A New Paradigm for Shipping on the Danube River in Terms of Turkey
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Abstract
Cost factor is important in terms of both profitability and competition in transportation sector as other segments. Particularly in the crisis periods, different aspects needs bring with new pursuits and bring forward some applications that turn the crisis into the opportunities. This study offers new sights in terms of container shipping for producing companies and merchants. The main subject of this study is analyzing transportation on Danube River in terms of Turkey. There are various studies that offer river transport’s spirits for container shipping in the world. Among all the rivers which nourish the Black Sea the Danube River is taking place by its extension 2783 km. This huge area is well known not only as a popular river, but also as a transportation territory for some countries. In this manner the basic objective of this study is to handle Danube River -which is one of the superiorities of Turkey caused by location- from the point of it’s economical advantages in transportation. In order to address this question, transportation on the Danube River and Turkey’s trade connection for the river have been analyzed in terms of container shipping. Then the world’s third ceramic exporter country-Turkey’s- ceramic trade options by container shipping on Danube River has been evaluated. The paper concludes as presenting different line of vision and suggests new transport rotation to the ceramic producing companies or merchants for transporting ceramic on the Danube River.

INTRODUCTION
The economic crisis has brought the search for new solutions in all areas as well as in transportation by using different methods of shipping. The cost factor also become more important than ever in these days and the significance of inland waterway transport, especially river transport has become more obvious. When we look at the development of inland water transport in the world, Mississippi River which provide U.S. overcome the maritime transportation cirisis is shown the world’s largest maritime transport network. Besides, the potential of container shipping on The Yellow River and Yangtze River for China, The Volga River for Russia are the well known examples of the river transportation. The Danube River that examined in this study has economical and political importance in terms of the countries pass through the river. Besides the Danube is convinient for shipping transportation from Ulm to Brasil via Blacksea (Çelik, 1977, p.203). Moreover, this river provides transportation of midlle-sized cargo load and passengers from Bulgaria to Romania, Austria and Hungary. On the other hand it is possible to reach Sırbia and South Germany with small crafts via it’s links (Ilgar&Koca, 2006, p.183). This study will investigate the commercial importance of Danube River in terms of Turkish merchants from the point of ceramic transportation.

LITERATURE REVIEW
Danube River and Trade
Since the ancient time people have used rivers as ways to travel or to transport goods long distances. Whereas travelling overland were often a cumbersome and seldom a dangerous affair in the past, rivers offered relatively safe and comfortable connecting routes. Along the Danube, trade routes and wealthy merchant towns grew up, such as Passau, Esztergom, Mohács, Novi Sad, Vidin, Galati and Sulina on the Black Sea. (www.danubebox.org).
The Danube River Basin is Europe's second largest, with a total area of about 800,000 km and a population of 83 million people, representing 19 countries of different cultures, languages and historical

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There is no other river basin in the world that is shared by so many nations. The length of the river, from its spring in Germany to its mouth in the Black Sea, is 2850 km. The Danube River itself connects 10 European countries: Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldavia and Russia (via the Black Sea). Due to its position it can be seen as the “Gate of Europe”, providing a water connection to the rest of the world. The Danube originates in the Black Forest in Germany at the confluence of the rivers Breg and Brigach, and it flows into the Black Sea in Romania (Vujko, Plavša & Ostojic, 2013:227).

The Danube is the second longest river in Europe, after the Volga. Located in the very heart of central Europe, the Danube River basin represents “the most important non-oceanic water body” which discharges into the Black Sea through wide delta (Ranisavljević et al., 2012, p.1).

Taking into account a straight 1630 km long distance between its source and its firth (Sulina), the sinuosity index of the Danube River is 1.71. According to the complex of its physiographic characteristics, the Danube is divided into (Bezdolniy, 2007, p.2):

- The Upper Danube (992 km) – from its source (2783 km) to Genju village (1791 km);
- The Middle Danube (860 km) – from Genju village to Turnu-Severin (931 km);
- The Lower Danube (931 km) – from Turnu-Severin to the Sulinsky channel.

Shipping becomes possible downstream the city of Ulm (2588 km), nevertheless the section up to the city Kelham (2415 km) is accessible only for the boats with the carrying capacity of no more than 300 tones. Regular goods transportations by large-tonnage boats take place from Kelham and further downstream (Bezdolniy, 2007,p.2).

The Danube River has a great importance for central and western Europe in terms of maritime transportation. Besides the channels of Danube have intensive shipping flow with regard to Blacksea. These channels and river links has shown in Map 1. Besides interbasin transportations, there are some interbasin canal tracks functioning, such as the Danube – the Main – the Rhine – the North Sea, the Danube – the Oder – the Elbe. Nevertheless, the richest freight flow is concentrated on the canal track the Danube – the Black Sea. This waterway has an outlook for extension in the industrial regions of Eastern countries direction (Russia, Kazakhstan, Azerbaijan, Uzbekistan, Iran etc.) through the Black Sea, Kerch- Yenical Channel, the Sea of Azov, the Volga-Don Canal, the Volga River and the Caspian Sea. Owing to its great importance, the Danube waterway gained the status of the International Transport Corridor (ITC) No:7. It is on the list of 10 the most important Pan-European transport corridors. It is harmoniously connected with other functioning shipping tracks of international importance (Bezdolniy, 2007,p.3). Taking into consideration the results of the 3rd Pan European Transport Conference of Helsinki, June 1997, the Pan-European Transport Corridor VII refers to (http://ec.europa.eu/ten):

- the Danube inland waterway,
- the Black Sea-Danube Canal,
- the Danube branches Kilia and Sulina,
- the inland waterway links between the Black Sea and the Danube,
- the Danube – Sava canal,
- the Danube – Thissa canal,
- and the relevant port infrastructures situated on these inland waterways.
In other respects, inland water transportation within the scope of “European Transportation Corridors” becomes more of an issue for European countries. As a matter of fact transportation operations depend on land carriage has been shifted to maritime transportation by taking account of economical and ecological properties in the strategic transportation orientation programme of European Union Transportation Commission in 2000. The same decisions are stated in the Declaration of the European conference dedicated to inland water transport, Rotterdam, 5-6 September 2001. The Danube – the Black sea Ukrainian DNC is an additional possibility to pursue the stated course to the freight flow distribution from the motor and railway transport for the water one as the most economic and nonpolluting. One of the most important transit traffic waterways in Eurasian space is the Pan-European international transport corridor No: 7 that unites 18 European countries and passes through the inland water ways and river canals of Rhine, Main and Danube (Bezdolniy, 2007, p.14).

On the other hand, we should never forget that since the opening of the Suez Canal the Danube has become the shortest way for transporting to the big economic and industrial centers in Central and Western Europe the food and raw materials brought from Asia and for the export of industrial products from Europe to Asia. (Ciprian-Beniamin, Adrian, 2010, p.21).
The Approach Related Shipping on the Danube River for Turkish Ceramic Merchants

Although Turkey is not riparian to the Danube river, it takes place in the river basin’s one of the most important areas which is impressed by economical and environmental aspects. Turkish Straits is the only navigation route of Ren-Main-Danube waterways to Mediterranean. Danube and Blacksea are connected not only for standing navigation, but also for economic collaboration (Arat, 2002). There are 44 inland ports on Danube River and almost all of them are connected to other countries via railway and highway. The Danube River is not only connects Turkey and European countries, but also constitutes a new transportation corridor from Turkey to Caucasus, the Middle East and Africa. Due to this unifying feature, the Danube River has a huge advantage in terms of transportation and this speciality is expected provide a major contribution to maritime economics. Besides it’s superiority of location, one crucial advantage of the Danube River is cost efficiency. While some inland waters require passing fee, the Danube River is a free waterway like the oceans.

Traditionally the Danube countries demand building construction materials as ceramic, cement, iron, metal reinforcement and structural materials. When logistic costs are concerned in terms of profitability and the time costs, it is clear that this demand should be met by the neighboring countries as Turkey. Besides, such a choice of transportation requires a robust infrastructure. The transportation and trade between Turkish and the Danube ports are already carried out on the Danube River. However this limited trade is an indicator that Turkey can’t benefit fully from the potential of this river. Therefore, it’s necessary for Turkey to create required support and infrastructure by government policies to turn this demand to opportunity. For instance, the industrial ceramic which has big share in Turkey’s exports may be transported on the Danube River by the vessels convinient for inland waters and this provides economical advantage to buyers and sellers.

There are some studies regarding inland water transportation that may be a guide for Turkey to carry ceramic products on the Danube River. Venstra, Zhang and Ludema’s study regarding container shipping on the Yangtze River is a well known example of inland transportation. The study uses a generic model to analyze specific transport system. They consider the container flow to be the outcome of the interaction between cargo generation and the restrictions that are put forward by the various layers in their model. Therefore they split the middle layer in the model (transport services) into three parts: service capacity, service operations, and service related regulation and administration. The first of these refers to the capacity of ports and ships that is necessary to perform a certain inland transport services. The second element addresses the way in which services are marketed to potential clients. In inland shipping many of the operators sail on fixed routes, where various customers employ the ship that sails on the route most convenient for their purposes. The last element encompasses the organizational and regulatory restrictions that influence how much and in what way transport services can be offered in the market. Specific items in this respect are customs inspection procedures in ports, arrangements for the relocation of empty containers, and regulations for the certification and authorization of ships and crew (Venstra et al., 2008, p.537). Their model is presented in figure 1.

When we investigate container flows n the Danube River, The Danube “12-lanes highway” offers good possibilities for reaching the maximum benefits and maximum number of TEU at minimal costs. Approximately half of the transport volume stems from imports on the Danube one-third travels on transit routes. Since 1992, the volumes have been rising moderate but steadily. In 2003, the Danube lost some volume because of the extremely low water levels in the second half-year. According to forecasts by the Austrian Institute for Regional Studies and Spatial Planning with implementation of measures under the National Action Plan Danube Navigation (NAP) the volume is expected to rise further up to 27.7mn t by 2015 (Cold Container Liner Service Danube Report, 2006).
If we look at the administrative operations and legal framework of the Danube River, Romania Transit Team’s “Trade Facilitation on Danube, 2012” study sets light to this matter. Convention regarding the regime of navigation on the Danube signed at Belgrade on 18 August 1948. According to the Convention when both banks of the Danube belong to the same State, the latter shall have the right to place goods in transit under seal or in charge of the customs officers. Such State shall also be entitled to require the master or owner of a vessel to make a written declaration stating only whether or not he is carrying goods the importation of which is prohibited by that State but shall not be entitled to prohibit the transit of such goods. These formalities shall not entail an inspection of the cargo or delay its transit. The master or owner of a vessel making a false declaration shall be liable under the law of the State to which the declaration was made. When the river Danube forms the frontier between two States, vessels, rafts, passengers and goods in transit shall be exempt, while afloat, from all customs formalities (www.danubecommission.org). When it’s researched in terms of river capacity and river infrastructure there is an important study that prepared by Dr. Dejan Radojcic. It’s a well known fact that general requirements of operational costs are dramatically reduced with increase of water depth, i.e. increase of vessel draught (Radojcic,2009):

- During the low water levels, the ship should be able to operate with restricted economical effects.
- The same ship should be able to operate in deeper water too, but will then be less efficient than the ship initially designed for deep-water operation only.

The Danube River’s specifications are stated as below (Radojcic,2009):
**Water depth**
Upper Danube – stretch Straubing-Vilshofen with hW-LNRL< 2 m (1.7 m)
several sectors have hW-LNRL= 2.0 – 2.3 m
Lower Danube – several sectors have hW-LNRL= 2.3 – 2.4 m (1.5 m)
Elsewhere – hW-LNRL> 2.5 m. Middle Danube - often above 5 m

**Bridge height or air clearance**
Critical bridges – Deggendorf hA-HWL= 4.73 m and Passau hA-HWL= 6.36 m
RMD canal bridges – ~ 6 m
Other bridges – upstream from Budapest ~6.7 m, downstream hA-HWL> 7.5 m

**Size of locks**
Critical - Straubing at 12x190 m (as all locks of RDM canal)
Other on the Upper Danube are 2x24x190

On the other hand Radojcic (2009) offers convenient ships for the Danube River. With the aim to demonstrate how a contemporary, safe, cost-effective, shallow draught vessel intended particularly for the Danube waterway should look like, some of the conclusions and technical achievements aimed at increasing efficiency of inland navigation are incorporated into design of two specific ship types; Self-propelled container vessel and Barge train (actually a push boat) for bulk cargo. These two distinct ship type concepts are good representatives of typical ships used on the Danube.

With the all information given above, container transportation on the Danube River by Turkish ceramic producers and ceramic exporter countries is worth analyzing. Today, Turkey is ranked 9th ceramic producer country of the world with having high quality of ceramic materials, successful scientists and technicians trained with innovation to provide customer satisfaction. Table 1 shows Turkey’s ceramic production.

![Table 1: The Export Performance of Turkish Ceramic Sector](image)

**Source:** Turkey Ceramic Sector Strategy Document and Action Plan 2012, p.11

According to Table 1, Turkey’s exports of ceramic sanitary ware and ceramic tiles provide high added value. The demand for ceramic decreased and the capacity utilization rates fell at the end of 2008 with the impact of global crisis. According to Turkish Statistical Institute’s data while total exports of ceramic industry in general, 868 million U.S. dollars in 2008, it fell to 675 million USD in 2009. Then this rate increased to U.S. $ 778 million in 2010 and to U.S. $ 883 million in 2011 (Turkey Ceramic Sector Strategy Document and Action Plan 2012, p.11).
It’s a well known fact that, Turkish ceramic sector become one of the world’s leading exporter sector in the last 10 years. Because of the export-oriented sales, it’s seen as enhancing value added activities by the ceramic companies. In reference to EBKCCA’s (Eskişehir Bilecik Kütahya Ceramic Cluster Association) report total ceramic export of Turkey is 650 thousand tons in 2012 (EBKCCA Logistic Project, 2013). On the other hand, transport costs in the ceramic industry occupy a very important place in the total cost due to the nature of ceramic products. On account of the fact that transportation network mainly depends on highways rather than seaway and railway in Turkey, cost of transportation becomes high in both domestic markets and foreign markets. That’s why products can not be transported from production zone to convenient loading and discharging area efficiently. Besides lack of seaway usage increases the transportation costs. That’s why this paper offers a solution to ceramic traders companies regarding maritime transportation problem by using Danube River.

Table 2: Ceramic Tile Exportation Countries of Turkey – 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>56%</td>
</tr>
<tr>
<td>England</td>
<td>13%</td>
</tr>
<tr>
<td>Israel</td>
<td>9%</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>11%</td>
</tr>
<tr>
<td>Canada</td>
<td>6%</td>
</tr>
<tr>
<td>Canada</td>
<td>6%</td>
</tr>
<tr>
<td>Others</td>
<td>5%</td>
</tr>
</tbody>
</table>


Turkish ceramic industry currently exports its products to more than 100 countries in 5 continents. Most exporting countries such as Germany and the UK are the member states of the European Communities. Turkey’s export markets according to the quantity exported are England, Israel, Germany, Canada, Romania, Azerbaijan, Greece, France, Georgia and the United States.

Due to the fact that ceramic trading is contributing competitiveness of Turkey, the transportation costs should be decreased by using multimodal transportation and inland waterway shipping - the Danube River-. This river presents substantially cost advantage to the traders and Turkey should use this superiority in order to enhance the competitive advantage.

CONCLUSION

Danube River transport as part of the combined transport used by Turkish hauliers and exporters will provide a significant reduction in the cost of exports and will contribute to the competition in ceramic sector. However, there are some shortcomings related to using this River. One of them is river transport by Turkish companies is not been fully understood. The other one is Turkey’s adequate equipment and experience in this regard.

While Turkey is is the gateway to the world for Central and Eastern European countries associated with the Danube, the Balkan countries, Russia and the Caucasus countries, unfortunately it can not benefit enough from the advantage of this position. It’s advised to construct required infrastructure to use the Danube River effectively for container transportation.
Lastly, river transport should be encouraged for Turkish ceramic transporters in order to compete with European countries and to benefit from the advantages of container ships for inland waters. In this way Turkish shipowners will gain competitive advantage in terms of ceramic transportation costs.

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