

Major projects that influence world trade

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Abstract: - In 1869, with the opening of the Suez Canal, world trade entered a new era of development. The commercial routes linking the Far East to the western countries were shortened considerably as compared to the maritime corridor around the Cape of Good Hope. In 1914, the opening of the Panama Canal sealed the new deal in world trade, opening for business the shortest commercial routes around the world. After 145 years from the inauguration of the Suez Canal, world trade is on the eve of a new expansion. Two major projects: the expansion of both the Suez and Panama canals, planned to be completed in the next two years, will double their transit capacity. This paper does a comparative analysis of these two strategic projects, underlining the main benefits for Egypt, Panama and world trade, based on the available statistical data, reports and literature in the field.

Key-Words: - Panama, canal, Suez, trade, project, growth, management, extension, TEU.

1. Introduction

The Suez Canal and the Panama Canal were two of the greatest financial, technological and logistical projects of their time, both originating in France in the 19th Century, Paris being the capital of world engineering during that time.

According to UNCTAD (2012) “The maritime transport is the backbone of international trade and a key engine driving globalization. Around 80 per cent of global trade by volume and over 70 per cent by value is carried by sea and is handled by ports worldwide; these shares are even higher in the case of most developing countries.”

During the French occupation of Egypt, Napoleon Bonaparte had the idea of opening a canal between the Red Sea and the Mediterranean Sea. His initiative came to life in 1854 when Ferdinand Lesseps was granted the right to dig a canal across the Isthmus of Suez. The project planning finished in 1856. The Suez Canal Company was established in December 1858 (its stock owned chiefly by French and Egyptian interests¹) and in April 1859 the project started its operations. The excavations took almost 11 years and involved over 1,5 million people, registering a death toll of thousands of workers. During its execution the British Empire opposed the project that now accounts for almost 8-10% of world trade volume, probably because they were not involved in it, but, as soon as they had the chance, they bought Egypt's shares in 1875. The Suez Canal shortened the distance between the Port of Constantza and the Port of Doha by 7950 nautical miles, the route around the Cape of Good Hope being 12001 nautical miles long and the one through the Suez Canal, 4051 nautical miles². The Cost of the Canal was over 3,3 billion, in 2014 dollars.

Table 1. Shipping on the Suez Canal, 1870-1895

Year	Ships	Tons
1870	486	436.609
1875	1.494	2.009.984
1880	2.026	3.037.422
1885	3.624	6.890.094

¹ <http://www.suezcanal.gov.eg/sc.aspx?show=8>

² <http://www.sea-distances.org/>

1890	3.389	6.890.094
1895	3.434	8.448.383

Source: Daniel Headerick, Tools of Empire, Oxford: NY. 1981.

The Suez Canal is 60 meters wide and its daily traffic is about 50 ships, due to the fact that the vessels travel in one way convoys, thus, the ones coming from the opposite direction have to wait in designated areas for their turn. At present up to 10% of the seaborne trade passes through the Suez Canal, the toll fees reaching over \$5 billion in the last three years.

Table 2. Detailed yearly statistical Report

Month	Vessels	Net Ton (1000)	Cargo Ton (1000)	Tolls \$ million
2006	18.664	742.708	628.635	3.815,8
2007	20.384	848.162	710.098	4.601,8
2008	21.415	910.059	722,984	5.381,7
2009	17.228	734.450	559.245	4.289,5
2010	17.993	846.390	646.064	4.768,8
2011	17.799	928.879	691.800	5.222,7
2012	17.224	928.472	739.911	5.129,7
2013	16.596	915.467	754.461	5.110,8

Source: Suez Canal Traffic Statistics, 2014. Data compiled by the author.

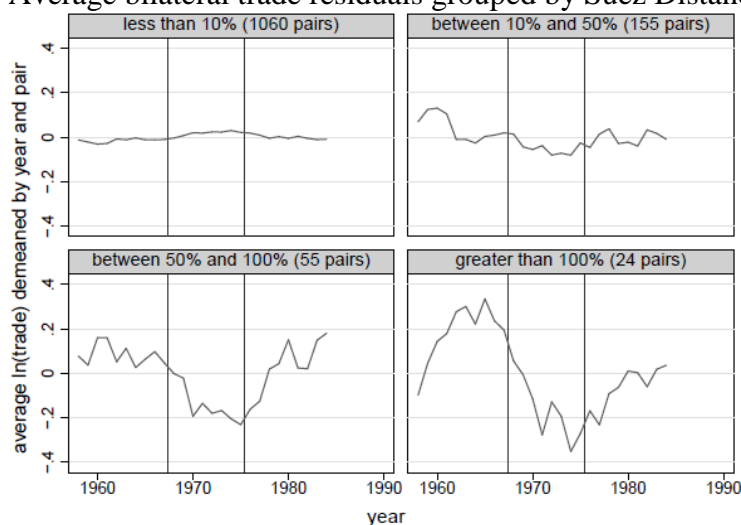
A report from R.K. Johns & Associates Inc. (2005) forecasts that the Suez Authority might raise tolls by 2015, estimating a 5% increase.

The Canal had a strategic importance for the British Empire, and France, enabling a quick route to their colonies. From 1936 until 1954-56, when it was nationalized, London maintained a defensive force along the Suez Canal Zone.

James Feyrer (2009) did an analysis on the influence of the Canal's closure (1967-1975) on international trade flows, taking into account the increase in the distance between the trading partners. He identified a clear drop in trade for the partners, registering distance increases of more than 10 percent and also noticed that it took several years for the partners to reach again the level of trade before the closing.

Feyrer's analysis proves the importance of the Suez Canal for world trade.

Figure 1. Average bilateral trade residuals grouped by Suez Distance Increase



Source: James Feyrer (2009).

The Panama Canal was the first big project of the 20th Century that laid the foundation of modern project management. The main beneficiary of the Canal was the United States of America, which funded its construction for a strategic reason, mainly to ensure an easy transit between the Atlantic and the Pacific Oceans

for the American Navy, and then for the transportation of oil from the West Coast to the East Coast. The total cost of the Canal in 2014 dollars was over \$8.3 billion. The main advantage to world trade consists of shorter sailing distances. The distance from the Port of Los Angeles to the Port of New Jersey via the Cape Horn is 12788 nautical miles and through the Panama Canal it is 4930 nautical miles. Initiatives to dig a canal in Panama existed before. After the great success of finalizing the Suez Canal, with support from the French authorities, Ferdinand Lesseps, engaged in a new adventure trying to build the Panama Canal. His endeavor took seven years, from 1882 to 1889 and was never finalized due to bad project management (poor environment analysis, bad planning, wrong technical solutions, high mortality among the workers etc.). After the State of Panama became independent, in exchange for a one-time payment of \$10 million, the U.S. were granted the rights to a Canal Zone of twenty-mile wide to build the Panama Canal. The project started in 1904 and was completed in 1914, before the start of the Great War. Panama benefited very little from the canal's spillovers (only the U.S. payments made for the Canal Zone, and the decline in the incidence of malaria in the two major cities). John Stevens, the second project manager of the Panama Canal, who was appointed by Theodore Roosevelt himself, was the first manager that had a clear image on how to build the Canal. He used the work break down structure (WBS), in order to divide the project in smaller, manageable activities, so that people feel confident they can complete it. The last project manager of the project was George Washington Goethals, an engineer and a military man (major in the U.S. Army Corps). He was the one who finished the project and became the first governor of the Canal Zone. The Suez Canal project cost the lives of 30.000 people, including the ones lost during French attempt (25.000).

In 1939, Arnold Wilson (1939) made a comparison between the two canals: "The Suez Canal was opened to traffic in 1869, the Panama Canal in 1914. The Suez Canal is owned and controlled by a commercial company, incorporated and domiciled in Egypt, subject to Egyptian laws and customs, under a concession from the territorial government, confirmed by Turkey as Suzerain Power. The Panama Canal is owned and controlled by the United States Government, who constructed it and maintain it, in virtue of a series of international treaties; it is subject to American Law. The Suez Canal is 100 miles long, the Panama Canal 50 miles long. One is at sea level, the other rises by three locks at each end to 85 feet above sea level. The former cost £30 million to build, the latter £75 million".

Table 3. Relevant data on both canals

<i>Project</i>	<i>Country</i>	<i>Year of Completion</i>	<i>Project duration</i>	<i>Length km</i>
<i>Suez Canal</i>	<i>Egypt</i>	<i>1869</i>	<i>11</i>	<i>164</i>
<i>Panama Canal</i>	<i>Panama</i>	<i>1914</i>	<i>22</i>	<i>77,1</i>

Source: Terra et Aqua/Number 120/September 2010.

On December 31, 1999, after 85 years of American administration, the Panama Canal became a corporate entity of the Panamanian government. The Panama Canal accounts for about 4% of the nation's GDP, but its multiplier effect, amplify it up to 30% (employees' expenditures, schools, restaurants, hotels, various services and industries inked to it etc.)

2. The need for developing the maritime infrastructure

According to UN (2012) experts, in the last four decades maritime trade increased on average by "3.1 per cent per year, reaching an estimated 8.4 billion tons in 2010. At this pace, and assuming no major upheaval in the world economy, global seaborne trade is expected to increase by 36 per cent in 2020 and to double by 2033. While bulk trade accounts for the largest share of global seaborne trade by volume, the containerized cargo contribution grew more than threefold between 1985 and 2010."

Niessen and Reid (2014) argue that there is an increasing demand for canal services. They emphasize that "investment of \$600 million in container handling facilities at both ends of the canal indicates strong expectations that the canal will play an important role in the rapidly growing container shipping segment."

Rodrigue and Notteboom (2011) argue that by 2014, post-Panamax vessels are expected to account for 48% of the global container fleet capacity (post-Panamax vessels are bigger than the ones allowed to travel

through the Panama Canal). The same UNCTAD report [7] points out that at present, “the container ship order book is dominated by post-Panamax ships, which account for 92 per cent of the container-carrying capacity on order”.

Table. 4 Development in international seaborne trade, selected years (millions of tones loaded)

Year	Oil and gas	Main bulks ^a	Other dry cargo	Total (all cargoes)
1970	1 440	448	717	2 605
1980	1 871	608	1 225	3 704
1990	1 755	988	1 265	4 008
2000	2 163	1 295	2 526	5 984
2005	2 422	1 709	2 978	7 109
2006	2 698	1 814	3 188	7 700
2007	2 747	1 953	3 334	8 034
2008	2 742	2 065	3 422	8 229
2009	2 642	2 085	3 131	7 858
2010	2 772	2 335	3 302	8 409
2011	2 794	2 486	3 505	8 784
2012	2 836	2 665	3 664	9 165

Source: UNCTAD, Review of Maritime Transport 2013.

UNCTAD figures for 2013 [6] show an increase in the seaborne trade by 4.3%, (9,2 billion tons in 2012, the biggest increase ever).

2.1. Great powers` needs

This year, the Chinese president Xi Jinping invited Egypt to join the Silk Road Economic Belt on both land and sea. The Chinese strategic project aims to boost economic relations between the Far East and the Western Countries involving in this initiative the Central Asian countries, rich in natural resources, and the other states along the old Silk Road.

Figure 2. The Silk Road Economic Belt



Source: Xinhua, 2014

The Maritime Silk Road begins in East China and heads to the Malacca Strait, Malaysia, Bangladesh, Sri Lanka, India, crosses the Indian Ocean, towards Kenya, continues north along the Horn of Africa and enters the Red Sea through the Gulf of Aden, reaches Egypt and enters the Mediterranean Sea through the Suez Canal

and the Mediterranean Sea to Greece and then crosses the Adriatic sea to Venice in Italy and connects to the land route. China and other Asian countries are interested in diversifying their sources of food and to do so, they are targeting the Eastern European markets which don't capitalize their huge agricultural potential lacking investments and proper organization of the field. The Eastern European countries could start exporting grains and meat through the ports at the Black Sea, and then the commercial routes to the Mediterranean Sea and the Suez Canal.

P. R. Kumaraswamy (2004) says that "nearly 70 percent of China's trade is carried by sea through the Strait of Malacca, the Indian Ocean and the Suez Canal."

The surge in transpacific trade from Asia, chiefly China had a beneficial effect on the Panama Canal especially in the first half of the 2000s, due to the fact that the American land bridge didn't have the capacity to handle the expected cargo volumes.

The LNG tankers (post-Panamax) can't travel through the Panama Canal. The distance to ship American LNG from the gas terminals located in the Gulf of Mexico to Asia is at present around 16000 nautical miles, 7000 miles longer than the distance through the Panama Canal. The extension of the Panama Canal will allow the U.S. exporters to be competitive on the Asian energy market, especially in Japan, South Korea and China.

3. The new projects to meet the world trade needs

3.1. The Suez Canal expansion

On the 5th August 2014, Egypt's president Abdel Fattah al-Sisi, announced the construction of the New Suez Canal, as a first phase of a strategic project, the Suez Canal Corridor, aimed at transforming the region into a global economic hub, by investing in the next 20 years between \$20-100 billion. The announcement followed the visit to Cairo of the Chinese Foreign Minister Wang Yi who conveyed Beijing's support for Egypt's economic development and Xi Jinping's invitation for Egypt to join the Silk Road Economic Belt and 21st Century Maritime Silk Road. Yi reiterated the Chinese interest to invest in the Suez Economic and Trade Cooperation Zone and also cooperate with Egypt in various fields (agriculture, energy, highways, tunnels, aerospace and satellite technologies).

Ahmed Farouk Ghoneim (2014) argues that in the first phase of the project, Port Said and the Suez ports will be transformed into global warehouses. All the required infrastructure will be put in position (roads, railways, navigation management, related industrial projects etc.). The next day after Sisi's speech, a team of 7,500 workers begun the excavations of a new canal of 35 kilometers, from the Mediterranean Sea to the Bitter Lakes which will flow parallel to the original Canal. In the south of the lakes the project will double the width of the Suez Canal along its 37 kilometers. The Egyptian Government entrusted the project to Dar Al-Handasah, a Saudi company specialized in planning, project management and supervision consultancy and to other companies from several Gulf Cooperation Council. The Saudi company will work with other contractors (52 companies and about 15000 workers) and the Egyptian Army to develop the industrial infrastructure and logistics in the canal area. From this standpoint, the new project is similar to the original Panama Canal, which was completed under the command of an American major, as we mentioned above.

The cost of this phase is estimated at \$8,4 billion. To finance it, the Egyptian Authorities issued debt certificates denominated in Egyptian pounds, bearing 12% interest only for the Egyptians in the country and debt certificates in dollars for the Egyptians living abroad, bearing 3,5% interest. The certificates were sold through Banque Misr, the National Bank of Egypt, Banque Du Caire and the Suez Canal Bank. Suez Canal Insurance bought debt certificates worth EGP 10 million. The expansion of the Suez Canal is expected to boost the tolls up to 13,5% by 2023.

The second phase, will focus on developing the industrial infrastructure of the Canal Zone (production of machinery, ship repair centers, packaging factories, textiles etc.) and the logistics infrastructure (seaports in Port Said, Ismailia, Port Tawfiq, Suez, Nuweiba in Sinai and the development of the airport in Sharm al-Sheikh). Under the enlarged Canal, six tunnels will be built. At least two will be railway tunnels and the rest will be designated for road and highway traffic. The estimated cost of phase two is \$8 billion. The building of the tunnels aims at developing the links with Sinai Peninsula, which is underdeveloped, but rich in natural resources.

Phase three plans to transform the Canal Zone (especially Ismailia) and the Sinai Peninsula into a modern industrial, technological and research area. The third phase will also focus on the development of tourism, trade and communications.

A lot of rich countries (United States, China, India, Russia, Holland, Norway, Denmark, Saudi Arabia, United Arab Emirates, Kuwait etc.) want to invest in this projects.

3.2. The Panama Canal expansion

The extension of the Panama Canal, was approved by the National assembly of the State of Panama on July 17, 2007. The project started on September 2007 at an estimate total cost of US\$5.2 billion and the work began in August 2009. This megaproject is the largest infrastructure project since 1914 and aims at: constructing a new canal with larger locks at each end that can accommodate post-Panamax vessels; widening and deepening each entrance of the original Canal and widening and deepening the navigation channel at Gatun Lake. The final objective of the project is to increase the tolls by means of increasing the transit of larger ships through the Canal. Larger locks and channels will allow the passage of vessels double the size of the one transiting now. The new Canal will allow more ships to pass daily doubling the total annual throughput capacity of the Canal. The Panama Canal serves now over 140 maritime trade routes to over 80 countries. About five percent of global maritime cargo transits the Panama Canal every year.

Through the expansion of the Canal, the Republic of Panama will consolidate its position as a major transportation and logistics hub in the Americas.

In the next 20 years, the trade volumes carried through the Panama Canal will grow around 3% per year, doubling the tonnage by 2025 as compared with 2005.

Informa Economics (2011) indicates that the transit of grain and soybeans from the Midwest of the U.S. to the Asian countries, through the Panama Canal will increase by 30% reaching 48.4 million metric tons by 2021. At present around 40 million of metric tons of grains are exported to Asia via the Canal.

The expansion of the Canal will lead to an increase in the trade between the West Coast of America and Asia and the Eastern countries from South America, (Colombia, Venezuela and Brazil) favoring their exports of coal, iron ore and other natural resources.

New York/ New Jersey metropolitan area's economy is preparing for the completion of the New Canal. The authorities spend billions of dollars to dredge the shipping berths to accommodate larger vessels; invest hundreds of millions in cranes to handle bigger containers and in infrastructure (access roads, raising the Bayonne Bridge to allow more clearance for larger ships). The port rail carrier serving the port area invests billions for improving dockside rail and support infrastructure (raising the roofs of tunnels for the double stack trains that will transport goods delivered to the port).

According to The Economist (2014), China Harbor Engineering Company, will build a new port on the Goat Islands, 30km west of Kingston to accommodate new-Panamax vessels. Brazil and Cuba developed the port of Mariel, west of Havana, The port has been dredged to 18 m and was opened for business this January.

The main advantages of the Panama Canal are:

1. The route through the Cape Horne is longer (8000 nautical miles) and more perilous, making the maritime insurance very expensive;
2. Navigation time is shorter and cheaper.

The route from Shanghai to New York through the Panama Canal takes up to 26 days, and the one via the Suez Canal up to 28 days. From the Port of Los Angeles over the land bridge (railway) it takes up to 21 days at an extra cost of \$600 per container, which is more expensive than the transit through the Panama Canal.

To ensure the money required to complete the works, the Panama Canal Authority signed contracts with the Japan Bank for International Cooperation (\$800 million), the European Investment Bank (\$ 500 million), the Inter-American Development Bank (\$400 million), the International Finance Corporation (\$300 million) and Corporación Andina de Fomento (\$300 million).

So far, the project created approximately 30.000 jobs.

According to the Panama Canal Authority, the works at the Canal are executed by a consortium of companies from Europe (Sacyr Vallehermoso SA - Spain, Impregilo S.p.A. and Cimolai – Italy, Jan de Nul n.v. – Belgium), Tetra Tech- the U.S., and a local company, Constructora Urbana S.A.

A report of the Regional Economic Studies Institute (2012) analyzed the regional impacts of the Panama Canal expansion on the Port of Baltimore (U.S.). They estimated that an increase in the containerized cargo by 25 percent will have the following effects:

1. About 138 new jobs will be created;
2. An increase in the state's GDP by \$39.8 million;
3. An increase in wages by \$13,8 million;
4. An increase in the taxes revenues (state's and local) by \$2,1 million.

According to the Panama Canal Annual Report (2013), "the waterway is a crucial channel for world commodities, affecting directly the GDP of several exporting nations. In 2012, 10.6 percent of global maritime grain transport transited the Canal, as did 5.8 percent of the chemical products, and 4.7 percent of the containerized cargo."

Table 5. Maritime Trade Volume Transiting the Canal (percentage of total metric tons)

	2006	2007	2008	2009	2010	2011	2012
Containerized cargo	6,7	6,5	6,2	6,0	5,3	5,1	4,7
Grains	12,4	9,8	9,7	12,6	1,9	10,3	10,6
Oil and derivatives	1,3	1,3	1,3	1,4	1,3	1,3	1,3
Coal and Coke	0,7	0,9	1,5	0,9	1,1	1,5	1,3
Mineral and Metals	1,5	1,1	2,3	3,0	2,7	2,8	1,8
Chemical products	8,5	7,4	7,4	7,7	6,6	6,2	5,8

Source: Panama Canal Annual Report 2013

The expansion project will double the traffic in the Canal and will contribute to the development of other linked economic activities: hospitality, merchant marine registry, banking, warehouses, legal services, communications etc.).

The annual Report (Canal de Panama, 2013) emphasizes that "the Canal, the port terminals, the Colon Free Zone, and Tocumen International Airport complement each other's strengths. In short, the Canal is the main driver within the logistics cluster, and in turn, the cluster strengthens the Canal's position as an optimal transit option. This cross-sector synergy has a multiplier effect and increases the country's overall competitiveness, and that of other countries in the region which can use Panama as a hub."

Table 6. Relevant data on both canals

<i>Extension Project</i>	<i>Cost \$ billion</i>	<i>Year of Completion</i>	<i>Duration (Years)</i>	<i>World seaborne Transit (%)</i>
<i>Suez</i>	5,2	2015	1	5-6%
<i>Panama</i>	4	2016	9	7,5-8%

Source: data compiled by the author

Table 7. Comparisons for a round trip Hong Kong to New York-New Jersey via Panama and Suez canals

Indicators	Panama	Suez
Size of ship	4.800 TEU	8000 TEU
Cost	\$1,250/TEU	\$850/TEU
Transit times	8-10 hrs.	12-16 hrs.
Tolls on a fully loaded 4.800 TEU container ship	\$450.000	\$489.600
Non-Stop transit time at 18 knots	26 days	27 days
Distance	11.205 nautical	11.589 nautical

Indicators	Panama	Suez
	miles	miles

Source: data compiled by the author

The container transit from Asia through the Suez Canal to the east coast of the U.S. East Coast has surpassed the Panama Canal for the first time this year (Suez 52%, and Panama Canal 48%) according to estimates by Drewry cited by Ian Lewis (2014), as a result of the cost savings registered by almost doubling the loads on larger vessels and the rise in Panama's tolls.

4. Conclusion

Considering the trends in world trade now, the projects undertaken by Egypt and Panama are more than welcome. The expansion will double the volumes of goods transiting Suez and Panama canals and will decrease the associated costs of transportation due to the fact that bigger vessels will be allowed to pass through. The transit times will also improve ensuring the traffic fluidity. As we presented, big infrastructure projects are planned to be developed around the canals. Egypt will invest tens of billions of dollars to create the biggest commercial, industrial, technological and urban hub in the area. Due to the strategic locations of both canals many economic powers are willing to invest their money in order to have a seat at the future's table. China will invest in the Suez Economic and Trade Cooperation Zone and intends to further cooperate with Egypt in various areas such as: agriculture, energy, transport infrastructure etc. In Jamaica, China built a port to accommodate new-Panamax vessels. The same thing happens in the United States of America which invest in the East Coast ports creating thus new jobs and business opportunities and developing the infrastructure all vectors of economic growth. We shouldn't forget about the multiplier effect on the economy of these projects. Even if the contribution of the Panama Canal to the country's GDP is of about 4%, the multiplier effect generated by the economic activities of the entities related to it increases it to 30% of the GDP.

President Abdel Fattah al-Sisi learned from the history of the Panama Canal and entrusted Egypt's biggest infrastructure project of the 21st Century to a consortium of companies led by the Egyptian Army to make sure that nobody resigns from the job and the tasks are completed as planned. This is a good lesson of project management, to learn from past mistakes.

The two canals have the supremacy at present, but there is another Chinese project in the making which could rival both. The billionaire Wang Jing plans to build the Nicaraguan Canal, the largest infrastructure project of our times in terms of difficulty, scale, resources and impact on the world trade and world economy. The Canal will be around 278 kilometers long and will accommodate vessels with loaded displacement of 400.000 tons. Its estimated cost is around \$50 billion. This project will definitely have a great impact on the canals surveyed in our paper.

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