STRATEGIES FOR THE TRANSFER OF DRY CONTAINER TRANSPORT ON THE DANUBE RIVER IN THE ROMANIAN SECTOR

Iordănoaia, Florin[1]

Abstract:

In this paper is analyzed the situation of the transfer of container transport, from the road, to the inland waters and especially on the Danube river, in the area of Romania. This is an EU program idea, which is far behind the forecast. The situation in Romania is much more difficult than other EU Member States. The paper reviews the real situation on the river artery, the possible intermodal connections and the strategies necessary for the transfer of containers on the Danube.

Keywords: *logistics, transport, container, strategies, development.*

JEL Classification: *E61, R11.*

1. Introduction

The most important steps to promote river transport and inland waterways began in 1991 when the European Commission published the "White Paper" on transport, pointing out that "freight and passenger transport is increasing and that there is a danger that road transport will no longer be able to meet the needs of the market" (1). Due to the rapid growth of freight transport on highways and roads, which has generated congestion in road traffic, European authorities have in recent years paid more attention to the development of waterway transport. The European Commission adopted in 2001 a new "White Paper" on transport, entitled "European transport policy for 2010: it is time to decide", which was revised in 2007 (2). But the situation is still unresolved; no progress has been made at Community level and hence a number of problems with the transport of containers.

2. General situation of river transport in Southeast Europe

In the European Commission document (2) analyzed the situation of transport at that time, one of the important conclusions being that "it is necessary to pay particular attention to the river transport, which is the least polluting, the cheapest, which has a great potential for development and is a viable alternative to decongesting road traffic". In January 2006, the European Commission presented the Communication on "NAIADES". This is an "Integrated Action Program for Inland Navigable Waterways" (3). This Communication aimed at "promoting and developing inland waterway transport" and contained a series of recommendations on the measures and actions to be taken during the period 2006-2013 to exploit the full potential of this mode of transport. This program has been continued since 2013 with the "NAIADES II" program, called "Inland Waterways Action Program" (4). A number of specialists appreciate that "river navigation is one of the best alternatives offered by Romania for freight and passenger transport" (5). After the accession of most of the countries bordering the Danube, to the European Union (except for Serbia, the Republic of Moldova and Ukraine), the Danube became of particular importance to the European Commission in terms of the development of transport networks in general and network waterways of the European Union. From the analysis of the traffic figures it can be concluded that the Danube, compared to the Rhine, the second large Community navigable waterway, is very little used. Thus, if Rhin, which has a 700 km waterway sector, transports about 350 million tons of freight every year, and approximately 80 million tons are transported on the Danube, which has a navigable sector of about 2200 km.

This reduced traffic is the effect of several factors among which the most important are (6):

[1] University Lecturer, Maritime University, Constanta, Romania, floriniordanoaia@yahoo.com.

-The economic situation in some states along the Danube, their low level of economic development.

-The political events that took place between 1992-1995 and 1999-2005 on the Yugoslavian sector of the Danube and which led to the directing of goods to other modes of transport.

-The critical situation of the transport infrastructure on the Danube. This is a major concern of the European Commission.

The importance of the Danube also results from the fact that at the "Pan-European Transport" Conference, which took place on the island of Crete in March 1994, the "Pan-European Transport Corridors" were established and then revised at the third "Pan-European Transport" Conference, which took place in Helsinki in 1997.

The territory of Romania is crossed by three corridors:

-Corridor IV: Berlin-Nuremberg-Prague-Budapest-Bucharest-Constanta-Thessaloniki-Istanbul.

-Corridor IX: Helsinki-St.Petersburg-Moscow-Pskov-Kiev-Liubashevska-Chisinau-Bucharest-Dimitrovgrad-Alexandropolis.

-Corridor VII: The Danube, including the Danube-Black Sea Canal.

Corridors IV and IX are multimodal, including nodes and collection and distribution centers, between modes of transport: road, rail, river and sea. On the territory of Romania, the Pan European Corridor, which refers to the shipping is "Corridor VII" and includes:

-Danube river.

-"Danube - Black Sea" and "Poarta Albă - Midia Navodari" waterways.

-The arms of the Danube, Sulina and Chilia.

-Infrastructure of Romanian ports on these waterways.

The most important aspect is that the economies of Central and Southeast European countries continue to grow rapidly, benefiting from a number of advantages of belonging to the unique European market. This has led to an increase in demand for high quality transport services and facilities, meeting the needs of all partners involved in this type of logistics chain. What are the general advantages of developing inland waterway transport? A number of specialists appreciate that "the estimated effects will materialize directly in time and cost savings (resulting from improved service delivery at a distance) and indirectly from potential decongestion of interurban road transport and increased service life of main axes road communication" (5), (7). A second major advantage is that a reduction in the environmental impact caused by congestion in land transport modes and their emissions will be achieved, the river transport means being much less polluting than land. Equally important is the establishment of an appropriate framework of financial support, through fiscal policies, to enable the development of river transport, with guarantees of quality, safety, territorial integration and observance of the principles of free competition. Tax policies are considered to be "fundamental to facilitating the integration of river transport in intermodal transport chains, encouraging the creation of new competitive line services and improving existing ones" (5). On this line, it is also envisaged the development of a plan of economic and financial measures to support the river sector, having the fundamental objective of facilitating the modernization of the Romanian river fleet (8). This plan of measures will have the advantage of improving the safety and quality of services provided by the river fleet.

3. "NAIADES" program, the starting point of the river strategy

The "NAIADES" program of the European Union was designed to support the development of inland waterway transport. This program has been adopted by the European Commission, the European Parliament and the Member States and has an "Action Plan" that integrates into the general policy of the European Union for an efficient and sustainable transport system, where each mode of transport is based on strengths, reducing its weaknesses to meet the challenges of this century: competitiveness, global warming and energy security (3). The first steps of the "NAIADES" Action Plan have been implemented and the next

package is in place. But in reality, change is difficult because of the challenges it faces: infrastructure upgrading, renewal of workforce and innovation in the fleet of river ships. Priorities must also be set, because they can not solve all the problems at once. For small and medium-sized companies, inland waterways need clear policies to create jobs, and in particular to contribute to economic growth and take advantage of new energy-related business opportunities and technologies environment. In 2016, the European Court of Auditors presented a "Special Report" in which it "examined whether strategies for the inland waterway freight transport were effectively implemented by the Commission and the Member States EU".

On this line, the European Court of Auditors sought to answer two main audit questions as follows:

-Have the projects co-financed by the EU budget effectively contributed to increasing the modal share of goods transport, inland waterways and improving navigation conditions?

-Have the EU's inland waterways strategies been coherent and based on comprehensive and relevant analyze?

The audit revealed that the strategic objective of the European Union, which consists in "reorienting traffic from road to inland waterway transport and improving airworthiness" has not been achieved. Between 2001, when this target was set and 2012, the year for which the latest statistical information is available, the modal share of inland waterway transport did not increase substantially, fluctuating around 6%. In conclusion, the Court of Auditors in the "Special Report" stated that "EU inland waterways strategies have not been implemented effectively". Existing EU-funded projects have not always been in line with the objectives of freight transport on inland waterways and only a few of these projects have contributed to improving navigation conditions. It has been found that some isolated bottlenecks have been removed, but they were still surrounded by other bottlenecks. Therefore, the impact of these projects on inland waterway transport was low. This is partly explained by the weaknesses in EU inland waterways strategies that were not based on sufficiently robust and comprehensive analyzes as well as by the duly unused use of scarce resources at EU and national level states. In addition, the approaches adopted by Member States in relation to inland waterway transport were inconsistent along the main corridors. EU strategies have not sufficiently taken into account the environmental aspects and the attention paid by Member States to waterway maintenance.

4. Infrastructure of Romanian ports located on the Danube

Due to its membership of the Trans-European Transport Network (TEN-T), the Danube has the potential to become an element in the development of the combined transport system for the development of tourism in the adjacent areas of the Danube and the Danube Delta, such as and to improve the operation of river ports, figure 1. The projects on specific operating technologies for ports and projects for environmental protection on the Danube are also very important. The Danube is part of “Danubian River Corridor VII”. It intersects in Romania with the road IX corridor connecting Northern Europe to its South, figure 2. To understand the way in which the transfer of goods, rail and road transport can be made on the Danube River, it is necessary first the knowledge of the Danube ports and facilities offered by them, the existence or absence of connections with other means of transport, whether or not large investments are required to make this transfer. In this sense I conducted the research in the ports: Moldova Nouă, Orşova, Drobeta Turnu-Severin, Calafat, Bechet, Corabia, Zimnicea, Giurgiu, Oltenita, Călăraşi, Cernavodă, Hîrşova, Braila, Galati and Tulcea. I consider that the best placed ports for the transport of containers are: Orşova, Calafat, Giurgiu, Olteniţa, Braila, Galati.

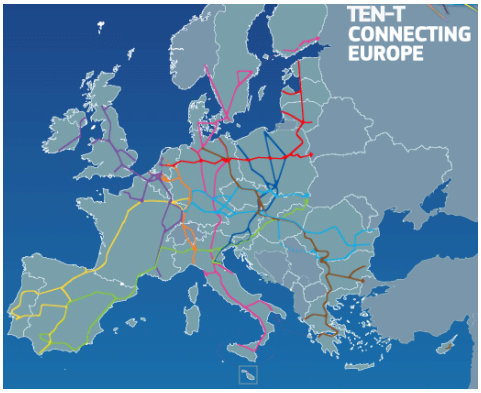

Figure 1. European TEN-T network.

Figure 2. The VII River Corridor.

Source: ec.europa.eu/transport/themes/infrastructure.

The main features of these ports are:

1. The Orşova port. Orsova port is located at km 955 in Mehedinţi county, figure 3. The port council is situated between km 953-957, in the upstream area of the present accumulation lake of the Hydropower and Navigation Complex "Iron Gate 1", in Mehedinţi County. General data of Orşova port, figure 4 are as follows:

-The port is the public property of the Romanian state. The port area is 50439 sqm. It is concessioned by the Ministry of Transport to the National Company "Administration of the Danube Rivers Ports" SpA, Giurgiu (10).

-Port operator is "E.P. Drobeta" SpA Company, Orşova. Operated goods: ore, iron, wood, general merchandise, building materials, bauxite, fertilizers, etc.

-The harbor has 100 meters long sheds and 500 m long vertical sinks. The port also has a modern passenger terminal with a river station at European standards. Facilities: drinking water, sewerage and electricity.

-Communication routes: internal access to the street network of Orşova, NR 6 (National Road) and NR 57, the mooring of the ships is made at vertical and mooring pontoons.

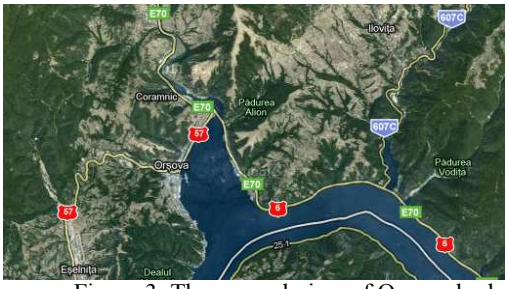

Figure 3. The general view of Orsova harbor.
Source: google.ro/maps.

Figure 4. Port Orsova, commercial area.
Source: N.C. ”ADRP” SpA Giurgiu.

2. The Calafat port. The Calafat harbor is located between km 794-795, in Dolj county, figure 5. The port harbor is between km 793-796 on the left bank of the Danube. The general data of Calafat Harbor, figure 6, are as follows:

-Administrator: port is public property of the Romanian state. The total area of the harbor enclosure is 50,968 sqm. It is concessioned by the Ministry of Transport to the National Company "Administration of the Danube River Ports" SpA, Giurgiu.

-Port Operators: "E.P. Drobeta" SpA Company Orşova, "Cerealcom Dolj" SpA Company. Goods operated: general goods.

-The port is of the river type, allows the mooring of barges up to max. 2000 t. Access to water is provided directly from the Danube waterway. The mooring depth is -3.00 m. The port has the following mooring fronts, planted with pear, from upstream to downstream: RO-

RO ramp, with a length of 100 m, at the passenger berth; 100 m operative front, 350 m freight docks, where 2 portable cranes of 5 tf x 32 m are mounted; ferry-boat ramp.

-A border crossing point with all the facilities is arranged in the RO-RO ramp area. The harbor has storage platforms of 11,000 sqm. Operating equipment: 2 portable crane boats of 5tf x 32 m, and the other berth operations are carried out with floating cranes. Traffic capacity: 270000 t/year. The harbor has power, water and sewerage facilities.

Figure 5. The general view of the Calafat port.
Source: google.ro/maps.

Figure 6. Port Calafat, RO-RO berth.
Source: N.C. "ADRP" SpA Giurgiu.

-Communication routes: road access connected to the local transport network and further links to NR 55, NR 5A and NR 56A; the rail link through ramp lines in the zonal network.

3. Port of Giurgiu. The Giurgiu harbor complex is located at km 494-491, in Giurgiu County, figure 7. The river roadsted is between km 489-497, on the left bank of the Danube. The general data of Giurgiu port are as follows:

-Administrator: the port is public property of the Romanian state. It is managed by the National Company "Administration of the Danube River Ports" SpA Giurgiu. Goods operated: bulk goods, general goods, cereals, petroleum products. Main Operators: "A.E.P. Giurgiu Port" SpA Company, "Dunapref" SpA Company, National River Company "Giurgiu Nav" SpA Giurgiu.

-The port is of a river type, allowing the mooring of barges up to max. 2000 t. Water access is provided on the Danube for the "Ramadan" and "Cioroiu" sectors and the "Smârda" Arm in the "Plant" Basin respectively. The total area of the harbor enclosure is 59 ha, of which 70,000 sq m were built. Traffic capacity is 2305000 t/year. The port has facilities for power, water and sewerage.

-Communication routes: The port has road access from the city's main street network and further links to the CR (County Road) 504, CR 507, NR 5, NR 5B, NR 5C. The harbor has railway links provided through rebrusment lines, in all four sectors, from the city railway station to the regional railway network.

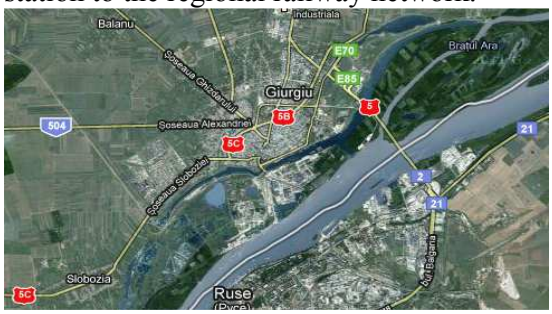

Figure 7. The general view of Giurgiu port.
Source: google.ro/maps.

Figure 8. Port Giurgiu, the "Plant" basin.
Source: N.C. "ADRP" SpA Giurgiu.

The port of Giurgiu is developed in four locations as follows: the "Ramadan" sector has mooring functions on the Danube, with a length of approx. 750 m; the "Plant" basin, with mooring fronts with a total length of 740 m, and a dump for the ballast products is arranged to

“Cioroiu” Island; “Veriga” Basin and Oil Port. For containers, a specialized terminal was built in the “Plant” Basin on the "Giurgiu Free Zone" at km 492 (11). The terminal is managed by the Commercial Company "Arranging Container Danubian Port" Ltd, Giurgiu (12). The terminal's facilities are the following: a vertical jet of 217 m in length, can simultaneously key 3 barges of 70 m each length; 1 quay portal type 50/25 tf x 25/35 m; 2 portal type cranes of 15/8 tf x 23/36 m; 1 45 t reachstaker that can handle 40-foot containers up to 12 m in height; 4 forklifts with a maximum lifting capacity of 3 tf each; 2 internal transport platforms of 60 tf each. The operating capabilities are as follows:

a). Containers: 100 containers/8 hours in a berth.

b). General goods: palletized: 500 t/8 hours in a berth, 1000 t/8 hours in two dances; Bulk: 400 t/8 hours in a berth, 800 t/16 hours in a berth.

4. Oltenița port. The Oltenița port is at Km 430, in Calarasi County, figure 9. The port harbor is between km 428-431, on the left bank of the Danube. The general data of Oltenita port, figure 10, are as follows:

-Administrator: the port is public property of the Romanian state. The surface of the harbor enclosure is 88.7 ha, of which 9.600 sqm. It is concessioned by the Ministry of Transport to the National Company "Administration of the Danube River Ports" SpA Giurgiu.

-Goods operated: grain, pond products, quarry products. Main Operators: "A.E.P. Giurgiu Port" SpA Company, "T.T.S." SpA Company from Bucharest.

The port is of a river type, allowing the mooring of barges up to max. 2000 t. Access to water is provided directly from the navigable channel of the Danube. The mooring depth is -3.00 m. The port consists of the following mooring fronts, which are upstream and downstream: 4 mooring ramps for transporting the oversized parts, 200 m non-operating queue, 300 m perpendicular for loading/unloading goods. Operating equipment: 3 portable crane boats of 5tf x 32 m. Traffic capacity: 525000 t/year.

-Communication routes: road access connected to the city street network and further links to NR 4, NR 31 and NR 41; railway connections secured by connecting to the city train station.

Figure 9. The general view of Oltenita harbor.
Source: google.ro/maps.


Figure 10. Oltenița commercial port.
Source: N.C. ”ADRP” SpA Giurgiu.

5. Port Braila. Braila Harbor is at Km 168 + 300 m and Km 170 + 875 m, Marine Mile 90, figure 11. The port harbor lies between km 167-168, on the left bank of the Danube, in Braila County. This is a river-sea port, as commercial ships on the maritime Danube can enter, from Sulina, on the Sulina branch to Braila. The general data of Braila Harbor, figure 12, are as follows:

-Administrator: the port is public property of the Romanian state. Total area: 389,630.13 sqm, number of basins 1, jump: vertical = 797 m, wall = 2.506 m.

-Port facilities: storage of goods on open platforms and closed warehouses, docked with port equipment for ship operation, grain silo, shipyard. The number of operating docks is 25. Provides facilities for: winter ship staging, ship maintenance, cleaning of warehouses and

warehouses on ships, cleaning and degassing of fuel tanks. Goods operated: grain, ores, chemical and industrial products, general goods. Main Operators: "Hercules" SpA Company Braila, "Trans Europe Port" Ltd. Company Galaţi, "Cerealcom" SpA Company Brăila, "Romanel" SpA Company Braila. Facilities: water supply, sewerage, electricity.

-Communication routes: connection to the national road system via NR 2B (national express road) connecting with Buzau and Galati, NR 21 Brăila - Slobozia, the European road E 87, passing through Tulcea and Constanţa; connection with the national railway network, has a wide track railway along the operating docks.

Figure 11. The general view of Braila harbor.
Source: google.ro/maps.

Figure 12. Braila Harbor, commercial area.
Source: "Hercules" SpA Company Brăila.

6. Port of Galati. The Port of Galati is at Km 149-157, Marine Mile 80, figure 13. The port harbor is located between km 155-158, for inland waterway vessels and between km 158-159 for bare river ships on the left bank of the Danube, in Galati County, being also a river-sea port. The general data of Galaţi port are the following (13):

-Administrator: the port is public property of the Romanian state. The total surface area of the port is: 864,131 sqm, 2 port basins, the length of the jars: vertical = 4,675 m, wall = 2,390 m, 56 operating docks. The quay front stretches over a total surface of 1,500 meters, of which 500 meters on the Danube, and the rest is the existing port basin. Port facilities: the port is equipped with a number of efficient port harvesting technologies, has a number of multiple storage capacities, as well as mechanical means for lifting, transporting and stacking goods, grain silos, oil terminal, shipyard, etc. It offers a range of facilities for: winter ship stacking, bunkering, ship maintenance, ship waste disposal (garbage, wastewater and bilge water). It offers a range of utilities: electricity, water, natural gas. Goods operated: grain, ores, chemicals, petroleum and industrial, general goods. Main Operators: "Romportmet" SpA Company, "Unicom Oil Terminal" SpA Company, "Damen Shipyards" SpA Company, "Prutul" SpA Company, "Romanel International Grup" SpA Company Braila.

-Communication routes: connection to the national road system, on NR 2B and E 584; connection to the national railway with a European gauge and a railway track with enlarged gauge for the ex-Soviet countries.

Figure 13. The general view of Galaţi port.
Source: google.ro/maps.

Figure 14. Galati Harbor, commercial area.
Source: N.C. "AMDP" SpA Galaţi.

Conclusions

With the accession of Romania to the European Union and the increase of the pollution reduction requirement, the river traffic has gained more importance. The European Union has signaled to invest in river vessels for container transport lines on the Danube. The strategy for achieving this transfer should be oriented as follows:

-The Ministry of Transport has to design a "National Container Transfer Plan". This plan, in particular, must contain: the necessary measures for carrying out the transfer of containers; sources of financing; economic agents that need to become partners; the port administrations in Romania, which will be responsible for the development of port infrastructure for container traffic; partner foreign authorities in Bulgaria, Serbia, Ukraine and the Republic of Moldova; execution deadlines and executives.

-The Danube Port Administrations companies from Giurgiu and Galati, have to design development projects for the river ports they manage, which can be included in the national container transfer system. The six ports presented can be a starting point for this project, considering their positioning on the Danube, the links with the interior of the country and the other European countries.

-Ensuring the Romanian state financing of the construction of specialized barges for containers, as Romania does not yet have such barges. For this, a public-private partnership is needed between the transport ministry and the Romanian capital of the Romanian river transport companies (14).

-Establishment of container shipping lines on the following domestic and international routes: Route 1: Constanţa - Braila - Galati - Giurgiuleşti - Reni; Route 2: Constanta - Oltenita - Giurgiu - Ruse; Route 3: Constanta - Calafat - Orsova - Belgrade.

-Taking European funds for the maintenance of the Danube waterway in the Romanian area. Without dredging where the Danube creates problems for the vessels, the river transport of containers can not develop, the ship owners have great problems with the delays due to the decrease of the Danube level.

Initial costs are not very high, as ports have modern loading / unloading facilities, they have free spaces on which container terminals can be arranged and have great opportunities to set up logistics spaces. The six ports have the greatest advantages to easily integrate into the national container transportation system, covering all the areas of the country as fanfares.

The most difficult aspect is bringing a large number of economic agents to the same negotiating table, which carrying goods in containers on the roads. This situation is difficult due to the interests of transporters to respond quickly to customer requirements. Customers want to receive the goods on time and securely, according to commercial contracts. This will require a highly advanced computer-aided transport planning management and even a unified program to which all sellers, buyers and carriers interested in container transport will have access. The integrated computer-assisted program can be implemented at the container carriers' association, which will manage this program.

In practice, however, there will be some resistance from those who buy goods and resort to container, road or rail carriers. But also from carriers. I believe that this can be solved through negotiations and partnerships that have been concluded so that all those interested can understand the advantages of transferring container shipments to inland waters.

No tough action should be taken to increase road tolls for busy roads or to transit through cities, as happened in Romania in the past.

The advantages of container shipments on inland waters will be very important for the entire society.

Bibliography

[1] Council Regulation (EC) 1365/2006 of the European Parliament and the European Council, Brussels, 2006.

[2] European Commission, White Paper on Transport, "*European Transport Policy for 2010: Time to decide*", Brussels, 2001.

[3] European Parliament resolution "*Inland waterway transport: NAIADES, an integrated European action program for inland waterway transport*", Brussels, 2006.

[4] European Parliament resolution on the "NAIADES II" "Inland Waterways Action Program", (2013/3002 (RSP)), Brussels, 2013.

[5] Sobaru C.A., Nastase I.G., Avadanei C., "*Arterial waterway Rhine-Main-Danube, European Strategy 2020*", Economic Publishing House, Bucharest, 1998.

[6] Iordannoaia F., "*Supply Chain Management and Integrated Logistics*", "Nautica" Publishing House, Constanta, 2015, pp. 134-136.

[7] Vaduva Gh., Dinu M., "*European integration strategy*", National Defense University Publishing House, Bucharest, 2005, pp. 8-9, 18-19.

[8] Ministry of Transport and Infrastructure "*Intermodal Transport Strategy in Romania 2020*", Bucharest, 2011, pp. 43-44.

[9] The Court of Auditors "Special Report", "*Inland waterway transport in Europe: since 2001, there have been significant improvements in terms of modal share and sailing conditions*", Luxembourg, 2015, pg. 7-8.

[10] National Company "*Administration of Danube River Ports*" S.A. Giurgiu, "*Official Documents*", Giurgiu, 2017.

[11] Decision of the Government of Romania no. 788/1996, regarding the establishment of the Autonomous Administration "*Administration of the Free Zone Giurgiu*", Bucharest, 1996.

[12] Commercial Company "Arranging Container Danubian Port" Ltd, "*Official Documents*", Giurgiu, 2017.

[13] National Company "Administration of Maritime Danube Ports" SpA, "*Official Documents*", Galati, 2017.

[14] Romanian River Navigation Company "Navrom" S.A., "*Official Documents*", Galati, 2017.

Sites visited:

http://www.apdf.ro/

https://www.google.ro/maps/

http://www.metaltrade.ro/

http://www.romanian-ports.ro/html_nou/index.php

http://www.zlg.ro/terminal.htm

https://ec.europa.eu/transport/themes/infrastructure_en