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THE PORTS ON THE LOWER DANUBE – SOME TECHNICAL ASPECTS

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Abstract
The geographic water routes have always played an important role in the geostrategic decisions of the great powers. Today, this aspect is actively integrated in a variety of policies, from those on cross-border cooperation and good neighbourhood to the sectoral ones for the development of transport, tourism and trade. In this respect, the Danube is one of the most obvious examples, its role being promoted by the riparian states, as well as outside Europe, due to the connections it opens. In terms of flow and navigation, the most important part is on the Romanian territory, in the so-called Lower Danube sector, while Romanian ports are key points in the implementation of development strategies. Accordingly, the article reviews their technical potential, so as to underline the differences, as well as the possibilities for future capitalization.

Keywords: harbours, Danube, potential, river

1. The Lower Danube – navigation route and the meanings of a regionym

On the Romanian territory, the Danube River has three different parts:
1. the main fluvial part, about 1075 km long, is simply a navigable river (considering certain conditions) (fig. 1);
2. the second part is represented by the river mouth flowing (through the Danube Delta) into the Black Sea with three branches – Chilia, at the North side of Delta, Sulina, navigable, on about 70 km, and Sf. Gheorghe, in the South part of the Danube Delta;
3. the third part is an artificial canal, built during a long period (with a convulsive history), namely the Danube-Black Sea Canal (with two branches).

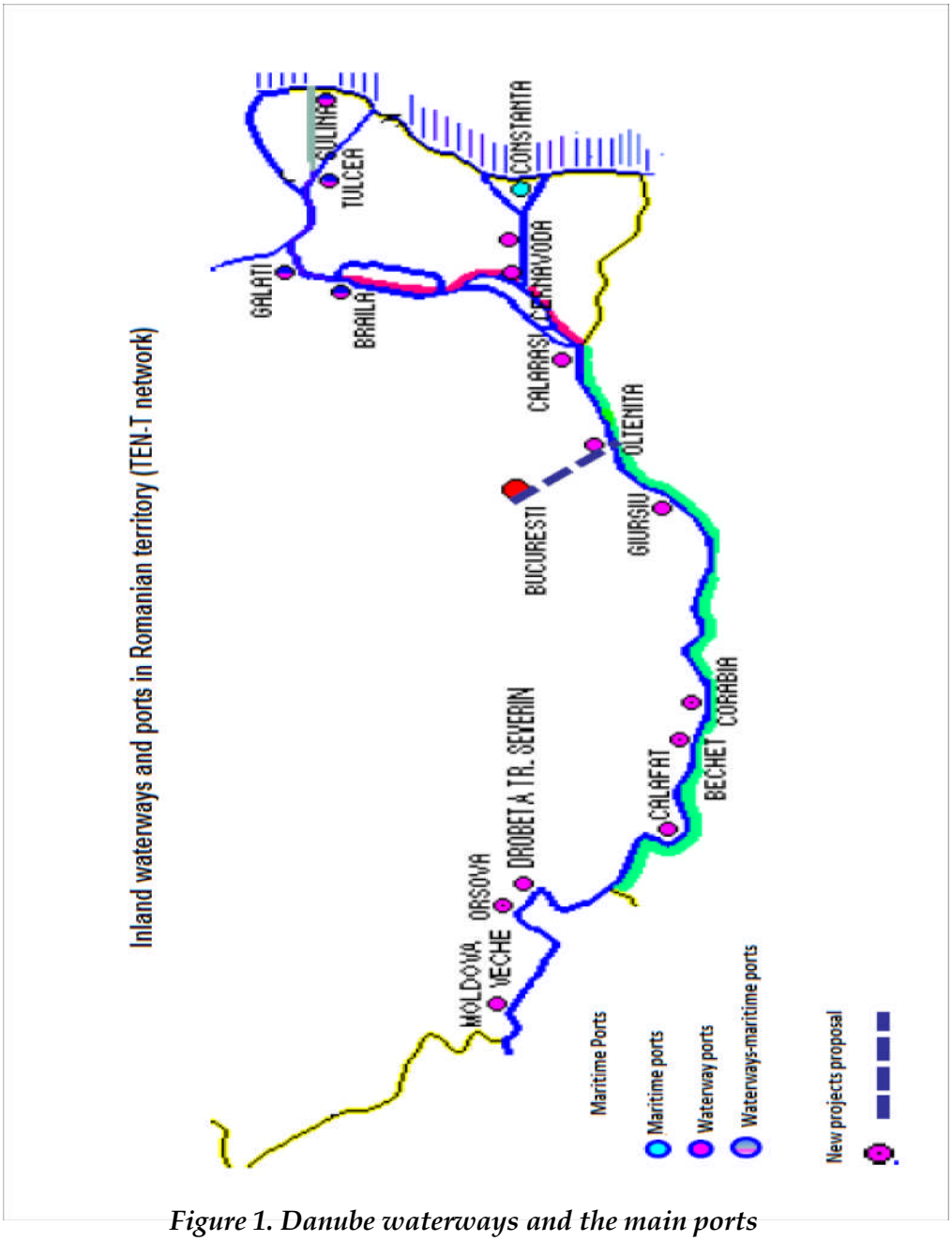

Figure 1. Danube waterways and the main ports
(Source: Romanian Ministry of Transport and Infrastructure -RMTI, Romanian Strategy of Intermodal Transport, 2020)

The appellative *Lower Danube* is frequently used in a variety of articles, from those on geography and history to those on engineering and navigation, as well as in administrative and political documents. Its usage in this article prompts a short overview of the distinctions between the syntagm *Lower Danube* and its synonyms, *inferior Danube* and *maritime Danube*, used to refer to the final section of the river. As a result of the natural inclination towards gradual simplification, the common language combined the meanings of the three terms into one, although their content is not identical.

The appellative *Lower Danube* has physic-geographical meanings, while the *maritime* attribute reflects the projection, in navigation, of the geomorphologic and hydrographical characteristics. Since, in terms of space, up to the half of the 19th century, the two terms referred to the same geographic region situated between the Iron Gates gorges and the maritime mouths of the Danube, it is no wonder that the attribute *lower* is adopted for its plasticity, with no differentiating nuances between the two. The area it denominated was characterised by such riverbed, gradient and flow rate as to make possible the access of ships upstream to the Danubian Border (gorge).

The situation changes in the second half of the 19th century. Due to the technical advance registered in shipbuilding[1] and the political events in Europe after the Crimean war, the Danube becomes an important geostrategic axis, whose division, based mostly on water transport, will reflect into the names used for the upstream and the downstream sections.

After 1856, the establishment of the European Danube Commission sped the arrangement works on the Sulina branch, which was to become the most important navigation route, thus, also changing the fate of the port cities on the Lower Danube. The highest commercial traffic flow was registered in Brăila and Galați, since they remained free ports from 1836 until 1883, this being the main route for the Romanian Principalities' export. Their activity has the combined advantage of a geographic positioning on great Danube shallows and of the development of internal transport facilities such as railways and roads, which would ensure a better

[1] In 1837, the first Austrian steamship, coming from Constantinople, sails up the Danube to Brăila.

connection between ports and their hinterland. Moreover, the hinterland would be one of the determining factors in a certain specialization of the ports, according to the products and commercial flows they attract.

The access of maritime vessels with a draught up to 7 m is possible from Sulina (km 0) to Brăila (km 170). This is the maritime Danube sector, clearly a shorter one than the inferior Danube. Accordingly, the attribute *lower* starts being associated, alternatively, either with the entire inferior course or with its extreme segment. A first imposition of this restriction comes with Prince Al. I. Cuza's Royal Decree in 1864 that attributes the name Lower Danube to a newly-established archbishopric, with its see in Ismail. Today, the appellative is used in correct references (e.g. the Lower Danube River Administration, national authority with its headquarters in Galați), as well as in names that exceed the actual area, such as the Lower Danube Euroregion or the University of Lower Danube.

Therefore, this is an instance of an important economic function, like that concerning harbours and navigation, generating the meaning of concentration/reduction of a general physico-geographic term to a limited area.

2. A few tendencies concerning ports and navigation routes in a European context

The volume of all freight transported on Romania's navigation routes holds the second place in EU (table no.1), which may be seen as admirable, considering that it shares the top three with the Netherlands and Belgium. However, Romania cannot be compared to the Netherlands, which has a similar position on the Rhine, the key difference between these countries being the lack of modern harbour facilities in Romania. Here, 9% out of the water freight transportation takes place on the Danube, and the majority of the commodity cargo is bulk cargo.

Table .1. Percentage of all freight transported on water, in tons/km 2011

Country	%	rank
The Netherlands	36,7	1
Romania	21,7	2
Belgium	18,5	3
Bulgaria	15	4
Germany	11,2	5
Croatia	5,7	6
UE 27	6,2	

3. Romanian ports on the Danube – a diverse potential[1]

The current list of the ports on the Lower Danube includes 34 entries: the large and well-established, as well as the smaller ones, whose importance decreased.

1. Sulina

Once the seat of the European Danube Commission, Sulina capitalizes, at present, almost none of its location's potential. The port is a member of the TEN-T extended network, as it provides its residents with essential services in terms of passenger transport, as well as freight transport in the Danube Delta region. The port has four berths and a wharf, 5,940 m long. However, its activity centres primarily on passenger transportation, while being used to a small extent for freight transport. Most of the freight traffic consists in transit activities.

2. Tulcea

This is an important port, which is also a member of the TEN-T extended network. It has 41 berths, eight gantry cranes and a total surface of 82,762 m^2 (open storing area of 70,000 m^2). The port is the gateway to the Danube Delta, while also servicing local industry. It primarily handles

[1] The information in this sub-chapter uses, to a great extent, the data provided by Romania's General Transport Master Plan, 2014

mineral products (quarry extracted, aggregates, gypsum, slag, salt) and its main activity is to supply materials for the building sector, which is why the necessary facilities are organized around quarry extraction and loading materials. A short distance away is Tulcea Industrial Port. It was built in 1974 so as to supply raw materials to the metal processing factories in Tulcea. Its main activities are loading and unloading maritime and river vessels carrying various raw materials, such as manganese, bauxite, iron ore, lime, ferrous alloys. A grain terminal is set to be built in the future.

3. Galați is the largest river-maritime port and Romania's second largest port, operating over 5 million tons of freight in 2011 and being part of the TEN-T core network. The port has four terminals: Docks Terminal for general cargo and containers, New Basin Terminal for general cargo, Oil Terminal for oil products, Mineral Terminal – serving the Arcelor Mittal Steel Plant. It provides a series of value-added logistics services. Furthermore, the port of Galați connects the Black Sea to the rivers with no exit to it. The geostrategic dimension of the port is given by the direct connection to Ukraine and Moldova (less than 7 km of road transport) and by the existence of a railway system (the only one with both European and Russian gauge). Thus, Galați is the port that makes the connection between the European Union and the former Soviet states. Its technical facilities include 56 berths, 31 gantry cranes, 10 truck cranes and 9 floating cranes, a forklift and conveyor belts for the transportation of great quantities of coal and iron ore. It has a surface of 864,131m^2 (an open storage area of 538,320 m^2 and a covered storage area of 7,200 m^2). There is also a free zone of 73,967 m^2.

In addition to operating import and export freight, the port of Galați is a transshipment port from barges to coasters, to continue the delivery to other ports of the Black Sea which service Ukraine, Russia and Turkey. Galați imports significant quantities of iron ore for its neighbouring steel works. There is a continuous flow of mineral ore internal transport on barges from south-western Romania to Galați, on a distance of 800 km. Transit traffic is the most important traffic segment for the port of Galați. The most frequent types of goods present in this port are cereals, aggregates and scrap metal, together with coal, chemicals, LPG and cement, which is joined by the development of container operating

procedures. The fact that, at the moment, the port has significant weaknesses in what concerns intermodal systems is a major obstacle for the integration of the port's logistics in the international transport system.

4. Brăila

This is another large port, located upstream of the Galati Port, part of the TEN-T extended network. Its surface is 398,630m^2 out of which a large section for grain and fodder silos. It allows as well the mooring of maritime and river vessels. The port has a connection to the railway system, but the infrastructure is outdated. The main goods in the port of Brăila are mineral products, wood products and chemical fertilizers, serving also for general cargo and grain traffic, being placed in an agricultural prevailing area.

5. Cernavodă

This port, part of the TEN-T core network, is situated on the right bank of the Danube, closely downstream from the entrance into the Danube-Black Sea Canal, its area comprising the riverside, as well as a dock. The port of Cernavodă has a passenger terminal, an oil berth and commercial berths in the dock. Most of the products unloaded in the Cernavodă port are mineral and wood products.

6. Medgidia

Situated on the Danube-Black Sea Canal, the port of Medgidia, provides, besides passenger services, industrial berths (17) and commercial berths (5), its main activities being agriculture-related operations and transporting cement.

7. Basarabi/ Murfatlar

This port is situated on the Danube-Black Sea Canal, and it provides 11 berths for industrial usage as well as a passenger berth.

8. Călăraşi

Călăraşi port can be accessed via a short navigable canal and it is part of the TEN-T extended network. The operation zone is divided as

follows: the commercial port (on the Danube) operates mostly with agricultural freight, while the industrial port (on the navigable canal) was designated as a key steel transit point for the Siderca Steel Plant. The latter is, at present, almost abandoned and, except for a limited production zone, it has not managed to supply the tonnage for which the port was built.

9. Oltenița

This port is part of the TEN-T extended network, it can receive barges of up to 2,000 tons and it handles about 520,000 t per year. Despite its closeness to Bucharest, it handles a small amount of containerization, while being used mostly for mineral and grain products.

10. Giurgiu

Giurgiu is a port of the TEN-T core network. It is situated at the intersection of the Danube with Corridor IX, which is on the north-south route from the Baltic Sea to Bulgaria, Greece and Turkey. Along the years, the bridge between Giurgiu and Ruse, in Bulgaria, was an essential connection for rail and road transport (among the most frequently utilized border transit points). Giurgiu is also one of the closest ports to Bucharest, which grants it with an increased importance. There is also a free zone of 17,000 m^2 with a customs storage facility and 7,200 m^2 of covered storage space, as well as a container storage platform with facilities for loading and unloading containers. Giurgiu port operates in four locations which provide specialized port facilities:

o The "Ramadan" commercial port: the passenger port, plus berths handling agricultural freight from vertical elevators for grain, ballast, coal, general goods.

o The "Canalul Plantelor / Sf. Gheorghe" (Plant Canal/ St. George): grain elevator, but it also handles aggregates and general goods.

o The Cioroiu Port: oil terminal.

o The Giurgiu Free Zone: handles general goods and containers.

Considering its location close to the terrestrial border crossing point and its proximity to Bucharest (as well as its size), this port is an important hub for the future transportation of goods on the Danube. The role of containerization has begun to rise in the port, grain and grain products being also among the main goods.

11. Corabia

At present, Corabia registers a low rate of freight traffic and it is in an advanced state of decay. It only handles grain and it has some storage facilities. However, it is well positioned as the only larger port between Giurgiu and Calafat. It also has the advantage of an extensive hinterland which can be accessed from the port.

12. Bechet

At the moment, Bechet port registers a low rate of regular traffic. The most important customer is the RO-RO ferry which crosses the Danube to Bulgaria. The port is located close to the Craiova industrial centre and it can become a useful load handling terminal.

13. Calafat

Calafat is part of the TEN-T core network and it has three berths. The technical advantage consists in having enough space for barges of up to 2,000 t, the storage space and the RO-RO facilities. The Danube River Ports Administration acquired for this port a vessel for managing waste coming from ship operations, bilge water processing and collection. Calafat is part of the recently designated Ten-T South Corridor IV and it uses the road and railway bridge recently inaugurated, connecting Vidin, in Bulgaria, to Romania. This corridor has a significant potential considering that it could become a main route for freight transport from Germany and Central Europe towards Turkey and it could become a viable alternative to the current routes that cross Serbia; moreover, a significant increase was registered recently in the volume of goods handled.

14. Drobeta Turnu Severin

Drobeta is a port of the TEN-T core network and it is the first port to be classified by AECOM as having national importance on the route from Central Europe to Romania. It is located on the TEN-T South Corridor. It has seven berths, three gantry cranes, a rotating crane and 13,725 m^2 open storage space, as well as a waste management vessel. Drobeta Turnu Severin is strategically located as a transshipment point on the Danube for the traffic from north-west and towards cities such as Craiova.

15. Orşova

Building materials and mineral products are an important component of goods transportation from the port of Orşova, while there is no dominant industry or predominant quantity of goods.

16. Moldova Veche

This port was nominated for inclusion in a modernization program since it is the first port encountered on entering Romania on the Danube. It has 3 berths, 30,000 m^2 open storage space and 2,000 m^2 covered storage space. It can provide maintenance and repairing services, storage and unloading facilities for containers.

Local ports

In addition to the ports with significant facilities and traffic, there is also a series of small ports on the Danube, which have local usage.

No.	Port	Activity
1	Drencova	It handles less than five ships a year, having only one berth.
2	Gruia	It handles mainly small ballast and spall quantities and it is a small port (1,000 m^2) with limited infrastructure possibilities.
3	Cetate	Port with a limited surface (1,000 m^2) which handles large quantities of ballast and spall from dredging the Danube.
4	Turnu Măgurele	It is mainly associated with the chemical and fertilizer plants in its vicinity, handling both chemical raw materials and the produced fertilizers.
5	Zimnicea	The iron and steel sector is one of the main users of the port, although the latter is also used for ballast river transport.
6	Hârşova	It has only one basin with a 500 m inclined wharf; besides passenger transport, the port is currently also used for shipping sand extracted from the river bed.

7	Turcoaia	It focuses on quarry stone processing for building construction.
8	Macin	It handles stone for the national construction industry and it focuses exclusively on this product's shipment.
9	Gura Arman	Its activity consists of stone transportation from the Iacob-Deal quarry.
10	Isaccea	It handles exclusively products for the construction industry in terms of transport, as well as wood, stone and sand operations.
11	Mahmudia	It is mainly used for the local stone transport for the construction industry.
12	Ovidiu	It is a port situated on the Poarta Alba-Midia branch of the Danube – Black Sea Canal. It has two berths and a low rate of freight traffic.
13	Chilia Veche	At the moment, it does not handle commercial freight transports, and, as such, it holds no interest.
14	Feteşti	Situated on the *Borcea Branch* of the Danube, the port does not handle significant freight volumes.
15	Tisovița	It did not transport freight between 2010 and 2011.
16	Rast	It is a small port situated in the Romanian-Bulgarian sector. Port operations are very few.
17	Baziaş	Close to the border with Serbia, the operations in this port are in a very small number.
18	Luminița	It is included in the port network of the Danube – Black Sea Canal's Administration of Navigable Canals. It is close to the Midia port (the satellite port of Constanța). Although handling a certain volume of freight, it deals mostly with mineral products. The vicinity of Luminița to the ports of Midia and Constanța means that most goods in the area are handled by these latter ports.

It becomes evident that there is a great diversity of potential and characteristics among the Romanian ports on the Danube. As the dynamic European and international context requires a continuous re-consideration of development strategies, Romanian ports formed an association – the Union of Romanian Inland Ports – whose mission is to consolidate their position within national economy and internationally, by active involvement in the implementation of viable investment projects, by bridging partnerships for the implementation of projects with an active role in the support and development of the naval sector and in attracting new freight flows and by promoting the Pan European Corridor VII.

Conclusions

The Danube provides real opportunities for re-launching river activities. In addition to the diversified freight transport, for which an infrastructure more or less adapted to current standards already exists, the great number of locations for ports reveals a potential of multiple connectivity on the upstream-downstream route, a true European river "road", as it was called by geographer N. Al. Rădulescu.

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