

Challenges to and challengers of the Suez Canal

Dr. Theo Notteboom, President of ITMMA, University of Antwerp, Antwerp, Belgium & **Dr. Jean-Paul Rodrigue**, Hofstra University, New York, USA

The Suez Canal revisited

The Suez Canal plays a pivotal role in today's global container shipping network, in particularly in accommodating vessels sailing on the important Asia-Europe trade lane. Together with the Panama Canal, the Suez Canal serves as one of the oceanic canals contributing to the large concentration of shipping and port activities along the world's maritime 'beltway' or equatorial route. Along this beltway we find the majority of large transshipment hubs acting as turntables in extensive regionally-based hub-and-spoke networks.

Yet, in recent years the almost monopolistic position of the Suez route is being scrutinized by rising security concerns caused by piracy acts and armed robbery on vessels transiting the region, by high Suez Canal charges and by an ever-changing geography in world trade patterns. Moreover, a number of alternative all-water and land-based routes are vying for part of the cargo flows now passing through the Suez Canal.

Shippers and shipping lines are continuously re-assessing the design of their shipping and distribution networks in search of high cost efficiency, manageable risks and increased routing flexibility. This could affect the dominant position of the Suez route in the longer term.

The importance of the Suez Canal route

The Suez Canal was opened in 1869 as a man-made waterway connecting the Mediterranean Sea and the Red Sea. The canal is owned and maintained by the Suez Canal Authority (SCA), which is under the government of Egypt. However, the passage is guaranteed by the Constantinople Convention of the Suez Canal of March 1888.

Over the years the dimensions of the Canal increased in depth, width and length (see Table 1). Improvements are made to increase draft to 22m (72 feet), allowing passage of fully laden supertankers. The largest container vessels can navigate the Canal without difficulties. It is a single-lane waterway with four passing places in Ballah and in the Great Bitter Lake. Passage takes between 11 and 16 hours. Ship convoys are formed on either side of the canal to cope with the limited width of the canal. Shipping lines reserve their place in a convoy and as such want to ensure that the vessel will make it in time to the Canal's entrance.

The Suez Canal route's dominant function is accommodating East-West container trade between Asia and Europe. In 2008, 8,156 container vessels transited the Suez Canal, an increase of 74% compared to 2001. More than a third of all vessels using the Canal are container vessels. About 723 million tons of cargo passed via the Canal in 2008 or almost double the tonnage of 2001.

Nearly half of the cargo volume is containerized. The share of containerized cargo is still rising on the South to North direction (westbound from Asia to Europe) while it remained rather stable at 50% on the eastbound leg to Asia. Total container volumes reached an estimated 31 million TEU in 2008 compared to 20 million in 2004. Nearly 93% of these container flows are related to the Europe-Asia trade routes. North America (East Coast) – Asia trade represents about 5.3% (figures: Boston Consulting and Suez Canal Authority).

Suez Canal transit fees

The transit rates are established by the Suez Canal Authority (SCA). They are computed to keep the Canal transit fees attractive to shippers. In fiscal year 2008, Egypt earned US\$5 billion in canal fees (US\$4.6 billion in the previous year) making it Egypt's third largest revenue generator after tourism and remittances from expatriate workers.

Container ships account for just under half of the Canal's traffic and a slightly higher percentage of its net tonnage and revenues. Table 2 provides an estimate of the transit fees for various container vessel sizes based on rates of April 2008 (i.e. the last rate increase). The average canal transit fee per TEU (at 90% vessel utilization) amounts to US\$102 for a vessel of 1000 TEU down to US\$56 for the largest container vessels.

In early 2009, SCA announced an indefinite freeze on transit fees as a result of the global downturn and the Somali piracy crisis. Suez Canal fee revenues fell to US\$1.1 billion in the first quarter of fiscal year 2009/2010 compared to US\$1.5 billion in the same period of the previous fiscal year (minus 24%).

In early 2009, a number of shipowners started to boycott the Suez Canal because of the high transit fees. Maersk Line and the Grand Alliance were examples of shipping lines temporarily opting for the Cape route around South Africa instead of the Suez Canal route, mainly on the eastbound leg of the roundtrip.

TABLE 1: EVOLUTION OF THE NAUTICAL CHARACTERISTICS OF THE SUEZ CANAL

	Unit	1869	1956	1962	1980	1994	1996	2001	2008
Width at 11m depth	m	44	60	90	160	210	210	210	210
Maximum draft of vessels	feet	22	35	38	53	56	58	62	68
Overall length	km	164	175	175	190.25	190.25	190.25	190.25	190.25
Doubled parts	km	–	29	29	78	78	78	78	78
Water depth	m	10	14	15.5	19.5	20.5	21	22.5	23.5
Max. tonnage of vessel (DWT)	ton	5,000	30,000	80,000	150,000	180,000	185,000	210,000	210,000

Source: Own elaboration based on data from Suez Canal Authority

TABLE 2. ESTIMATED TRANSIT FEES FOR A SINGLE TRANSIT VIA THE SUEZ CANAL (FEES FOR APRIL 2008)

TEU-capacity	Typical SCNT*	Canal transit fees (US\$)	Net tonnage fee (US\$)	Fee on-deck containers (US\$)	Per TEU (full vessel)	Per TEU 90% utiliz.	Per TEU 60% utiliz.
1,000	8,727	91,999	87618	4,381	92.0	102.2	153.3
1,500	14,210	130,762	123,360	7,402	87.2	96.9	145.3
2,000	19,693	168,141	157,141	11,000	84.1	93.4	140.1
3,000	30,659	221,403	205,002	16,400	73.8	82.0	123.0
4,000	41,625	271,939	251,796	20,144	68.0	75.5	113.3
6,000	63,557	373,589	339,627	33,963	62.3	69.2	103.8
8,000	85,489	455,770	414,336	41,434	57.0	63.3	95.0
10,000	107,421	536,782	483,588	53,195	53.7	59.6	89.5
13,000	140,319	654,455	584,335	70,120	50.3	55.9	83.9

* Suez Canal Net Tonnage = 10.966 x TEU-capacity – 2238.7 (R-square = 0.9861)

Source: Own elaboration based on transit fee tables from the Suez Canal Authority

Maersk Line had 15 services routed through the Suez Canal, but in early 2009 six services (half the total volume) were rerouted via the Cape. The Cape route has longer transit times (i.e. caused by an additional sailing time of five to seven days) and thus requires more vessels per loop.

However, going via the Cape allowed shipping lines to avoid high toll fees. In a reaction to the economic climate, SCA made discounts more readily available to container shipping lines. This practice is highly unusual since SCA normally does not grant rebates to container ships on any trade lane. Since 1987, the Suez Canal Authority has maintained a flexible pricing strategy defined to include rebates for various other ship types and trade routes for which the Canal believes it faces a competitive alternative route (particularly oil tankers). The SCA has been granting rebates to owners/operators whenever they are able to prove that the voyage cost via the Suez Canal is more expensive than proceeding via the Cape/alternative route. There is a rebate committee, which meets every day and discusses all rebate applications submitted.

Challenges to the Suez route

While the Suez Canal will undoubtedly remain a very important oceanic canal, the Canal is confronted with a number of challenges which determine the Canal's appeal to shipping lines and shippers.

Piracy

First of all, the recent wave of piracy acts has generated great concern among shipping lines and cargo owners. The number of reported attacks near Somalia and in the Gulf of Aden increased from only 10 in 2006 to 111 in 2008 (figures of the International Maritime Board).

Somalia pirates operate up to 800 nautical miles from the coast using mother vessels. The security threat linked to piracy increased the insurance fees for vessels transiting the region (i.e. war risk insurance, additional P&I fees and higher premium on cargo insurance) and increased operating costs in terms of additional manning costs, costs related to a licensed security guard and deterrent equipment. These additional costs typically amount to US\$100,000-US\$115,000 per transit.

Capacity issues

Second, the Suez Canal has a finite capacity. For the foreseeable future there are no serious capacity constraints or draft limitations for container vessels. However, the single-lane character of the Canal continues to constrain the number of transiting vessels per day due to peaks in ship arrivals. As soon as the Canal is nearing its full capacity, SCA might have to consider a capacity management strategy based on a variable pricing system (yield management), i.e. high transit fees on peak moments and lower fees when demand is less.

The impact of the bunker price

Third, liner service dynamics have an impact on the Suez Canal. Bunker price evolutions remain an important factor to the success of the Suez Canal. Low bunker prices make shipping lines less concerned about nautical distances (see the rerouting via the Cape in early 2009 when bunker prices were low). High bunker prices give an incentive to shipping lines to slow steam and cut sailing distance. In times of surplus vessel capacity, shipping lines are more eager to opt for longer roundtrip times as it helps to absorb surplus capacity in the market (i.e. more vessels needed per loop).

The Cape route as an alternative

Fourth, the macroeconomic geography has contributed significantly to the success of the Suez Canal. The Europe-Far East container trade, the Canal's key trade lane, surged in the last decades. The Suez route is expected to remain the logical and dominant choice for connecting Asia with Europe. However, the Cape route could serve as an alternative to the Suez option on trades between Asia and South America, Asia and West Africa and South America and East Africa.

The flows related to the first two trade lanes now typically pass through the Suez Canal and are interlined in hubs such as

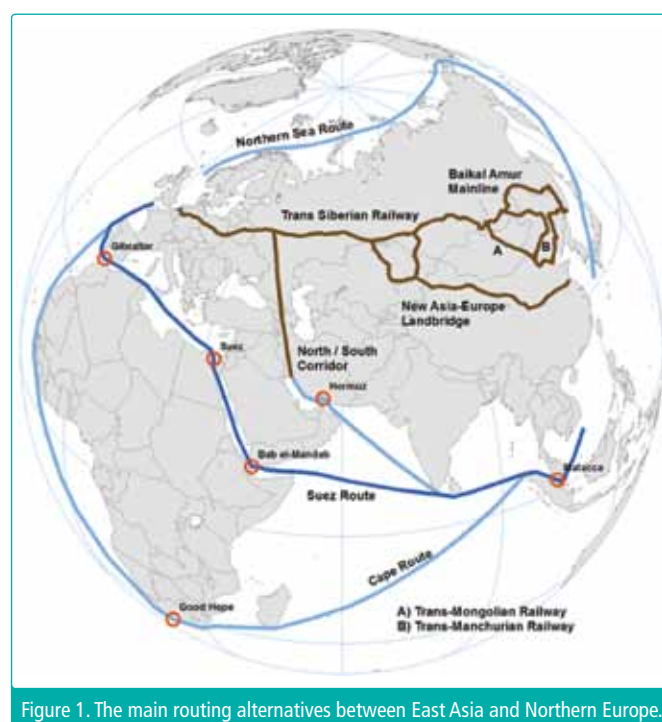


Figure 1. The main routing alternatives between East Asia and Northern Europe.



Figure 2. Circum-Equatorial maritime route.

Algeciras, Tanger Med or even in more northern ports such as Rotterdam (Maersk) and Antwerp (MSC). Interlining via the Cape offers a potential alternative to the Suez route. While distances and transit times via the Cape on these routes are typically lower than the Suez route, the Cape route today still faces higher costs mainly caused by poorer vessel economics (vessels on the Europe-Far East route are on average much larger) and the lack of large scale and efficient interlining ports in Sub-Saharan Africa.

However, by 2020 interlining via a hub near the Cape is expected to become more competitive compared to the Suez route due to a combination of higher Suez Canal transit fees, better vessel economics on the routes to Africa; and subject to a more competitive terminal efficiency and pricing strategy of southern African transshipment facilities in view of attracting interlining flows. This does not imply the Cape route would overtake the Suez route as the dominant shipping link between East and West. The expected emergence of the Cape route should be seen as the embodiment of a promising development of south-south trade volumes between Asia, Sub-Saharan Africa and South America.

New routing alternatives

Fifth, next to the Cape route, a number of other routing alternatives are being planned or are in operation to accommodate part of the trade volumes between Europe and Asia (Figure 1), but their market shares are expected to remain low compared to the Suez route.

First there is the *Northern Sea Route*, a set of all-water shipping lanes between the Atlantic Ocean and the Pacific Ocean along the Russian coast of Siberia and the Far East. Future ice cap reductions would open new possibilities for commercial shipping on this route. In cost terms the route today is still less favorable due to the need for ice-classed ships and ice breaker assistance, non-regularity of the liner services, slower sailing speeds, navigation difficulties and Russian transit fees.

Secondly, *North South land corridors* could develop as land bridges from the Persian Gulf via Iran to Russia.

Third, the *East-West rail corridors*, a set of railway lines connecting East Asia and the western part of Russia with the

Eastern part of Russia, are becoming more commercially interesting. One of the main arteries is the Trans-Siberian Railway which connects St. Petersburg with the port of Vladivostok. Other primary rail connections are the Trans-Manchurian Railway, the Trans-Mongolian Railway and the Baikal Amur Mainline (BAM – opened in 1991). The 'Trans-Siberian in Seven Days' program sets a target speed of 1,500 km a day by 2015. Rail land bridges in principle offer lead time advantages to shippers, but capacities remain low compared to container liner services. They offer a niche potential for time-sensitive cargo.

Competition with the Panama Canal

Sixth, the Suez Canal is also competing for cargo between Asia and North America (East Coast). Cargo between Asia and the US East Coast can follow three routing alternatives: the land bridge route (via US West Coast ports and then inland via the double-stack rail network), the all-water route via the Panama Canal and the all water route via the Suez Canal. The dominance of the land bridge route is being challenged by a resurgence of all water services between Pacific Asia and the East Coast. The share of the land bridge route for cargo from Asia destined for New York is expected to decrease from 75% to 60%. It is expected that the Panama Canal route will continue to account for the vast majority of all-water routes between Asia and the US East Coast, certainly when considering the Panama Canal expansion.

Still, the Suez route plays a modest but increasing role particularly through pendulum service configurations offering plenty of cargo bundling potential by connecting Asian, European and North American cargo centers. The relation between the Suez Canal and the (upgraded) Panama Canal is not only of a competitive nature: these oceanic canals show a high degree of complementarity in view of a renewed development of round-the-world equatorial liner services (Figure 2). Shipping lines have abandoned RTW-services in the mid-1990s due to the vessel size restrictions of the Panama Canal, but the Panama Canal expansion is expected to revive their interest in such a liner service network solution.

ABOUT THE AUTHORS



Dr. Theo Notteboom is President of ITMMA (an institute of the University of Antwerp), professor at the University of Antwerp, a part-time professor at the Antwerp Maritime

Academy and a visiting professor at Dalian Maritime University in China and World Maritime University in Sweden. He published widely on port and maritime economics. He is also President of International Association of Maritime Economists (IAME) and Chairman of the Board of Directors of Belgian Institute of Transport Organizers (BITO), an institute of the Belgian Federal Government.



Dr. Jean-Paul Rodrigue is a Professor at Hofstra University, New York. His research interests mainly cover the fields of economic and transport geography as they

relate to global freight distribution. Area interests involve North America and East and Southeast Asia, particularly China. Specific topics over which he has published extensively about cover maritime transport systems and logistics, global supply chains and production networks, gateways and transport corridors, international trade and regional development.

ENQUIRIES

Professor Dr. Theo Notteboom
ITMMA – University of Antwerp
Kipdorp 59, 2000 Antwerp
Belgium
Email: theo.notteboom@ua.ac.be

Dr. Jean-Paul Rodrigue
Department of Global Studies & Geography –
Hofstra University
Hempstead, New York
USA
Email: jean-paul.rodrigue@hofstra.edu