Sulina and Danube-Black Sea Channels: Competitors or Allies on Cargo Transport in South-Eastern Europe?

Ionica Soare[1], Iulian Adrian Şorcaru[2]

Abstract: The two river channels which connect the Black Sea to the inland Romanian area, have constituted since the beginning of their building two very important transport routes for the cargo and passenger traffic (Sulina) that have connected Black Sea to the internal ports of Romania, thus representing ”transport highways” of the Romanian economy. The present study tries to present the chronological evolution of these two shipping routes, regarding their importance to the cargo traffic, as well as the financial policy imposed by the administration of these channels. We will present and analyze retrospectively the major elements regarding the administration of these channels, a comparative analysis of the role of these two channels in the river cargo transport, consequently trying to predict a future evolution of these two river communication routes.

Keywords: river channels; draught; cargo transport; river traffic; merchandise

JEL Classification: R41; R42

1. Methodology

This article presents the results of a research on past and future economic potential of the two maritime traffic channels. The research was conducted throughout the spring of 2015 and included field and bibliographic research from different sources of information. We identified specific and particular conditions of the two channels: geographical, economic and transport of both maritime and communication routes. On this basis, we analyzed the transport activity and economic implications arising after 1989. We also focused on comparing and analyzing the output of transport of the two channels, and the income resulted from the freight traffic depending on the draught of the cargo ships crossing the two channels.

An important element in the economic development of the two channels was the fiscal policy adopted after 1989, which artificially conditioned freight traffic, acting

[1] Senior Lecturer, PhD, Faculty of Economics and Business Administration, “Dunarea de Jos” University of Galati, Romania, Address: 59-61 Nicolae Bălcescu Blvd, Tel.:+40336130242, fax: +40336 130 293, E-mail: iulian.sorcaru@ugal.ro.

[2] Senior Lecturer, PhD, Faculty of Economics and Business Administration, “Dunarea de Jos” University of Galati, Romania, Address: 59-61 Nicolae Bălcescu Blvd, Tel.:+40336130242, fax: +40336 130 293, Corresponding author: iulian.sorcaru@ugal.ro.

as a restrictive element. The conclusions presented in the end offer a way of the future development of these two maritime channels and it also support the need for integration in the European inland waterway axis Rhine-Main-Danube.

2. Introduction

After different local and foreign initiatives have been circulating more than a century ago, regarding the building of a channel that will cross Dobrogea from Cernavoda to Constanta, as well as adapting Danube's branch Sulina to the river traffic, studies drawn up between 1972-1973 have emphasized the necessity of developing new harbor facilities, as well as the opportunity of developing "The Danube-Black Sea navigation system" that will contribute to the connection of the harbor facilities with the river traffic system (Sobaru et al., 1998, pp. 129-130). The work on the Danube-Black Sea channel in a new and modern conception, mainly on a different route (crossing the Dobrogean Plateau, en route to Basarabi-Straja-Cumpăna-Agigea), has begun in 1973 at The Institute of Auto, Naval, Aerial Transports, Projecting department (I.P.A.N.A.T) from the Ministry of Transport, the main designer of the channel, the institute benefitting at the same time from the collaboration of other 38 institutes and companies of such profile from the country (Diana et al., 1998, p. 71). Danube-Black Sea Channel and its connecting developments have been completed between 1976-1984, being assigned to a building company, especially designed for this purpose, named Station Channel Danube-Black Sea (Sobaru et al. 1998, 130).

For its building, projecting and optimal route, was taken into account the geographical characteristics and also the economic and strategic implications, of the presence of this channel in the South-Eastern part of the country. In order to understand the main particularities of these two channels we have reunited in Table 1 the defining elements of these two constructions. First of all, these elements are important for a series of aspects concerning the traffic of merchandise reported to their gauge. At first glance we can observe the geographical and economical uniqueness of these two channels, which have marked their functionality in time.

3. The Merchandise Traffic -Vector of Economic Evolution for Both Channels

By comparing the statistical data regarding the cargo traffic on the Danube-Black Sea Channel during 1985-2001, which was way below the level of maximum traffic capacity (almost 100 million tones/year) for which it was designed; the channel is placed in the league of the most performing constructions of this kind (sixth class according to the norms adopted by the European Conference of the Transport Ministers). The statistics mentioned above indicates a more accentuated

development of the river traffic until 1989 on both, Danube-Black Sea Channel, and Sulina Channel, an increase of the capacity of transport with seagoing vessels, caused by the economic development of the country.

After 1990, the decrease of the national economic production, the embargo imposed to Yugoslavia by UN (lifted much later), the stranding of the Rostock vessel on Sulina channel, have led to the decrease of the river traffic, according to the total cargo traffic on the two channels, between 1985-2000 mentioned in the above graph, not exceeding the previous values of the year 1989.

The advantages of the river traffic regarding the national and foreign traffic on Sulina channel haven't been lost once the Danube-Black Sea Channel was built. In order to understand the breach produced in 1988 regarding the river traffic, by changing the balance towards the Danube-Black Sea channel, in the detriment to the other one, it is necessary to start the analysis by presenting the situation of the cargo traffic on Sulina channel, (entries and exits) previous to 1984 until 2000, as well as the one regarding the Danube-Black Sea Channel with reference to import, export and international coasting.

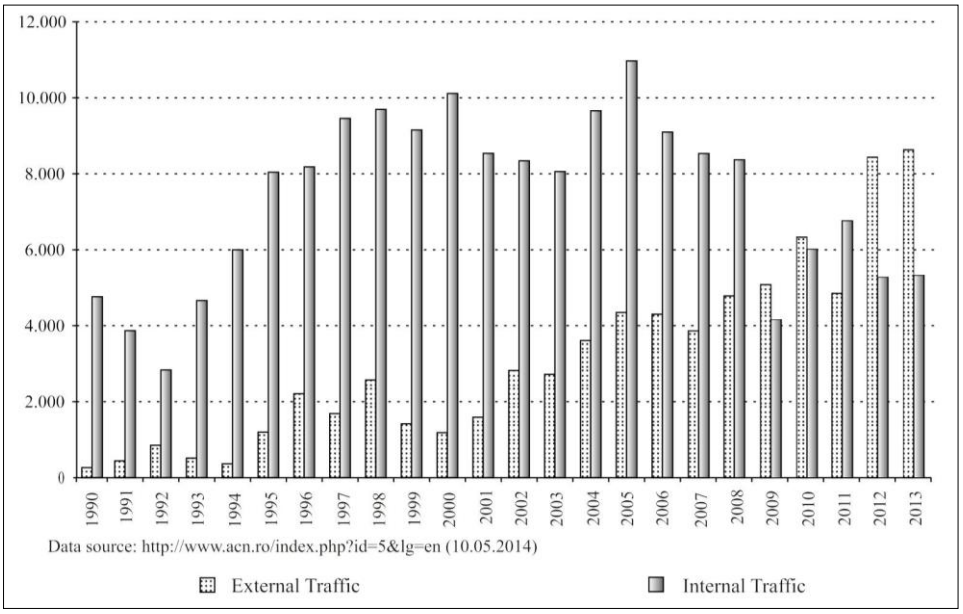

Figure 1. Merchandise Traffic (thousands tons) On Danube-Black Sea Channel During 1990-2013

Table 1. Technical and Geographical Characteristics of Sulina and Black Sea Channels

Technical-geographical characteristics	Danube-Black Sea Channel	Sulina Channel
Length of the shipping area	64.4km	Km 62.97-0.00
Width of the shipping channel	Minimum – 90m in range; 120m in curbs	Minimum - 60m
Capacity of the vessel	Convoy – 6 barges X3000 tons; length - 296m ; width-22.80 Vessel with maximum draught of 6.0m	Convoy - 2 barges X3000 tons- length 150m; width-22m Vessel with maximum draught of 7m
Water depth	7.0m – at normal level of exploitation	7.32m at the entry of Sulina
Mininal bending compass	3,000 m	1,000 m

Source: The Statistic YearBook of Romania

After 1988, analyzing the traffic on Danube, we observe that Sulina Channel was surpassed by Danube-Black Sea Channel, the amount of the merchandise being double for the last one: almost 12 thousand tons of merchandise have been transported on Danube-Black Sea Channel and only 6 thousand tons on Sulina Channel. A sudden decrease of the import on Sulina Channel is registered, thus maintaining the export at the same parameters, as in 1977-1988, and an increase of the import on Danube-Black Sea Channel, presenting values double than the export. How can this be explained? The highest values of the cargo traffic on Sulina channel (between 3,000 and 11,000 tons) registered between 1975-1989 from the time when the economy was planned, and the export was double than the import. The largest share belonged to the upstream traffic due to the transportation of raw materials, while downstream, was the transportation of lower volume industrial products. The increase recorded in 1975 corresponded, by the information offered by Grigor P. Pop in "Romania – The Geography of Traffic" (Pop, 1984, pp. 120-121), to the first stage of commissioning, in June 1974, the new ore port of Galaţi (located at 156 km) for the supply with iron ore and coke of the Steel Plant, to the commissioning of many basins around the harbor of Tulcea, especially for berthing ships that would bring bauxite ore and ferro-alloys for the local industry. Moreover, Grigor P. Pop mentioned that the prevailing exports consisted in oil products, non-ferrous metallurgy and wood.

4. The Import-Export Dynamics on the Two Channels and the Economic Implications

Following the structure of the goods transported on the Danube-Black Sea Channel, we noticed that the export is mainly based on cement, rolled products and grain while the import consisted in iron ore, coal and non-ferrous ores (mainly bauxite). The commodities imported via the Danube-Black Sea Channel, having the highest value,

are in fact those constituting the raw materials for the plants in Galati and Tulcea. Thus, one can easily deduce a freight traffic on the Danube-Black Sea Channel, sustained by SIDEX Galaţi (60-80% of the domestic traffic) and the alumina plant in Tulcea (10-15% from 1994). An additional proof, regarding the conveyance of freight traffic on the Danube-Black Sea Channel towards the metallurgical plants of Galati and Tulcea, is the amount of merchandise entered on Sulina Channel, the one unloaded in the ports of Galati and Tulcea, the one imported on the Danube-Black Sea Channel, as well as the identification of the countries providing raw materials by counting those countries whose vessels have entered the Sulina Channel. The year 1998 is the most pertinent for analysis considering that, in this period, was the largest freight traffic on both channels until 1990; the total freight traffic on Sulina channel was of 2,983.8 thousand tons, batched on 182 ships under the flag of more than 40 countries, while on the Danube-Black Sea Channel, were transported 12.265 million tons. The countries whose vessels entered the Sulina channel are grouped according to the traffic of goods: Malta (15.0%), Portugal (5.2%), Azerbaijan (35.2%), Syria (18%), Russia (8.5%), Turkey (3.2%) etc. The countries having traffic of less than 3% were reunited in the group "other countries". Romania recorded a traffic of less than 0.3% (14,200 tons) (Annuaire statistique de la Commission du Danube pour 1998/Statistical Yearbook of the Danube Commission for 1998)

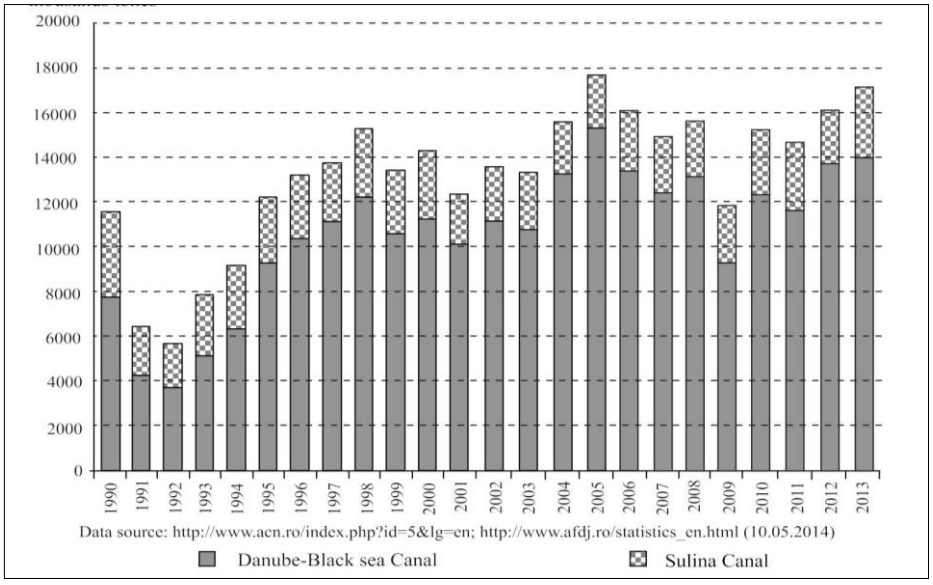

Figure 2. Traffic of Goods (thousands tons) On the Danube-Black Sea Channel and Sulina Channel during 1990 – 2013

Out of the group of countries enlisted above, are missing those considered the largest suppliers of raw materials for the plants of Galaţi and Tulcea. On Sulina Channel entered ships carrying 571,000 tons of cargo, while in Galati Harbor, 8.29 million tons of freight have been unloaded, and in Tulcea Harbor 584,000 tons arrived. Consequently, the quantity of the cargo discharged in the two ports exceeds considerably the one entered on the Sulina Channel and slightly the import via the Danube-Black Sea Channel (7,867 thousand tons).

It is obvious that the characteristics of Danube-Black Sea Channel offers, compared to Sulina channel, obvious advantages for operational traffic, given the stability of the route, the bed depth and the reduced speed of the water flow, the reason why the thrust is much lower compared to other methods of propulsion on the Danube. For the domestic traffic, the transportation of bulk goods is made especially, in convoys of barges of 10-12 thousand tons each, between Constanta harbor and the industrial companies, especially Galati steel plant and the Tulcea alumina plant.

We can explain the reduction in freight traffic through Sulina channel especially after 1990, due to the navigation conditions at the mouth of Sulina and to the reduced radius bends upstream the channel (in Tulcea and Pisica). In the mid-twentieth century, it seemed that there were no problems regarding the ships which navigated the Sulina channel or docking in the Constanţa harbor due to their size. Semenescu M., in his work "Danube - River of Economic Importance", specifies that Constanta port was used during 1953-1955 at a rate of 66% by vessels with a draught up to 7m (Semenescu 1956, pp. 50-51). Most of the ships that regularly frequented the Mediterranean ports had a draught of about 7 m and about 70% of the global fleet are vessels with a draught up to 7 m. It is true that when the depths over the Sulina bar were lower than the draught of the ships about to enter the Danube, the operation was done in the basin (water surface outside the mouth of Sulina, to the north, where transshipment operations are done or ships are in hold). But still there were doubts about explaining the reduced traffic even from the planned national economy period, and since that time were proposals in order to increase the depth of the Sulina branch mouth up to 7.50 and even to 8m as compared to 7.32 as it was initially calibrated (Semenescu, 1956, p. 52). Large-scale works were thus necessary on the entire maritime Danube route by providing a waterway with a 10 m depth.

It is possible that opening the Danube-Black Sea Channel and South Constanţa port should not be a response to the technical progress in shipbuilding, which is fully consistent with the requirements of the global economy. High capacity modern ships from the entire maritime fleet world can come alongside with no particular difficulty to the new port in Constanţa.

5. Taxation – A "Conditioning" Element for Both Channels Evolution

It seems that the policy of the customs duties is not appropriate for the Sulina channel traffic, the charges for the small capacity vessels are very high and therefore Constanţa port is preferred. Also, lightening navigation on the Sulina Channel is prohibited. This should be added to those reported by Chiriac Avădanei, that connecting the Danube river to the Constanta port not only shortens the route by about 400 km, but can also continue the river transport directly by sea, with specialized ships, of a very high capacity that unlike the small and medium ships, have a much lower cost of transport. (Sobaru et al., 1998, p. 143).

Table 2. Cargo traffic (thousand tons) on Danube, Sulina Channel, Danube-Black Sea Channel in 1998

Danube (exits, entries, coasting, transit) In Romanian Section			**Danube and Black Sea Channel (National and International)**	**Sulina Channel (Entries and Exits)**
15,391 of which:			**12,265**	**2,983.8**
At The Board Of Inland Vessels	At The Board Of Seagoing Vessels	Completely In Transit		
12,366	1,231	1,794		

Source: The statistic Year Book of Romania

The author points out that the total cost of transport, especially for mass goods, the component with the most important share is charged for sea freight; this freight can even double for vessels of small or medium capacity, as compared to the specialized high capacity vessels.

Following these considerations, since 2001, a growth of the total freight traffic was foreseen on the Danube-Black Sea Channel to 24 million tons/year, including the international one. Since the planned economy period, there was a forecast, that in 1990, the transport volume on the channel would reach almost 55 million tons, while in 2000 it was expected to reach 75 million tons (Berziris, 1988, p. 58). Unfortunately, in 2001, it went up to only 10 million tons. Currently, this channel also takes over a part of the freight transported on the Sulina Channel and on the Cernavoda - Constanţa railway. Before opening the Danube-Black Sea Channel, it was expected that savings will be made, as compared to the rail transport, of 1.1 billion (Cojocaru 1983, p. 148).

Table 3. Sea Routes Distances

Sea line	Normal sea route (km)	Rhine-Main-Danube Route (km)	Danube-Elba Route (km)	Danube-Odra Route (km)
Constanţa - Rotterdam	6,163	3,748	-	-
Constanţa - Hamburg	6,673	-	3,148	-
Constanţa - Szczezecin	7,167	-	-	2,848
Odessa - Rotterdam	6,482	3,785	-	-
Odessa - Hamburg	6,991	-	3,185	-
Odessa - Szczezecin	7,486	-	-	2,885
Alexandria - Rotterdam	5,887	5,470	-	-
Alexandria - Hamburg	6,356	-	4,870	-
Alexandria - Szczezecin	6,891	-	-	4,570

Source: The statistic YearBook of Romania

6. Conclusions

Being a link to the unitary navigation system, The Danube-Black Sea channel offered a new orientation to the economy of transports from our country, completing the Trans-European Through fare of Danube-Rhine Navigation and transforming Constanţa harbor from Romania's main harbor into one of Central Europe's most important harbors, mainly concerning the economic relations with Asian countries.

The two channels connect the European network of inland waterway with other extra-European systems of waterways. Rhine-Main-Danube channel ensures a direct navigable link from east to west along Europe, connecting the main harbors from Rhine with the ones from Danube, and the cargo brought through the river inlets of Danube and Black Sea channel, can reach all the way to Rotterdam and other harbors from the North Sea. Through this channel the distance between Galati and Rotterdam has reduced from 6,500 km on the sea route to only 3,600 km.

If Danube, Elba and Odra would have been linked through a system of channels, as it was designed by the Czech and Slovak engineers, a direct communication between Black Sea with Hamburg and Szczezecin would have been achieved; the distance between Galaţi-Hamburg would have reduced from 7,000 km on sea route to 3,000 km on Danube-Elba route and the distance between Galati- Szczezecin from 7,500 km on sea route to 2,700 km on Danube-Elba route (Semenescu, 1956, p. 39).

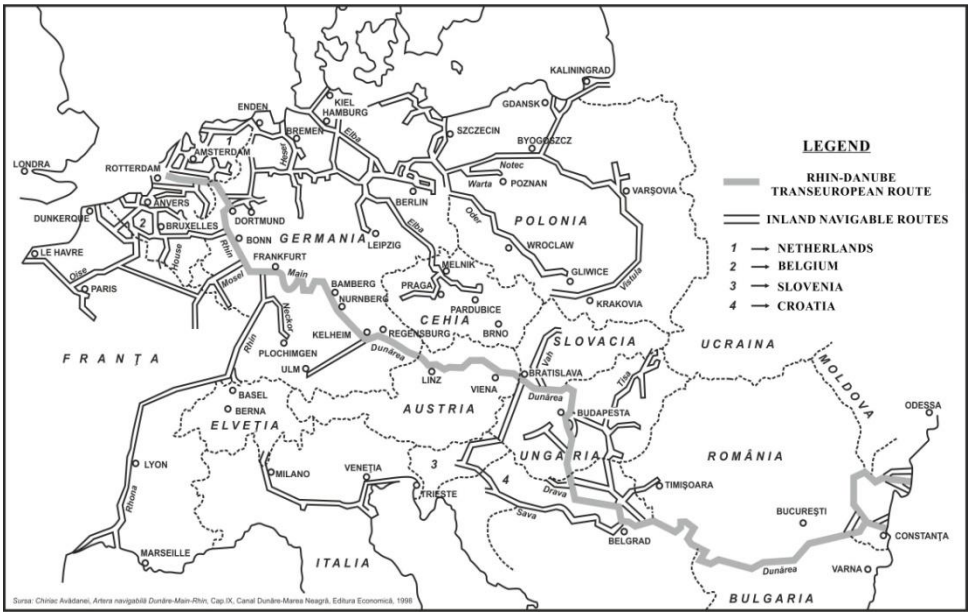

Figure 3. The navigation system North Sea – Rhine – Danube – Black Sea

Source: Adapted after (Avădanei, 1998)

Respecting all the projects drawn up till now, would have led to the connection of the Danube harbors with the river and sea harbors from all Europe, connections that would have reduced the distance of cargo transport from Eastern Europe and Orient to Western Europe. From the facts presented up to now anyone can wonder if the Danube-Black Sea Channel will only overtake or will replace the cargo traffic from Sulina channel. We should not forget that during the inter-war period, when the interest for improving the communication ways was increasing significantly, the Ministry of Public Works and Communication began some preliminary studies en route to Carasu Valley, in order to build a channel and drew the attention that this constitutes "*a solution for sea side exit, that will double the one from rivers mouth, not replacing it"* (Diana et al., 1998, p. 73). It is very difficult to pronounce upon this matter, only time and history will decide. For the moment it remains an open story.

7. References

Baltălungă, A.A., (2008). *România-oraşele porturi dunărene-Geografie umană şi economică/Romania Danube port cities - Human and Economic Geography*. Bucharest.

Baltălungă, A.A., Dumitrescu, D. (2008). The Role of the Danube River as main waterway of Central and South Eastern Europe. Geopolitical and economic Aspects. *Revista Română de Geografie Politică/Romanian Journal of Political Geography*, year X, no.1, Oradea.

Beziris, A. (1988). *Transportul maritim/Maritime transport.* Bucharest: EdituraTehnică.

Cojocaru, I. (1983). *Al patrulea braţ al Dunării/The fourth arm of the Danube*. Bucharest: Editura Militara.

Costachie, S., Soare, I., Baltălungă, A.A., Dumitrescu, D. (2011). The Sulina and Danube-Black Sea Canals: Geopolitical Vectors with Role in Accessing the Pan-European Danube Transport Corridor, in Recent Research in Tourism and Economic Development. *Proceedings of the 1st International Conference on Tourism and Economic Development* (TED´11), University Center Drobeta Turnu Severin.

Diana, A.M., Paşca, C. (1998). *Romanian projects of developing a seaside route between Danube and Black Sea, according to Dobrogei Directory*. New Series, Year IV, No. 1, Constanta.

Matei, E., Stăncioiu, A.F., Pârgaru, I., Manea, G., Vlădoi, A.D., (2011). *The Romania Ports on the Danube Valley-An Emergent Tourism Destination, in Recent Research in Tourism and Economic Development, Proceedings of the 1st International Conference on Tourism and Economic Development (TED´11)*. University Center Drobeta Turnu Severin.

Pop, G. (1984). *Romania - The Geography of Traffic*. Bucharest: The Geographical Institute of the Romanian Academy of Sciences.

Semenescu, M. (1956). *Dunărea - fluviu de mare importanţă economică/The Danube –river of great economic importance.* Bucharest.

Soare, Ionica, (2004). *Spaţiul dunărean fluvio-maritim. Studiu de geografie umană şi economica*, Galaţi: N'ERGO.

Sobaru, A., Năstase, G., Avădanei, C. (1998). *Seaside route Danube-Main-Rhin*. Bucharest: Editura Economica.

Stoian, M. (1983). *River of work and stability, see The symbols of the blue magistral.* Bucharest: UNDEEE.

*** *Commission du Danube, 2000: Annuaire statistique de la Commission du Danube pour 1998, Budapest/Danube Commission, 2000 Statistical Yearbook of the Danube Commission for 1998, Budapest.*

*** *Danube Commission, 1988: Recommendations regarding the establishment of the gauge of the mid channel, of other hidro-technical constructions, and other constructions on the Danube.*

*** *http://www.acn.ro/index.php?id=5 (10.05.2014).*

*** *http://www.afdj.ro/statistici_ro.html (10.05.2014).*