Dynamics of Air Passenger Transportation in Eastern Romania

Dan Păuna[1], Cornelia Tureac[2]

Abstract: The concept of an air route mile is, of course, entirely different from that of a road or rail route mile. An air route is a direct service between two cities. The too-rapid development of the air route system must inevitably result in an average intensity of operations on the route, and this means the frequencies are low or high, or the airplanes used are profitable or unprofitable. The purpose of this paper is to emphasize air passenger dynamics in Romania and to calculate specific indicators regarding this calculation for the airports in eastern Romania in 2011t., this, because the air passenger featurea indicator passenger – kilometer, starting with 2009 no longer calculate for aviation and shipping.

Keywords: lower airspace; upper airspace; flight level; traffic on airports in Romania; passenger air traffic

JEL Classification: L93; R12

1. Airways in Romania

Romania, by its geographical position, by its traditions and its open policy of good neighbourliness, having an area of over 237.5 thousand square miles and about 23 million inhabitants, is, de facto, part of the European countries' family and it has irreversibly started the integration in the European and Euro-Atlantic structures.

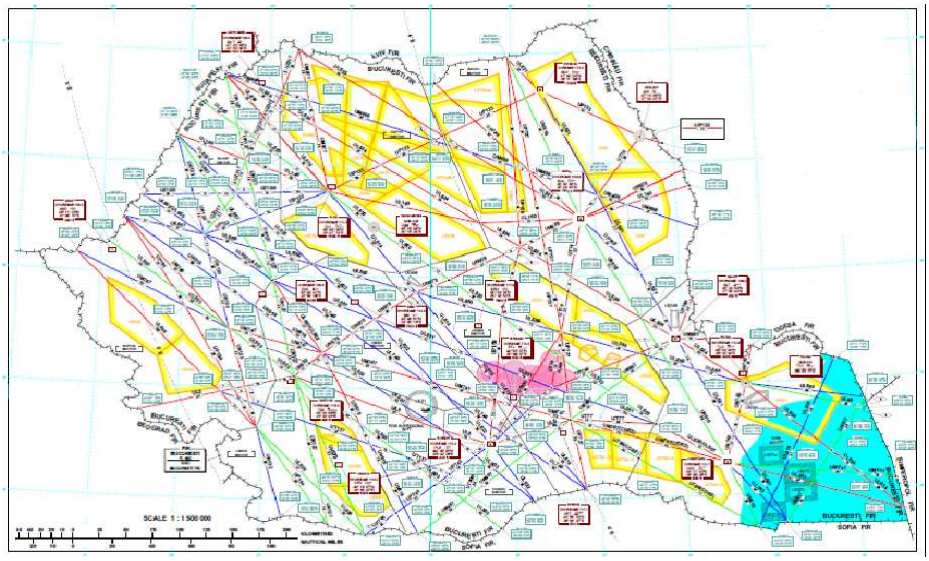
Situated on the transit passage between Western Europe and the Middle East, being in itself a regional force, Romania, once it became independent in the second half of the XIXth century, has started to develop the means of transportation by investing resources, talent and hard work in creating infrastructure of the highest technological level at the time (Fistung, 2007)

[1]Senior Lecturer, PhD, Danubius University of Galati, Faculty of Economic Sciences, Romania, Address: 3 Galati Blvd, 800654 Galati, Romania, Tel: +40372 361 102, Fax: +40372 361 290, e-mail: paunadan@univ-danubius.ro.

[2] Associate Professor, PhD, Danubius University of Galati, Faculty of Economic Sciences, Romania, Address: 3 Galati Blvd, 800654 Galati, Romania, Tel: +40372 361 102, Fax: +40372 361 290, Corresponding author: tureaccornelia@univ-danubius.ro.

The potential offered by its natural resources – bordering on the Black Sea and being crossed on a distance of 1.075 km by the Danube River, the most important waterway in Europe – has provided Romania a favorable strategic position in the confluence area of transport-generating poles in Europe, Balcans and the Middle East. By developing land transport infrastructure, Romania has become a connecting point between the Baltic and northern countries and the geographical area of countries bordering on the Black Sea. (Muscalu, 2006)

Changes in former Iugoslavia and former USSR have created a complete reorganization of the traditional transport pattern in the area and have also led to capitalizing on Romania's transport infrastructure and it's favorable geographical position. Romania possesses an infrastructure network (roads, railways, waterways, navigable canals, sea and river ports, airports, airways) which connects all places with the national transport network and with the international transport systems.Concentrating economical activity in relatively small areas means that travel time is short for the Romanian air transportation. There are 3 categories of airways in Romania (see map 1)



Map 1. Airways in Romania

Source: Information provided by the Romanian Civilian Aeronautic Authority (www.caa.ro/navigatie-aeriana)

- Airways for flights towards east (green)
- Airways for flights towards west (blue)

- Airways for bidirectional flights (red)

All these airways can be found on maps for lower[1] and upper airspace flights on both internal airways (10 km wide) and international airways (20 km wide).

2. Method of Analysis

The following research reports on air traffic[2] flow for passengers in the south-east and north-east of Romania from the 28th of March 2011 to the 23rd of October 2011. Traffic flow can be accurately described (due to the lack of statistics) only in connection with the origin and the destination of passengers using air services in this area.

The analysis of the total available seat miles[3] on the eastern routes of Romania has been carried out by studying timetables published by the airlines operating on airports in the developing areas in eastern Romania (Bacău, Iași, Suceava, Mihail Kogălniceanu and Tulcea).

This represents the best method of describing passengers' air traffic flow, since:

- first, it is impossible to estimate correctly, from a statistical point of view, the number of available seats on internal or international service sectors operated by Romanian or foreign airlines;

- second, round-trip traffic at peak times is to be considered;

- third, the connection between the places operated and the traffic flow depends entirely on the price the tickets are sold for and this varies considerably depending on the route. (Wheatcroft, 1954) Therefore, an analysis of passenger transport capacity of airlines based on published timetables will provide a useful description of air traffic pattern in eastern Romania.

[1] lower airspace (lower space) and upper airspace (top space) are separated from flight level(FL) 285.The upper is between FL 285 and FL 660, and the lower is between standard height of 900m and FL 285. A Flight Level (FL) is a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the International standard pressure datum of 1013.25 hPa (29.92 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

[2] according to flight schedule displays at airports that have sat in the study.

[3] passenger capacity derived by multiplying the number of available seats flying mileage.

3. The Route Pattern

The extent of transport routes in Romania used for this research includes the length of transport ways according to their type and taking into account data in the statistical database in 2010 and data provided by the Romanian Aeronautic Authority.

Offering other means of transportation, others than air transport, is rather connected to the area than to the number of population and railway, road or naval networks. (Fistung 2007) We can also notice from the calculation that the total number of these ways of transport is over six times bigger. In (table 1) there are the compared numbers of transport routes in Romania according to the two developing areas in the east side.

Table 1. Length of transport routes in Romania and in the developing areas

	România	North-eastern area	South-eastern area
Population	21504442	3.836.875	2.932.124
Area	238 391 km²	30.949 km²	35.770 km²
Road transport route length (km)	81693	24648	10966
Density on 100 km²	34,3	33,7	30,7
Railway transport route length (km)	10785	1619	1749
Internal river route length (km)	1.731	-	170
Total	94209	26267	12885
Airway route length (km)		14315	3717
Total		108524	42869
Airports (number)	17	3	2

Source: Processed by author according to the information provided by Romania's statistical database in 2010 and the Romanian Civilian Aeronautic Authority.

We can notice that the density of the routes in the east part of Romania compared to the same indicator at global level does not show significant differences. In regard to this conclusion we are able to analyze in this research whether passenger air traffic will compete with the other two means of transportation - road and railway- on both short and medium distances.

In (table 2), we can see the number of seats made available by the airlines operating in eastern Romania before and after joining the EU, that is in 2011 and 2006.

Table 2. Length of air transport routes in eastern developing areas from the 28th of March 2011 to the 23rd of October 2011 and the same period in 2006

2011							
Statistical data Areas	Airports	Length of airways (km)			Weekly available seats		
		Airways towards east	Airways towards west	Bidirectional airways	One way	Return	Round trip
North-East	Bacău	734	1300	1683	500	500	2432
	Iași				708	640	550
	Suceava				500	500	600
South-East	Mihail Kogălniceanu				1044	1044	2146
	Tulcea				Only charter flights		
2006							
Statistical data Areas	Airports	Length of airways (km)			Weekly available seats		
		Airways towards east	Airways towards west	Bidirectional airways	One way	Return	Round trip
North-East	Bacău	734	1300	1683	302	302	662
	Iași				412	380	250
	Suceava				120	120	250
South-East	Mihail Kogălniceanu				480	480	884
	Tulcea				52	52	-

Source: processed by author according to timetables of airlines operating on airports in the east of Romania and data provided by the Romanian Civilian Aeronautic Authority

Comparing the number of seats available for the eastern part of Romania between the two periods, that is between joining the EU and after that time, we can't help but noticing a process of growth. The explanation is the number of aircraft which served these areas – once Romania has joined the EU, air travel on the Union's territory has undergone some changes, offering consumers multiple choices. Open - skies deregulation has introduced competition on routes which used to be well-protected by the national airlines.

Airlines, stimulated by competition, offer products and services that are competitive in regard to quality and price (M. Muscalu 2007). If before joining the EU there were only national airlines, nowadays there are also a number of well-known airlines, both national (Malev, Austrian Airlines) and low cost (Air Berlin).

The spread of air routes in Romania is not based on the number of cities serviced, but on the fact that airlines wished to offer direct flights between as many cities as possible, internally as well as internationally, due to the massive shift of work force towards countries such as Italy, Spain or UK.
Analyzing (table 2) we can draw the conclusion that:

- The only important routes towards the eastern part of Romania are those servicing Mihail Kogălniceanu Airport if we take into consideration the weekly capacity of passenger transportation. This sector is unique in Romania thanks to the number of airlines operating there since beaches along the Black Sea coast are attractive in the summer.

- The other routes servicing the airports in the north-east appeal either to tourists or people working in other countries (this area has a high rate of unemployment).

- Tulcea Airport is a destination towards the Danube Delta and it is serviced only by charter flights

In (table 3) two reference indicators for air transport are calculated - these are seats/kilometer and seats-kilometers. This calculation is made on the basis of the timetable of each airline operating on an airport in eastern Romania and the type of aircraft provided.

Table 3. Seats/kilometer and seats - kilometers in eastern developing areas from the 28th of March 2011 to the 23rd of October 2011 (weekly research)

Statistical data / Areas	Seats/kilometer			Seats-kilometer (ASK)		
	Airways towards east	Airways towards west	Bidirectional airways	Airways towards east	Airways towards west	Bidirectional airways
East Romania	3,65	2,06	3,40	1970056	3489200	9640224
	Average 3,03 seats/kilometer			Average 5033160 seats - kilometers		
*For Air France in Europe in May 2009 the index was 992.000.000 Available seat-kilometers (*ASK*), weekly (www.airfranceklm-finance.com/financial-publications) * For Air Berlin in Europe in May 2009 the index was 938.148.148 Available seat-kilometers (*ASK*), weekly (http://www.airberlin-09.sw-gb.de.)						

Source: Processed by the main author

If we analyze the data used in (table 3), we can make the following assumptions:

- Traffic in Romania and the eastern airports is relatively low compared to the average European traffic;

- An aircraft profitability must be based on efficacy in passenger transportation on short distances and this depends on the ability to operate while having all seats booked;

- Romanian traffic is influenced by seasonal variation and this aspect adds significance to passenger transportation according to the number of passengers;

- After 2007, when the European Union was extended, air network over–extended in Romania, and this may be a primary cause of some of the economic problems of the airlines in the eastern region of Romania, such as: the deregulation of air space, which means there are more air transport companies LCC (low cost companies) which operate, or the frequency which is very important to business passengers because the speed advantage in air transport is of interest to them only if there are services available to get them to their destination.

3. Conclusion

The conclusion of route pattern calculation is that there is a tendency of making airways more crowded especially for medium courier flights, which doubles the available seats. (round trip) Short courier flights are in competition with the road and railway transport because the number of available seats has not very much increased (One way and Return).
Another conclusion refering to this has inevitable results in the average of flight density, which is relatively low. As a consequence, either the system of the other routes attracts the population willing to travel, or the aircraft used do not have the best economical profitability.
Today, air traffic may be affected by seasonal or random phenomena disturbing as form:

- The economic recession wich has greatly affected the air transport sector
- The effects of the pandemic influenza

Being wisely used, Europe's transport system is modernized and transformed in a trans-european transport network which links various means of transport. Therefore, passengers can travel and goods can be easily carried on long distances by air, sea, land and railway on different sections of their trip, and they are easily moved from one way of transport to the other.
The European Union's policy regarding transportation aims at the improvement of transport links between its member countries and between the EU and its neighbours in the east, most of them being determined to become members in the years to come.

4. References

Fistung, Daniel (2007). *Sustainable transport a viable prospect of development*. Bucharest: Romanian Academy, National Institute of Economic Research, Center for Business and Industry Services.

Kane, Robert (1999). *Air Transportation*. Chicago: Kendall/Hunt Publishing Company.

Muscalu, M. (coord.). (2006*). Dezvoltarea durabilă a industriei prelucrătoare, a sectorului energetic și a transporturilor din România (analiză diagnostic)/ Sustainable development of the manufacturing industry, energy and transport sector in Romania (diagnosis analysis).* Bucharest: Academia Română, Centrul de Economia Industriei și Serviciilor.

Muscalu M. (coord.). (2007). *Interdependențe dintre dezvoltarea durabilă a industriei prelucrătoare, energeticii și transportului din România și țările Uniunii Europene Bucureşti/Interdependence of sustainable development of manufacturing industry, energy and transport in Romania and the EU countries*. Bucharest: Academia Română, Centrul de Economia Industriei și Serviciilor.

Shaw, Stephen (2007). *Airline Marketing and Management.* 6th edition. London: Ashgate Pub Co.

Wheatcroft, Stephen (1954). *The Economics of European Air Transport*. Cambridge, Massachusetts: Harvard University Press.

(2012). *Romanian statistical yearbook 2010*, Chapter 17, Transport, Post and Telecommunications, INS, Bucharest.

http:// www.airfranceklm-finance.com/financial-publications/ accessed on May 2009.

http://www.airberlin-09.sw-gb.de/ fileadmin/ PDF/ downloadcenter_en / AB_E_web.pdf / accessed on May 2009.

http:// www.caa.ro/navigatie-aeriana/atm.html/accessed on octomber 2010.