Aspects regarding the evolution of the transport of containerized goods through the port of Constanta in context of European containerized trade

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Abstract. In the context of a continuous transformation of maritime freight transport, we considered it is important to conduct a study of the evolution of the transport of containerized goods. The aim of this research was to present the evolution of transport of containerized goods through the port Constanta between 2009 and 2017 and also to highlight the comparative analysis for the containerized trade through some of the most important countries which have ports on the Black Sea, the Adriatic Sea, the Baltic Sea, the Mediterranean Sea, the Aegean Sea, the Norwegian Sea and the North Sea. The period analyzed for these was between 2010 and 2016. The methodology used consists in data processing and graphic representation of the comparative analysis of the results.

Keywords: Maritime Transport, Port, Central and Eastern Europe, Black Sea, Containerized Transportation

1. Introduction

It is obviously that the maritime trade is one of the oldest and most economical ways to transport goods at the European level. Maritime transport has developed with the growth of the economy and gradually became a real industry. Today The European containerized trade marine is represented by well-organized fleets, modern port infrastructures, high-performance communications and, last but not least, high-class specialists.

From an economic point of view, the transport of containerized goods has dramatically reduced transport costs, mainly as a result of faster loading and unloading. Considerable intensification of capital investment along the entire transport chain was necessary to ensure the efficient use of containers. At the same time, it can be said that labour intensity has been reduced in a sustainable way, as fewer workers were required to the operations that means that of loading and unloading. Containerization was a radical change in freight transport, this meaning among other that prior to containerization the shipment speed was much lower and the acute delays led to inefficient transhipment resulting an incorrect management of the operational time of goods distribution. In the containerized trade, freight transport has reached a level at which time-based management realizes that the speed of distribution is very important. Any improvement in freight speed may in the future be based on the use of a better port infrastructure.

Talking about containerized maritime trade we used the study from [1] related to the period between 2009 and 2017 with the aim to obtain graphical comparative results and all of this are structured in the five next sections.

So, in the first section we study the evolution of containerized trade transport through Constanta Port between 2009 and 2017. The second section is about comparative aspects of containerized trade
transport through the ports of Romania, the Russian Federation, Ukraine and Bulgaria. The third section in the context of closer cooperation between EU member states we present some of comparative aspects of containerized trade transport through the ports of "The Three Seas Initiative" which follows to provide support for better cooperation and interconnection of the economies of the states in the geographical area of the three seas - the Adriatic, the Baltic and the Black, including in the field of transport. In the fourth section we present some comparative aspects of containerized trade transport through some of the important ports from Romania, Greece, Italy and Spain. In the last section we present comparative aspects of containerized trade transport through the ports of Romania, Netherland, Norway and Sweden. It is necessary to point out that in the last three sections, we considered the study period between 2010 and 2016 taking into account the fact that starting with the third quarter of 2010 most of the countries affected by the recession had already been on an upward trend. The comparative parameters which have taken into consideration in this paper are the container ships size, the containerized sea trade volumes and also the ports infrastructure.

2. The evolution of containerized trade transport through Constanta Port between 2009 and 2017

In Romania, the transport of containerized trade dates back to the early 70's of the 20th century. At that moment work began with the project of the first container terminal in the port of Constanta. After 1989 there was a new reorganization of the port activity and, implicitly, the transport of containerized goods through the port of Constanta had a spectacular expansion. Thus, in 2001, the port of Constanta reached a new record, of 118 645 TEUs, in the context of the transport of containerized goods.

Constanta Port is located at the intersection of the trade routes between Central and Eastern Europe and Central Asia and the Far East, it is a multifunctional port that offers facilities for the operation of large tonnage ships and connections through all modes of transport with customs specific services for the Free Zone legal status. It is an important centre for the transit of containers to the Black Sea ports also it is the main Romanian port on the Black Sea playing a highly important role as the transit node for the land locked countries in the Central and South-East Europe. The Port of Constanta is composed of the Northern Port completely in operation and the Southern Port partly operational. The Northern Port has terminals specialized in the trafficking of petroleum products, ore, coal, cereals, containers, rolled goods and general cargoes. The Southern Port has terminals specialized in chemicals, general, cargo, ferry terminal, Ro-Ro and on the berths of the maritime river basin there are arranged transhipment sectors for ore, coke and coal directly into barges which have access to the Danube-Black Sea Canal.

At the end of 2003, Constanta harbour opened the largest specialized container terminal in the Black Sea, operated by Dubai Ports World.

With a total area of over 76 ha (52 ha operational), the terminal offers an annual operating capacity of approximately 1 500 000 TEUs. Due to the depths, which have a minimum of 14.5 meters, the
terminal allows the operation of Post-Panamax port-container vessels and the operating facilities ensure the effective operating rate of the mooring vessels.

Another important container terminal which is operated by SOCEP, is located on the north part of the port and it operates on two berths of a combined length of 467 meters and a water depth of 13.5 meters. The nominal capacity of the terminal is 300 000 TEUs. The facilities, depths provided by Constanța Port made it possible in 2007 to achieve a record yearly traffic of containers in the Black Sea region, totalling 1 411 387 TEUs [5].

It is knew that container terminals in the Port of Constanța has an annual capacity over one million TEUs and is the most important container terminal at the Black Sea. The port of Constanța has the capacity to handle significant cargo flows, yet this capacity is currently unused to its full potential. Starting from 2009 however, volumes slumped to around 600 000 TEU. This volume decrease coincides with the repercussions of the financial crisis that impacted the Romanian economy at that moment. The container traffic in Constanța harbour dramatically reduced, reaching 556 694 TEUs in 2010 to climb to 689 066 TEUs in 2015. While the growth has a slowly recovering it could be said that it is far away from the previously results achived between 2004 and 2007.

Based on data provided by [6], we have drawn up the graph represented below in the Figure 1 showing the evolution of containerized trade transport through Constanța Port during 2009-2017. The data presented in the Table 1 are in TEUs.

### Table 1

| Port/ Year | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Constanța  | 595 303 | 556 694 | 662 796 | 684 059 | 661 124 | 668 349 | 689 066 | 711 339 | 696 438 |

![Figure 1](image.png)

3. **Comparative aspects of containerized trade transport through the ports of Romania, the Russian Federation, Ukraine and Bulgaria**

The container turnover in Russian ports has been growing since 2005 except in 2009 when it dropped 36% due to the global economic downturn. The trade volumes recovered quickly and in 2012, the container flow through Russian ports reached a record 4 500 000 TEUs. Based on industry reports, export/import container traffic through Russian ports grew by 10% in 2013 but dropped substantially in 2015, like the table below has shown.

The most important commercial ports are those from St. Petersburg and Vladivostok.

The majority of the berths of “The Greater Port of St. Petersburg” can accept vessels up to 9.8 meters of maximum draught, and several berths can serve vessels with 11 meter draught. The Port
operates year round. During the winter, the Port Administration provides 11 icebreakers for clearing the way for trade vessels. According to the “Greater Port St. Petersburg” Administration, this is adequate to ensure normal port operation during winter months. It has necessary to point out that “The Greater Port of St. Petersburg” belongs to the Russian government and 28 licensed stevedoring companies rent 200 berths at the port and handle cargo loading/unloading works and other operations accompanying the cargo transportation via port [7].

The commercial Port of Vladivostok has 15 berths with a total length of more than 4 kilometres. It is one of the largest multi-purpose and the best-equipped ports in the Russian Far East. Its modern cargo handling equipment enables to provide the customers with the innovative solutions in cargo handling [8].

The closest competitors for Constanta are the Bulgarian ports situated in the Black Sea range Varna and Burgas. Both ports are still under government administration via their respective Port Authorities. The port of Burgas is a small port which handled, like example, an annual throughput of 49 000 TEUs in 2013. It is also the only port that does not have gantry cranes for loading and unloading operations and relies on traditional level lifting cranes.

Both Burgas and Varna Ports are direct competitors for the port of Constanta for hinterland cargo due to the geographic proximity within the range.

Based on the data offered by Ukraine's officials which participated at "Black Sea Container Summit-2016" [9] we can say that in 2016 there was an upward trend. For example, marine terminals in Ukraine during the first 8 months of this year handled 320 000 TEUs, i.e. 18% more than in the same period of 2015. According to its reloading capacities today Ukraine is capable to tranship up to 3 000 000 TEUs each year. At the same time, experts say, these powers are involved only at 16.5%. In the next we have performed a comparative analysis presented through the Table 2 and we drew a graph shown in the Figure 2 for the containerized cargo transport through four chosen Black Sea countries considering a seven-year period starting with 2010 and using statistical data in TEUs from [10].

Table 2

| Country/Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------|------|------|------|------|------|------|------|
| Romania      | 555 674 | 662 796 | 684 059 | 661 124 | 668 349 | 699 000 | 721 339 |
| Bulgaria     | 142 611 | 152 293 | 169 922 | 179 840 | 195 800 | 201 000 | 198 400 |
| Russian      | 3 230 676 | 3 786 066 | 4 416 215 | 4 486 538 | 5 252 000 | 3 909 400 | 3 923 662 |
| Ukraine      | 605 508 | 60 640 | 682 848 | 732 987 | 665 000 | 480 000 | 588 000 |

Figure 2
Based on information from [11] it could say that the containers terminals from the Black Sea for Romania, Bulgaria and Russia Federation saw growth of nearly 13% in 2017. The highest growth was achieved by Russia with 23%.

4. Comparative aspects of containerized trade transport through the ports "The Three Seas Initiative"

In the context of closer cooperation between EU member states in 2016 at the summit of "The Three Seas Initiative" - the Adriatic Sea, the Baltic Sea, the Black Sea, one of the relevant aims of the sea countries will be to stimulate economic cooperation and their economic development. The main goal of the summit was to begin plans for the implementation of the initiative that hopes to increase cooperation on trade, energy, and infrastructure between the EU member states of Central and Eastern Europe [12].

The sea trade transport could have a great influence on this, so we aimed to highlight the evolution of containerized cargo transport through the ports of the countries involved in "The Three Seas Initiative": Romania, Bulgaria, Lithuania, Latvia, Estonia, Poland, Croatia, Slovenia, during 2010-2016 based on the data in TEUs provided by [10] and using them in the graph from Figure 3.

![Figure 3](image-url)

Table 3

| Country/Year | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  |
|--------------|-------|-------|-------|-------|-------|-------|-------|
| Romania      | 555 674 | 662 796 | 684 059 | 661 124 | 668 349 | 699 000 | 721 339 |
| Bulgaria     | 142 611 | 152 293 | 169 922 | 179 840 | 195 800 | 201 000 | 198 400 |
| Lithuania    | 295 226 | 382 185 | 381 276 | 402 536 | 450 400 | 393 000 | 443 300 |
| Latvia       | 254 560 | 302 973 | 362 297 | 381 099 | 391 200 | 359 390 | 388 433 |
| Estonia      | 226 457 | 197 717 | 227 809 | 253 627 | 260 293 | 208 784 | 208 327 |
| Poland       | 1 053 634 | 1 317 182 | 1 657 433 | 1 959 537 | 2 139 616 | 1 869 800 | 2 028 577 |
| Croatia      | 137 048 | 150 677 | 152 016 | 169 943 | 211 900 | 181 800 | 196 850 |
| Slovenia     | 476 731 | 589 314 | 570 744 | 600 441 | 647 000 | 791 000 | 844 000 |

5. Comparative aspects of containerized trade transport through the ports of Romania, Greece, Italy and Spain

About Greece, a study of National Bank of Greece says that container handling covers around 1/5 of port revenue from trade activities (where containers account for 13% of freight volume). The same
study relived that the container market in Greece is dominated by two ports, Piraeus and Thessaloniki, which mainly depend on container handling (almost 75% of their merchant port operations) [13].

When it comes to referring to Italy it could be said that the specialised port sector (containers) is in full expansion in Italy—nine of the 30 busiest ports in the EU, in terms of container traffic, are located in Italy. The role of maritime transport has been expanded in Italy thanks to the project of ’sea highways’ in the framework of the development of the trans-European transport network [14].

When we are talking about the Spanish containerized maritime trade we have to focus on the fact that the most important ports which are in the first 50 world container ports and those are Valencia, Algeciras and Barcelona.

Algeciras port is one of the top five ports of the European Union when analyzing total freight transport. Their positions at the Strait of Gibraltar, as well as the natural conditions of the bay help keep it at this stage of the hierarchy. In 2015, due to the large number of containers handled, "The Journal of Commerce Review" awarded him a prize being considered the third largest container port in Europe.

So, in 2016, Algeciras confirmed its status of the country’s largest container hub by generating throughput of 4 759 000 TEUs, which is equivalent to an increase of 5.4% related to 2015. Valencia achieved the record of 4 722 000 TEUs in 2016, that means an increase of 2.32% after that of previous year of 3.9%. At the same time Barcelona saw spectacular growth of 14.5% in 2016, this being the highest in the last decade, all of this was obtained from the Port Authority’s press release [15]. Using data in TEUs from [10] we had drawn the graph from Figure 4.

| Country/Year | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  |
|--------------|-------|-------|-------|-------|-------|-------|-------|
| Romania      | 555 674 | 662 796 | 684 059 | 661 124 | 668 349 | 699 000 | 721 339 |
| Spain        | 12 396 923 | 13 877 789 | 14 036 891 | 13 850 009 | 14 245 488 | 14 291 755 | 14 993 941 |
| Greece       | 1 089 607 | 1 976 003 | 3 051 755 | 3 486 310 | 3 934 713 | 3 679 000 | 4 026 000 |
| Italy        | 9 736 654 | 9 464 031 | 9 562 765 | 9 989 308 | 10 260 000 | 10 217 316 | 10 574 791 |

6. Comparative aspects of containerized trade transport through the ports of Romania, Netherlands, Norway and Sweden

The Netherlands has a good geographical position on the coast of Western Europe and this had offered them the possibility to play a significant role in the world trade for hundred years, more
It is necessary to remark that the strong infrastructure and the large ports that The Netherlands owns have made them become “The Gateway to Europe”. The European Commission published, every year a study by EUROSTAT on commercial activity in EU ports. The port of Rotterdam is the most important transit port of Europe and also it is the largest container port which is still expanding. So, 396 000 000 tonnes of freight was loaded or unloaded at Rotterdam in 2012, a quantity that was approximately equal to the one recorded in 2011, using EUROSTAT data. In addition, Amsterdam Port is ranked 5th in the European ranking and is, for example, the largest cocoa port in the world [16].

The most important ports for Norway are Oslo, Larvik, and Kristiansand. The Port of Oslo can be described as the gateway to Norway and is Norway’s largest port by far. With its modern facilities, central location and short approach, the Port of Larvik represent an important and natural hub between sea and land freight. A total of 61 800 TEUs passed through the port in 2012, making it Norway’s second largest container port. The Port of Kristiansand is southern Norway’s main port for cargo and ferry traffic and offers the shortest sailing distance to Central Europe and has seen formidable growth, so in 2012 growth exceeded 12%. The terminals handle containers effectively using mobile cranes and are staffed 24 hours a day [17].

When we talk about Sweden it is important to point out that there are 52 cargo ports. Port of Gothenburg is one of the stronger in the container sector where it handles almost 60% of Swedish volumes. Using the data from EUROSTAT the number of containers (TEUs) handled in Gothenburg was 837 000 in 2014, four times more than the second Swedish container port, Helsingborg. Another container port that is the largest container port on the Swedish east coast is Port of Gavle that has announced plans to double its capacity in a project worth approximately US$ 83 200 000 like the authority of Gavle Port had announced [18]. The expansion, which will increase the capacity to 600000 TEUs annually, is expected to be completed in the fourth quarter of 2019. Strategically located just north of Stockholm and right next to the industrial Central Sweden region, Port of Gavle is a natural east coast hub for import and export. Based on data in TEUs from [10] we realized the Table 5 and had drawn the graph from Figure 5.

| Country/Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-------------|------|------|------|------|------|------|------|
| Romania     | 555 674 | 662 796 | 684 059 | 661 124 | 668 349 | 699 000 | 721 339 |
| Netherlands | 11 420 107 | 12 266 249 | 12 282 447 | 12 046 068 | 12 671 464 | 12 699 016 | 12 800 244 |
| Sweden      | 1 219 255 | 1 264 876 | 1 343 778 | 1 394 989 | 1 446 200 | 1 438 700 | 1 503 400 |
| Norway      | 335 291 | 273 027 | 273 396 | 276 414 | 671 400 | 735 600 | 739 663 |

Figure 5
7. Conclusions
Our study, presented in this paper, could be finished with some conclusions which we highlighted in the furthered.

Constanța Port obtained in 2017 a growth of 14.53% compared to 2009.
Between 2010 and 2016 Romania obtained an increase of 21.74% while Bulgaria realized a growth of 28.12% and Russian Federation of 17.67%. In the same time Ukraine experienced a downward trend of 2.9%

When we compared the results that give the evolution of containerized transport through the ports of countries involved in "The Three Seas Initiative", we can say that: Lithuania knew a growth of 33.41%, Latvia one of 34.47%, Estonia has decreased with 8.70% and Poland, Croatia and Slovenia increased with 49.07%, 30.38% and 43.52% respectively.

In the same time Greece increased with 82.94% which represent by far the best grow from our study. On the other hand, Spain and Italy obtained an increase of 17.33% and 7.93% respectively.

When we studied Netherlands, Sweden and Norway we observed that they have obtained an increase of 10.79%, 18.91% and 54.67% respectively.

Finally, we can say that this work can be a starting point for developing a future study in the field both for students from the Degree Master Program and for informing port authorities about taken possible measures related to development, efficiency and growth traffic of sea trade containerized goods.

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