking up additional transportation to the places mentioned above. The carrier would know how many passengers will need additional transport. At the same time, this product appeals to the service offered by carriers and enhances its competitive ability on the market. By computing the costs and revenues of these lines, we have clearly demonstrated that, in the event of the introducing these lines on the market, the probability of implementation of lines mentioned above can be very high. At the same time, in this article, we point to a possible improvement of the services offered by air carriers. Mainly the opportunity for the customers to use transfer to the nearest cities after arriving to the final destination. This simplification of transport would make it particularly attractive for the lines flying to airports that cover multiple catchment areas. By analysing the input data and by analysing the suggested lines, we have confirmed both hypotheses. From an economic point of view, it is profitable for the company to operate direct flights to destinations mentioned above. In order to increase the attractiveness of these lines, it is also beneficial for the company to provide a transfer service that offers customers better connections to the destination. Financially, this additional service is not demanding for the carrier that much so that they will not be able to profitably operate our suggested lines.

#### 4. Conclusion

An economic analysis of the flight routes that connect the Central European market with Middle East's defines possible vacant market places that remain unused. Looking closer on airlines flying to Baghdad, Kuwait and Tel-Aviv destinations, we see that these lines are popular among customers and almost always fully occupied. Competition in the catchment area of the Bratislava, Vienna and Budapest airports is high, but the distance between these airports is minimal. At the same time, Bratislava Airport cannot compete with the other two mentioned airports. In many cities the passenger must use some kind of transport from the airport to the final destination and that sometimes takes more than an hour. Because of this we created a product that deals with passenger's transport in the catchment area. The advantage of this complementary product is that the customer does not have to arrange his travel to the final destination after arriving at the airport, but he will be provided the transport to the aforementioned places by the carrier. Customer does not have to waste time waiting for transfer. By analysing the input data, we have confirmed both hypotheses and answered the question whether it is profitable for the company to offer transfers that provide the customer with the opportunity of better connection to the destinations. At the same time, this product is more attractive on the market. This analysis can be used in the future in the process of creating new routes of Slovak flag carrier.

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