

# EUROPE'S SOUTHEASTERN GATEWAY: RESPONDING TO RAPIDLY CHANGING PATTERNS OF WORLD SHIPPING. THE UNIVERSITY'S ROLE

## Abstract

World trade and transportation are changing dramatically. Energy prices and transport sustainability concerns are reinvigorating ocean freighter shipping. An ever-increasing portion of trade is in containers, and container ships are getting larger quickly. Many ports, nations and continents are not keeping up with ship size increases putting them at a trade disadvantage. Major canals and seaways must also upgrade or be rendered obsolete, causing a change in the pattern of world trade.

Ports have to do more than expand vessel size limits. Port regions must also invest in infrastructure that improves multi-modal access to the port and augments hand-off of containers to smaller seaway ships, trains and trucks. With heightened security and evolving emphasis on flexible and efficient logistics, ports must become high-tech logistics hubs with improved real-time data about port throughput.

Constanța, Romania provides an example of an attempt to respond to this rapid change. Near the Danube Delta, on the Black Sea, Constanța offers a potential southeastern gateway to Europe for the Black Sea, the Eastern Mediterranean and beyond. Ships from Asia, entering via the Suez Canal can easily access Constanța, and thus save more than ten days of shipping time for destinations in southeastern Europe compared to shipping through Rotterdam or Hamburg. But Constanța needs to make all the improvements mentioned above.

Universities have several roles in this endeavor, including identifying and forecasting trends, providing the technical knowledge to develop high-tech logistics hubs, pursuing public-private partnerships for infrastructure development and offering training.

**Keywords:** containerization, logistics hub, multi-modal handoff, Danube, Constanța, Romania.

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## **1. Introduction**

World trade and related transportation are changing dramatically, and few countries are in tune with what is happening. Rising energy prices are creating a shift back to ocean shipping as a more important transportation mode. Ocean freighter transport is considerably slower than other modes, but can be substantially lower in cost per volume and can create lower carbon emissions. These relative advantages continue to improve not only because energy prices are rising but because freighters are becoming larger. Some Asian container freighters can now carry nearly 20,000 standard shipping containers (TEU) per ship, more than double the volume of just a few years ago.

Yet, this efficiency advantage is only available to some countries. Even those that felt they had good seaports are finding that their port facilities are rapidly becoming out of date. At present, only a few Asian seaports are able to accept the largest ships. Only a few ports in North America and Europe such as New York, Los Angeles/Long Beach and Rotterdam are able to handle the next smaller-sized ships, and those ports are quite congested. The two major canal systems of the world Panama and Suez are in need of the major upgrades, some of which are now underway, and some of the great inland waterways, such as the St. Lawrence Seaway and Europe's two major rivers require expansion just to handle 'handoff' traffic. Not keeping up with this ship size escalation could cause a country or a whole continent to fall behind economically. It could be the basis for the redistribution of world wealth.

Where does Romania stand in the new global shipping war? What role do universities play in making sure that their country stays on top of rapidly changing situations? The purpose of this article is to answer these questions. The first part will lay out the current situation. The second will evaluate the Eastern European and North American responses to the current situation.

## **2. The current situation**

To describe the current situation, some basics about freighter transportation are necessary. The first step is to describe the current status of containerization followed by a discussion of current ship characteristics. Then we must look more closely at the seaports, canals and waterways needed to handle those ships.

### **2.1. Containers**

Containerization is a method for transporting freight that uses large metal boxes called inter-modal containers. Built to certain standard dimensions, containers transfer easily from one mode of transport to another. Containers may be transferred from container ships to smaller container ships, to special rail flatcars or to semi-trailer trucks, without being opened. Overhead Gantry cranes can move containers between modes with very little physical human labor. Large ships pull into quays with railroad tracks and/or truck lanes along side of the ship. Giant Gantry cranes roll on their own rails parallel to the quay (<http://en.wikipedia.org/wiki/Containerization>).

Containerized shipping has now been around for nearly 60 years (World Shipping Council, 2012). Containerization has grown steadily over the decades because of the substantial reduction in cost it allows at the break-of-bulk point. This growth has been cited as a cause of growth in world trade.

As world wage levels have increased, more labor-intensive, manual methods of transferring goods from one mode to another have become prohibitively expensive in most developed and emerging economies, but containerization has released the shipping world from this obstacle. The only goods not regularly containerized are bulk goods such as coal, and liquids such as oil. Even these two categories are experiencing increased containerization with the advent of tanker containers and inflatable rubber liners for containers. Some car manufacturers have containerized the transport of new cars, with the potential for transporting up to four family cars in a 45-foot container (Global Security.org, 2012). The type of commodities that can be transported in a container is almost limitless. Therefore, the container market is expected to grow faster than world trade and the world economy in general.

The terrorism events of 9/11/01 also increased the potential relative cost advantage of containerization. In addition to labor cost reductions, containers have offered the potential of higher security. Containers can be inspected and sealed at their origin. They can remain sealed and electronically monitored and tracked until they reach their final destination, no matter what mode of transport they are on or country border they cross. To fully utilize this advantage will require much greater international cooperation, but the technology is in place and nearly every country is looking to balance security considerations with efficiencies.

Some energy and cost disadvantages to containerization also exist but are, in most cases, offset by savings. One disadvantage is that the weight of the container must be added to the shipping weight. Some are working on the use of new composite materials to reduce container weight. A second disadvantage is the need to dead-head empty containers from low demand origin locations (high destination demand) to high demand origin locations (low destination demand). The dead-head problem is acute at present between the U.S. West Coast and China with excess volume flowing east across the Pacific. The cost of dead-heading empty containers is great enough that many containers arriving on the west coast of the U.S. are discarded and the material is recycled rather than sending a container back across the Pacific. Finding a composite material that is strong, light and easily recyclable would greatly resolve the dead-head problem. Many organizations are looking for alternative uses for the huge number of discarded containers, such as turning them into buildings.

Containers come in standard sizes so as to easily fit in various-sized ships, on rail cars and as truck trailers. Five standard lengths are 20-ft., 40-ft., 45-ft., 48-ft., and 53-ft. The United States commonly uses 48-ft. (15 m) and 53-ft. (rail and truck). The U.S. is able to use the larger containers because railroad gages are larger and highways accommodate larger trucks. Freight or train capacity expressed in twenty-foot equivalent units (TEU, or sometimes *teu*) is common (World Shipping Council, 2012, Container Standards).

## 2.2. Ships

Ocean freighter ships are built to accommodate standard containers, with wide beams like bulk ships. Container ships are described in terms of their container capacity. 'Container ships are divided into seven major size categories: (1) small feeder, (2) feeder, (3) feedermax, (4) panamax, (5) post-panamax, (6) new panama, and (7) ultra-large' (Hayler and Keever, 2003). The word 'panamax' refers to the maximal size of a ship that is able to pass through the Panama Canal (discussed later). As can be seen by the listing, several categories are too large to fit in the existing canal.

'By 2000 the global container ships fleet numbered over 6,800 vessels' (Global Security.org, 2012, Container Types). More than 70% of these were built to carry ocean-going containers. This world-wide fleet had a capacity of nearly 6 million TEUs in 2000.

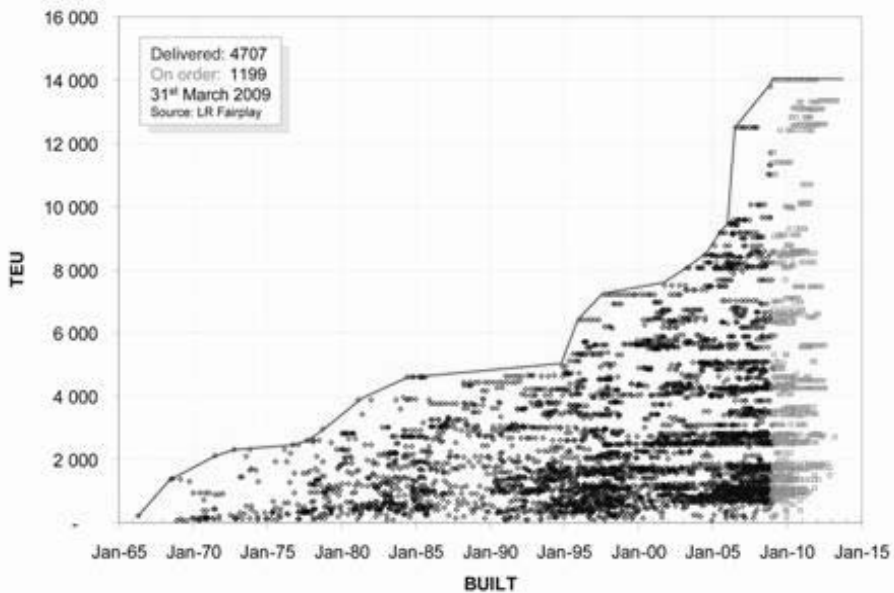
The size of ships in terms of the number of containers they can hold has grown rapidly in the last decade and a half. Nearly 3/4th of the fleet in 2000 consisted of smaller ships with under 1,000 TEU capacity. But, Super Post-Panamax vessel of 4,500 TEU and larger, were already growing rapidly as a portion of the total. By the end of 2001, about 10% of the global fleet could carry more than 4,500 TEUs (Global Security.org, 2012, Container Types).

By the end of 2003 about 100 container ships with a capacity of 8,000 TEU were already in use. The Samsung shipyard was building a container ship with a capacity of 9,200 TEU for use in 2005. Samsung delivered a 9,600 TEU ship in 2006. That size increased to 15,000 in 2010 and the maximum size is now in the 20,000 TEU range (Schumacher Cargo Logistics, 2012).

Figure 1 is a scatter gram showing ships built up to March 2009 and their size in TEUs. The chart shows the acceleration in size. The line indicates the largest container ship operating at any point in time. Since few container ships have been scrapped, this chart also gives a visual indication of the current percent of ships by size. The chart makes some trend predictions for the future (points on the right side of the chart), but those predictions have already been outstripped.

Korea's Daewoo Corporation plans to construct the world's largest ship for Maersk line. The ship will cost US \$190 million, and hold 18,000 TEU containers, 2,500 more than the previous largest. To get a sense of the amount carried by a single container ship of this size, if the same number of containers were loaded on a train, the train would be 110 km long (Gizmag, 2012).

Maersk claims that superior economies of scale will enable the new ships to surpass the industry record for both fuel efficiency and CO2 emissions per container moved. Maersk plans to put ten such ships into service between 2013 and 2015 with a further 20 ships optioned (Gizmag, 2012). The increase in the maximum size of container ships does not mean that the demand for small feeder and coastal container ships has decreased. Ships with capacities of less than 2,000 TEU accounted for more than 50% of the number of ships delivered from 1995 to 2005.



**Figure 1:** Ships built up to March 2009 and their size in TEUs

**Source:** Article based on a paper written by Knut A. Dohlie and first published in the *DNV Container Ship: Update No. 3*. 2009. Republished as 'The Future of the Ultra Large Container Ship', *Motorship*, June 18, 2010. Illustration © Mercator Media 2012.

### 2.3. Container ship ports

Obviously, with ship size increasing rapidly sea ports must be built to accommodate the larger ships. And, with the increased energy and cost efficiency offered, servicing larger ships could be important to a city or country's competitive advantage. The costs and time lags associated with building port facilities are much greater than for the ships themselves.

Below is a list of the world's 50 busiest container seaports (2010), providing the total number of actual TEU (in thousands) transported through each port annually.

As can be seen, container ports are dominated by Asian ports, with 7 of the top 11 in China. This list also approximates the order of ports by maximum ship capacity as measured by TEUs per ship or maximum dead weight.

Western nations are far behind in both port capacity and amount of trade. European ports that make the list are Rotterdam (#10), Antwerp (#14), Hamburg (#15) and Bremen/Bremerhave (#23).

North American entries are Los Angeles (#17), Long Beach (#18), and New York/New Jersey (#20). Other North American and European ports in the top 50 are: Valencia, Spain; Flexstowe, UK; Algeciras, Spain; Gioia Tauro, Italy; Savannah, US; and Vancouver, Canada; Zeebrugge, Belgium and La Havre, France recently dropped off the list.

Ports on this list can handle the Panamax ships, but not necessarily the newer ones of greater size. Going farther down the list, ports might only be able to deal with smaller

**Table 1:** Listing of world ports by container traffic

Container Traffic (in thousand TEUs):		Country	2010[1][2]	2009[3]	2008[4]	2007[5]	2006[6]	2005[7]	2004[8]
Rank	Port								
1	Shanghai	China	29,069	25,002	27,980	26,150	21,710	18,084	14,557
2	Singapore	Singapore	28,431	25,866	29,918	27,932	24,792	23,192	21,329
3	Hong Kong	China	23,699	20,983	24,248	23,881	23,539	22,427	21,984
4	Shenzhen	China	22,510	18,250	21,414	21,099	18,469	16,197	13,615
5	Busan	South Korea	14,194	11,954	13,425	13,270	12,039	11,843	11,430
6	Zhoushan	China	13,144	10,502	11,226	9,349	7,068	5,208	4,006
7	Guangzhou	China	12,550	11,190	11,001	9,200	6,600	4,685	3,308
8	Qingdao	China	12,012	10,260	10,320	9,462	7,702	6,307	5,140
9	Dubai	UAE	11,600	11,124	11,827	10,653	8,923	7,619	6,429
10	Rotterdam	Netherlands	11,140	9,743	10,784	10,791	9,655	9,287	8,281
11	Tianjin	China	10,080	8,700	8,500	7,103	5,950	4,801	3,814
12	Kaohsiung	Taiwan	9,180	8,581	9,677	10,257	9,775	9,471	9,714
13	Port Klang	Malaysia	8,870	7,309	7,970	7,120	6,326	5,544	5,244
14	Antwerp	Belgium	8,470	7,309	8,663	8,176	7,019	6,482	6,064
15	Hamburg	Germany	7,910	7,007	9,737	9,890	8,862	8,088	7,003
16	Tanjung Pelepas	Malaysia	6,540	6,000	5,600	5,500	4,770	4,177	4,020
17	Los Angeles	USA	6,500	6,748	7,850	8,355	8,470	7,485	7,321
18	Long Beach	USA	6,260	5,067	6,350	7,316	7,289	6,710	5,780
19	Xiamen	China	5,820	4,680	5,035	4,627	4,019	3,342	2,872
20	New York/New Jersey	United States	5,290	4,561	5,265	5,299	5,093	4,785	4,478
21	Dalian	China	5,260	4,552	4,503	4,574	3,212	2,665	2,211
22	Laem Chabang	Thailand	5,190	4,538	5,134	4,642	4,123	3,834	3,529
23	Bremen	Germany	4,890	4,578	5,529	4,912	4,450	3,736	3,469
24	Jakarta	Indonesia	4,720	3,800	3,984	3,900	3,280	3,282	3,170
25	Tokyo	Japan	4,280	3,810	4,271	3,818	3,969	3,593	3,358

26	Mumbai	India	4,280	4,061	3,953	4,060	3,298	2,667	2,361
27	Valencia	Spain	4,210	3,653	3,593	3,043	2,612	2,410	2,145
28	(Saigon)	Vietnam	4,110	3,563	3,100	2,532	2,532	2,122	1,868
29	Colombo	Sri Lanka	4,080	3,464	3,687	3,380	3,079	2,455	2,221
30	Lianyungang	China	3,870	3,021	3,001	2,001	1,302	1,005	N/A
31	Jeddah	Saudi Arabia	3,830	3,091	3,326	3,068	2,964	2,836	2,426
32	Salalah	Oman	3,490	3,490	3,068	2,600	2,390	2,492	2,229
33	Port Said	Egypt	3,480	3,300	3,202	2,127	2,127	1,522	869
34	Yingkou	China	3,340	2,537	2,030	1,371	838	634	N/A
35	Felixstowe	UK	3,300	3,100	3,200	3,300	3,000	2,700	2,717
36	Yokohama	Japan	3,260	2,555	3,490	3,400	3,200	2,873	2,718
37	Manila	Philippines	3,250	2,815	2,977	2,800	2,638	2,625	2,698
38	Surabaya	Indonesia	3,040	1,140					
39	Khor Fakkan	UAE	3,020	2,750	2,112	1,850	1,730	1,929	1,819
40	Gioia Tauro	Italy	2,850	2,857	3,468	3,445	2,900	3,161	3,261
41	Savannah	USA	2,830	2,356	2,616	2,604	2,160	1,902	1,662
42	Algeciras	Spain	2,810	3,042	3,324	3,152	3,257	3,180	2,937
43	Balboa	Panama	2,760	2,012	2,011	2,167	988	663	
44	Santos	Brazil	2,720	2,252	2,675	2,533	2,208	2,240	1,883
45	Bandar-Abbas	Iran	2,590	2,206	2,000	1,723	1,408	1,293	N/A
46	Durban	South Africa	2,550	2,110	2,560	2,511	2,334	1,955	1,717
47	Nagoya	Japan	2,550	2,113	2,817	2,890	2,740	2,470	2,304
48	(Istanbul)	Turkey	2,540	1,835	2,262	1,940	1,446	1,186	
49	Kobe	Japan	2,540	2,247	2,432	2,432	2,413	2,250	2,177
50	Vancouver	Canada	2,510	2,152	2,492	2,307	2,208	1,767	1,665

Source: The Journal of Commerce (2012)

ships. Norfolk, VA has low TEU volume but deep water larger ship capacity (Allen, 2012). Halifax is developing its deep water port to handle larger ships, but does not currently make the top 10 in volume.

Not only must ports upgrade the size of their ship bays, but other preparations must be made. In several major ports, bridges that cross the mouth of the bay are too low for the big ships. This is somewhat of a problem in Halifax and Baltimore, for example (Allen, 2012). Also the capacity to load containers on to trains and trucks quickly is a concern. One train can only carry about 240 40-ft. containers. About 20 double-stacked trains of maximum size would be required to move the containers from one 18,000 TEU ship. The larger the container ship, the more time is required for loading and unloading, but the time schedule for a container ship is very tight, since the demand is high (Global Security.org, 2012, Container Types).

Another issue is ship 'handoff' capacity to feeder ships. Smaller ships can be used to transport containers from the big ports to smaller coastal or up-river ports. But, again, the speed and efficiency of the inter-ship transfer process is critical. Often ships need the capacity to line up side-by-side and have gantry and quay cranes sort and transfer containers.

For all of these transfer strategies the required infrastructure includes not only physical facilities but also other technologies to maintain internal security, track inventory and deal with border-crossing bureaucracies related to customs, immigration and terrorism threats. These soft infrastructures are both a significant part of port costs and a more ongoing issue requiring constant update. They also contribute to a higher demand for advanced technologies in the port city and can lead to the establishment of a trade, transportation and communication technology hub there (Lick and Hamlin, forthcoming).

In the early history of urban development break-of-bulk points at seaports lead to the location of many of the world's great cities. More recently, the airport has become a catalyst for both industrial development and high-tech 'aerotropolis' services (Lick and Hamlin, forthcoming). Now, the elevated importance of sea freight in modern trade is providing an impetus for modern technological development and local economic growth near seaports, including high-tech logistics centers, often with a closely associated aerotropolis.

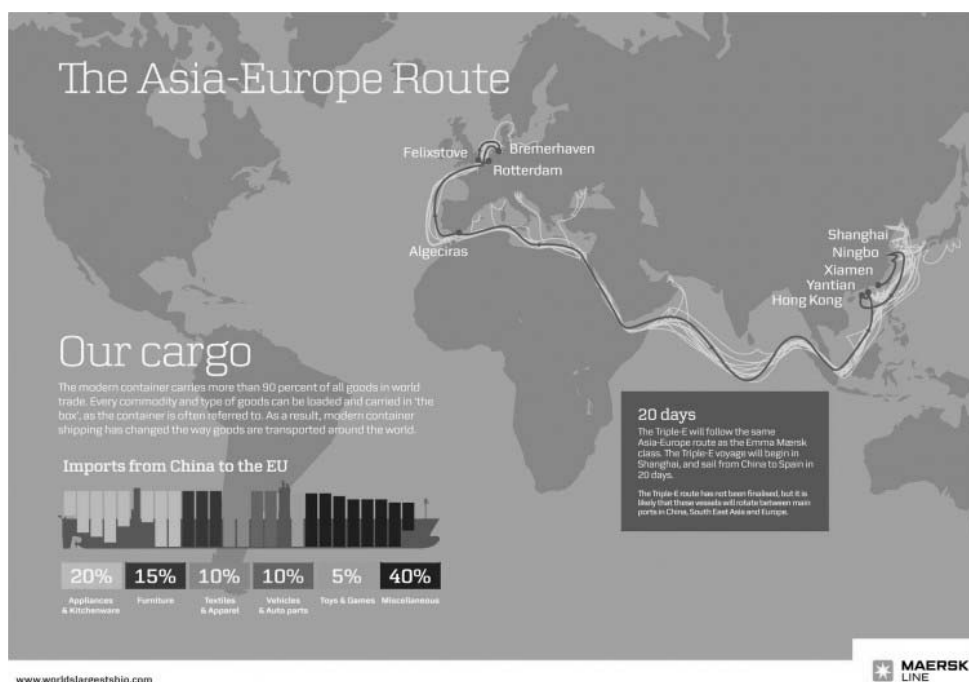
#### ***2.4. Sea routes and major canals***

Using very large ships also affects routes as well as origins and destinations. Most container shipping trade is between Asian nations. This is where ship size and port capacity are growing most rapidly. The greatest intercontinental shipping is probably between North America and Europe. However, the shipping routes from Asia to the west coast of North America are growing rapidly with a high percentage of that trade being one-way from Asia. This one-way pattern is creating a significant dead-head problem in both containers and ships.



The Los Angeles and Long Beach ports are able to take some large ships but both ports are very congested. Vancouver is trying to prepare itself to compete. A major problem with Asian shipping to the west costs is the break-of-bulk cost to get goods on trains and trucks. For goods going to the eastern half of the US, a fast but costly trip by train or truck is necessary.

Asia-Europe shipping can go in one of two directions, depending on the capacity of the world's two most important canals, Panama and Suez. Both routes have problems. For the growing economies of South Asia, the Suez route is most likely. The Suez has less ship-size limitations because it has no locks, but might have limitations vis-à-vis the new ship sizes. Furthermore, once ships get to the Mediterranean Sea, they may face a 10 to 20 day trip around Europe to the west and north coast to get to ports that can handle the larger ship size and cargo volume. The port at Constanța would be well positioned for the South Asia-to-Europe shipping if it were able to handle the large ships and develop better inland handoff capacity.



**Figure 2: The Asia-Europe Route**  
**Source: The Maersk Line**

The Panama Canal is still the preferred route for East Asians but this is changing as ships get larger. The Panama Canal is so important that, as mentioned earlier, ships are put in size categories based on whether they can pass through that canal. However, an ever increasing number of ships are larger than the old Panamax size.

The size of a panamax vessel is limited by the size of the Panama Canal's locks. The 'post panamax' category has historically been used to describe ships with larger hulls.

However a multi-billion dollar project is now underway to expand the canal's capacity, both in volume and ship size. Completion of the project is projected for approximately 2014 (Panama Canal Authority, 2006).

The Panama Canal expansion project is causing some changes in terminology. The 'new panamax' size category indicates the ship-size that will be able to pass through the new third set of locks currently being built (United Nations Conference on Trade and Development, 2010). The new locks are being built to accommodate a ship with an overall length of 366 meters and much greater width. Such vessels will have a total capacity of approximately 12,000 TEUs (Panama Canal Authority, 2006). Yet, even this multi-billion dollar expansion will only accommodate ships 1/2 to 2/3rds the size of those soon to be built.

Suezmax is a term describing ships capable of passing through the Suez Canal. The term is primarily used to refer to tankers. Since the canal has no locks, the most serious limiting factors are the maximum depth below waterline, and height due to the Suez Canal Bridge. A few supertankers filled to capacity are too deep to fit through. They either have to transfer part of their cargo to other ships or to a pipeline terminal before passing through. Alternatively, they must travel around Cape Agulhas. The canal depth was increased in 2009 from 18 to 20 meters. Suez Canal Bridge causes a maximum head room of 68 meters. Similar terms of Malaccamax and Seawaymax are sometimes used for the largest ships capable of fitting through the Strait of Malacca and Saint Lawrence Seaway, respectively<sup>1</sup>.

The Panama project may also greatly impact trade patterns. Not only will East Asian ships more likely continue to use Panama rather than Suez to get to Europe, they may also want to ship directly to the U.S. East Coast rather than to the West Coast with a rail transfer. However, the New York/New Jersey port is congested and needs upgrading of transfer capacity. Other ports such as Halifax, Norfolk and Baltimore are looking for ways to get in the big-ship game.

## 2.5. *Inland waterways*

The St. Lawrence Seaway in Canada and the US connects the Great Lakes to the Atlantic Ocean via the St. Lawrence River. It moves ships between the Great Lakes with a series of locks that compensate for the different lake levels. In the 1950s and 1960s the St. Lawrence Seaway was considered one of technological wonders of the world. It facilitated trade within North America and was responsible for Gary, IN becoming a world steel center. In fact, it promoted the growth of many of North America's great cities such as Toronto, Detroit, Cleveland and Chicago. Chicago, more than 1,400 kilometer from the Atlantic Ocean developed a strong ocean-ship seaport and a rail hub serving the entire continent.

Now, the increase in ship size means that true ocean freighters may no longer be able to use the seaway. Instead ocean freighters will have to pull into an Atlantic

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1 See (<http://en.wikipedia.org/wiki/Seawaymax>) (<http://maritime-connector.com/wiki/seawaymax/>) and (<http://en.wikipedia.org/wiki/Malaccamax>) for more information.

port such as Halifax and hand off cargo to feeder ships that can use the Great Lakes seaway, or handoff to rail lines. This has created the need for a new kind of port to both accommodate the huge ocean ships and facilitate the handoff as efficiently as possible. In Europe the problem is more difficult since the major river systems are smaller than the St. Lawrence and the rail gage is narrower, allowing for small containers on rail cars.

### **3. Gateways and transportation & logistics hubs: responding to the rapidly changing current situation**

A variety of cities and countries are attempting to redefine themselves as continental gateways or logistics and transportation hubs to capitalize on the emerging patterns of trade and transportation. Halifax, Nova Scotia, for example, is attempting to be a Canadian Gateway to the country's principal populated areas and to the mid-western US. Halifax currently acts as a handoff point for Great Lakes feeder ships and rail lines. Halifax has a long history as a major port even as a small city. The shape of the large provincial peninsula with a well-protected bay and a deep water harbor causes it to be a prime candidate to take advantage of both Suez and new Panama traffic from Europe and Asia. The Halifax Port Authority is currently promoting several expansion projects.

Somewhat surprisingly, Halifax is partnering with the state of Michigan in the US to look at these issues even though the two locations are more than 1,400 kilometers away from one another. In addition to the obvious seaway and Great Lakes connection, a main trunk line of the Canadian National Railway (CN) runs from Halifax to Chicago through Michigan. It also runs through the largest population and industrial centers in Canada, and then through a large tunnel under the St. Clair River that connects two of the Great Lakes at the Sarnia – Port Huron border crossing. This rail line with the large tunnel is the only meaningful rail entrance to the Midwestern U.S. from Canada that can accommodate double-stack container trains. Most North American rail companies feel that trains must be double stacked to be adequately efficient. The Detroit River tunnels, for example, connecting Detroit and Windsor, Ontario, cannot accommodate double-stacked trains<sup>2</sup>.

An organization called the Great Lakes International Trade and Transportation Hub (GLITTH) is working to maximize the benefit of the potential Halifax gateway for the economic benefit of the Great Lakes regions of both the U.S. and Canada.

#### **3.1. Europe's Eastern Gateway**

The Black Sea main commercial ports are: Samsun and Trabzon (Turkey), Batumi (Georgia), Burgas and Varna (Bulgaria), Constanța and Mangalia (Romania), Odessa and Sevastopol (Ukraine), Novorossiysk and Sochi (Russia). A few of them have access

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2 An effort is currently underway to finance an expansion of the tunnel connecting Detroit, MI with Windsor, Ontario according to a presentation made by William Muir of the Continental Rail Gateway organization to the Great Lakes International Trade and Transportation Hub, November 1, 2012.

to European gateways: Samsun and Trabzon (via Istanbul – Corridor IV), Burgas and Varna (Corridor VIII, Corridor IV via Sofia, Corridor VII via Rousse on Danube), Odessa (Corridor IX and Corridor V via Kiev) and Constanța (Corridor IV, VII and Corridor IX via Bucharest). Being EU member countries, Romanian and Bulgarian ports have competitive advantages over other ports in the Black Sea region. They enjoy a special status in terms of no custom duties with other EU member states and the prospect of Schengen integration will enable the two countries to benefit from the free movement of goods between EU member states with regard to land transportation – roads and railway.

### ***3.2. Constanța: favorable location***

Constanța Seaport<sup>3</sup> in Romania is another example of a port city that could take on new importance because of the shifting patterns of trade and transportation. Constanța is located at the junction of major trade routes. These include routes connecting the Transcaucasus, Central and Eastern Europe and Asia and the Far East. Constanța could also be a gateway to Western Europe saving time and fuel compared to routes going from the Suez to Northern European ports. The favorable geographic position of Constanța Seaport is emphasized by its connection with two Pan European transport corridors, as defined by the European Commission. They are Corridor VII, the Danube and Corridor IV, road and rail links.

Also, according to the ‘CO2 Reduction’ report issued by the European Gateways Platform, significant savings in CO2 emissions could be achieved if the flow of goods destined for Central and Eastern Europe entered Europe through the Port of Constanța, Romania. ‘Calculating over a period of ten years, if the transport is (re)routed via Romania, the saving for Europe is on average €74 million per year’, a press release, issued by a Dutch-Romanian supply chain and logistics expert company, informs. In 2020, the forecasted 1.47 million TEU represents only about 10% of the total volume destined for Central and Eastern Europe. The report analyses both Total External Costs and the CO2 emissions consequences of re-routing traffic flows from Asia to Central and Eastern Europe to a direct entry into the markets via Romania.

Already, important container shipping lines are utilizing Constanța Seaport as a distribution port for the Black Sea region. In the past decade Constanța Seaport has been serving freight flows from Austria, Bulgaria, Hungary, the Republic of Moldova, Slovenia, Slovakia, Ukraine and Serbia (Ilie, 2012).

### ***3.3. The European Gateway Project***

The European Gateway Project is engaged in plans similar to those of Halifax, looking at the port at Constanța, Romania as a Black Sea-Danube River handoff point

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3 According to World Port Rankings 2010 Constanța Port is ranked 18<sup>th</sup> in Europe and 84<sup>th</sup> in the world’s busiest ports by cargo tonnage (<http://aapa.files.cms-plus.com/Statistics/WORLD%20PORT%20RANKINGS%202010.pdf>).

to feeder containerhips and to other modes that could carry goods to inter-modal terminals in countries such as Romania, Serbia, Hungary, Austria and Germany.

According to Romanian authorities, the Port of Constanța offers the largest terminal handling capacity in the Black Sea Basin. Based on 2010 statistics, the container throughput in 2010 approximated 600,000 TEUs. Constanța ranks 25<sup>th</sup> among European ports in this regard, and in the top 10 in Eastern Europe. This volume increased between 15% and 20% during 2011 to approximately 700,000 TEUs<sup>4</sup>.

The largest container vessel calling on the Constanța port has a capacity of approximately 9,000 TEUs, about 1/2 the size of the world's largest container vessels. The largest container terminal, located in the southern part of the Port of Constanța, operated by DP World, has an area of 42 hectares. This will equal approximately 60 hectares when current work is completed, with an estimated annual capacity of 1.5 to 2 million TEUs. The total quay length is 1,500 meters with a railway shunting area, and a river barge operation facility. DP World has five gantry cranes and two quay cranes.<sup>5</sup>

Certain attributes of Constanța recommend it as a hub port for the Black Sea and beyond. First, the port has all three main elements of effective intermodal transportation (inland waterways, Black Sea Danube Canal, railways and roads/motorway infrastructure). Also, the facilities for servicing all type of vessels, containers, tankers and others are in place<sup>6</sup>.

### ***3.4. The Constanța Gateway Plan***

Constanța's attributes facilitate the connection of other Black Sea ports to Central European markets using Pan European corridors. As such, the Port at Constanța hopes to be Europe's link to the Black Sea basin that also serves the Ukraine, Russia, Georgia, Bulgaria and Turkey. And, with growing Asian-European trade and improvements to the Suez, Constanța might be well located to connect European and Asian markets. It could be a key link between Europe and the rapidly growing economies of South and East Asia through the Suez canal, saving shippers the multi-day trip around Europe to North Sea ports like Rotterdam and Brementhaven. Furthermore, with the expanding Panama canal, Constanța could provide better access between East Asia and the Black Sea basin through the Panama Canal.

Like the Great Lakes example, this attempt at an eastern gate to European trade and transportation hopes to create a new competitive advantage for the region and promote manufacturing and trade in general. Also a part of the project would be a high-tech logistics hub for the east side of Europe.

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4 Information provided by the Romanian Ministry of Transportation and Infrastructure, 2011.

5 Information provided by the Romanian Ministry of Transportation and Infrastructure, 2011.

6 Information provided by the Romanian Ministry of Transportation and Infrastructure, 2011.

Creating an advanced multi-modal freight facility and logistics hub requires a multi-faceted plan. Basic questions to be answered are: what do Constanța and Europe need to do to accomplish this lofty goal? What is the status of the Constanța Port as it relates to the new larger ships and changing pattern of global trade? What is the status of the handoff facilities at Constanța? What work needs to be done to the canal shortcut through the Danube Delta? What expansion of the Danube's capacity is required? Can Constanța become a logistics hub?

In April 2010 a 'White Paper' was presented to the Romanian Government which was to act as a roadmap and work plan for a joint taskforce to work out these details, potential consequences, implementation elements and actions required to develop, implement and realize the key building blocks of a trade, transportation and logistics hub and gateway. The Joint Taskforces consists of experts from representative Romanian ministries and other public entities (e.g. Constanța Port Authority) and experts from the European Gateway Platform foundation<sup>7</sup>.

In order to accomplish the targets and goals, Port of Constanța, with consistent support from Romanian Ministry of Transportation and Infrastructure, must elaborate a strategy for future developments which should integrate with the national transportation strategy.

### **3.5. Current projects**

Several projects are either in progress or to be started in the near future. The port is already capable of accommodating the current Panamax ships, but, as mentioned previously, ship sizes are increasing rapidly, and the Panama Canal is increasing its ship size capacity. The port of Constanța strives to secure better alongside-access conditions for most of its inner port basins to promote efficient intermodal transfer (truck and rail).

One of the important projects in railway traffic is the enhancement of railway capacity in the river-maritime area of Constanța Seaport. The project consists in the construction of a systematized railway complex. In the first phase, the railway lines serving current operators will be executed based on traffic estimates for the year 2020. The project costs an estimated €17.6 million. Important transport hub of TRACECA Corridor, Constanța Seaport has to carry on the already initiated projects in order to consolidate the efficient connection status in the complex logistics chain.

Projects to improve port transportation infrastructure are also in progress with regard to the development of roads and bridges connecting port operation areas with national transportation systems. The limited access highway from Bucharest to Constanța was recently completed. The Danube River – Black Sea canal is operational and being maintained at its current level. Focus is also given to projects expected to secure better sailing conditions on the Danube all through the year. The 2012 blockage of the ship travel illustrated a severe problem. Considering the natural position and

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7 The Dutch-Romanian Chamber of Commerce established the Romanian Gateway Association which developed a white paper with recommendations.

the existing links to south east and central Europe markets Port of Constanța can play best the role of logistic hub.

#### **4. University role**

What is the role of a community-oriented university in this kind of situation? Universities have several paths of involvement as illustrated by the Halifax – Michigan example of GLITTH. First, university researchers should be tracking global trends in issues such as world trade patterns so as to be able to alert private sector and governmental sources of these trends. The shipping example shows how changes in one small aspect of global activity, ship building, might have far reaching consequences on national and continental economic development. Second, in the high-tech-information age, development and usage of the most advanced technologies often comes from universities. Creation of a state-of-the-art information and logistics hub is a complicated entity that showcases the interaction of science-based technologies with human systems. Governments are greatly concerned at such locations about security and taxation. Private systems must track inventories, time costs, billing and shipping instructions to name a few. The interaction of real time data bases, government policy, law and profit orientation are all areas that cross sectoral and technical lines in a way that only universities can view objectively.

University-developed economic development strategies can also increase the degree to which a logistics hub can attract and spin-off other economic development such as new manufacturing and new service businesses related to trade, transportation, security and information.

#### **5. Summary, conclusions and policy implications**

Global transportation is changing rapidly. Few countries are in tune with what is happening. Rising energy prices, improved handoff technologies, and security concerns are elevating ocean shipping as a more important transportation mode.

At present, only a few Asian seaports are able to accept the largest ships being built. Only a few ports in North America and Europe such as New York, Los Angeles/Long Beach and Rotterdam are able to handle the next sized ships, and those ports are quite congested. The two major canal systems of the world, Panama and Suez, are in need of the major upgrades, some of which are underway, and some of the great inland waterways, such as the St. Lawrence Seaway and Europe's two major rivers require expansion just to handle 'handoff' traffic. Not keeping up with this ship size escalation could cause a country or a whole continent to fall behind economically.

The concept of continental gateway also becomes salient with the renewed importance of ocean freight. Secondary cities can emerge as major payers in global trade if, (1) they are located on the edge of a continent, (2) they have a good deep water port, (3) they build good inter-modal transfer facility, and (4) they obtain the technological expertise to develop a logistics hub. One place in Eastern Europe that has that potential is Constanța, Romania. Currently the largest port on the Black Sea, Constanța is effectively at the

mouth of the Danube River, and has rail and highway connections the rest of Europe. By using the port at Constanța ships coming from Asia, through the Suez can save more than ten days travel by unloading in Constanța rather than Rotterdam.

To take advantage of the locational advantage, Constanța and other similar gateways must rapidly upgrade quays to handle larger boats, improve cranes for 'alongside' transfer to Black Sea ships, river vessels, rail and truck. They must develop state-of-the-art information and logistics hubs that effectively interface the real time information concerns of government, regional security, inventory, safety, large-scale physical infrastructure.

Universities have a role in tracking world trends such as those discussed in this paper and are really the only institutions that can provide objective analysis and technical assistance to systems that cross lines between the public and private sectors and science-based and human technologies.

### References:

1. Allen, G., 'The Race to Dig Deeper Ports for Bigger Cargo Ships', National Public Radio, January 5, 2012, [Online] available at <http://www.npr.org/2012/01/05/144737372/the-race-to-dig-deeper-ports-for-bigger-cargo-ships>, accessed on October 22, 2012.
2. 'Containerization,' [Online] available at <http://en.wikipedia.org/wiki/Containerization>, accessed on November 8, 2012.
3. Dohlie, K.A., 'The Future of the Ultra Large Container Ship', December 17, 2009, *DNV Container Ship: Update No. 3*, [Online] available at <http://www.dnv.com/industry/maritime/publicationsanddownloads/publications/dnvcontainershipupdate/2009/3-2009/Thefutureoftheultralargecontainership.asp>, accessed on July 23, 2012.
4. 'Egypt's Suez Canal H1 Revenues, Traffic Up; Upgrade Helps', July 26, 2010, *Reuters Africa*, Thomson Reuters, [Online] available at <http://www.reuters.com/article/2010/07/26/ozabs-suezcanal-egypt-idAFJ0E66P09P20100726>, accessed on November 9, 2012.
5. Global Security.org, 'Global Ship Types', [Online] available at <http://www.globalsecurity.org/military/systems/ship/container-types.htm>, accessed on November 8, 2012.
6. 'Global Ship Standards', [Online] available at [http://en.wikipedia.org/wiki/Containerization#Container\\_standards](http://en.wikipedia.org/wiki/Containerization#Container_standards), accessed on November 8, 2012.
7. Hayler, W.B. and Keever, J.M., *American Merchant Seaman's Manual*, Centerville: Cornell Maritime Press, 2003.
8. Ilie, E., 'Constanța, Important 'Commercial Gateway' in the Eurasian Platform', April 24, 2012, *RailwayPRO*, [Online] available at <http://www.railwaypro.com/wp/?p=8790>, accessed on July 30, 2012.
9. Lick, D. and Hamlin, R.E. 'Public-Private Partnerships for Promotion of Cross-Border Trade and Transportation', 2013, *The Canada-United States Law Journal*, forthcoming.
10. Panama Canal Authority, 'Proposal for the Expansion of the Panama Canal: Third Set of Locks', 2006, [Online] available at <http://www.acp.gob.pa/eng/plan/documentos/propuesta/acp-expansion-proposal.pdf>, accessed on November 10, 2012.
11. Rodrigue, J.P., 'The Growth of Transport Systems', Hofstra University, Department of Global Studies and Geography, [Online] available at <http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/shipsize.html>, accessed on November 8, 2012.



12. Schumacher Cargo Logistics, 'Cargo Shipping Container Sizes', [Online] available at <http://www.schumachercargo.com/shipping-container-sizes.html>, accessed on November 8, 2012.
13. 'The Future of the Ultra Large Container Ship', June 18, 2010, *Motorship*, [Online] available at <http://www.motorship.com/news101/ships-and-shipyards/the-future-of-the-ultra-large-container-ship>, accessed on August 8, 2012.
14. *The Journal of Commerce*, vol. 13, no. 29, August 20-27, 2012, [Online] available at <http://www.jocdigital.com/08202012/08202012/1/1#&pageSet=21>, accessed on August 6, 2012.
15. 'The Triple-E Maersk Container Ship Will Be the World's Largest and Most Efficient', *Gizmag*, [Online] available at <http://www.gizmag.com/triple-e-maersk-worlds-largest-ship/17938/picture/130648/>, accessed on November 8, 2012.
16. The World Shipping Council, 'History of Containerization', [Online] available at <http://www.worldshipping.org/about-the-industry/history-of-containerization>, accessed on November 8, 2012.
17. United Nations Conference on Trade and Development, 'Trade and Development Report, 2010: Employment, Globalization and Development', 2010.
18. Willoughby, W.R., *The St. Lawrence Waterway: A Study in Politics and Diplomacy*, Madison: University of Wisconsin Press, 1961.