

Sustainability and competitiveness of the Inter-Oceanic Corridor of the Isthmus of Tehuantepec

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Abstract

The project entitled “Corredor Interoceánico del Istmo de Tehuantepec” (*Tehuantepec Isthmus Interocean Corridor*), aims to take advantage of Mexico's strategic geolocation to serve as another link for international business between Asia and the America East Coast. This is a Mexican government project focused on increasing Mexico's competitiveness in international trade by reducing the transit time between vessels coming from Asia to the United States East Coast and vice versa. The project explores connecting the Pacific Ocean with the Gulf of Mexico, through the Tehuantepec Isthmus, using the current railway infrastructure that links the ports of Coatzacoalcos (Veracruz state) and Salina Cruz (Oaxaca state).

This paper analyzes the sustainability and competitiveness of the project in terms of its economic, social and environmental impact. Variables (time and cost) will be compared against other major commercial links, such as the Panama Canal (ports of Balboa to Colón), and various ports on the east and west side of the United States. This proposal considers the logistics and capacities/limitations of both maritime and land transportation, since it would connect both Mexican ports with other ports from the United States or other countries bordering Mexico. However, this research paper does not take into consideration the costs or initial investment and capacities of infrastructure for the remodeling of the railways and the ports, or any other investments that may be required to carry out the project.

Keywords:

Sustainability and Competitiveness, geolocation, international trade, logistics, ports, time and costs

Introduction

Currently, there are several maritime routes for ships to transit between Asia (mainly to China) and the Americas (most of it directed to the United States). The Tehuantepec Isthmus is a project that was proposed by the Mexican government to compete with other countries in international trade. It aims to take advantage of the port and railroad infrastructure that connects the east and west coast of the Mexican Republic. To evaluate the sustainability and competitiveness of this project, we used two approaches, commercial and social; the commercial approach by using the available tools to estimate costs and times provided by the logistics service industry, and the social approach by using the empirical proof provided by migrant routes. The original railroad crossing the Tehuantepec Isthmus was built in 1894, but the different standards used in that process soon demanded important changes that were finished in 1907.

The Inter-Oceanic Corridor project: A closer look

This paper discussed the competitiveness of the Tehuantepec Isthmus versus the Panama Canal, which represents 6% of global maritime trade. The evaluation consists of comparing costs of transporting containers between ports located in the United States (Long Beach), Panama (Balboa) and China (Shanghai). The rationale behind the selection of ports is mainly commercial. The port of Balboa, located in the Panama Canal, is Panama's most important

port, and it is considered the most relevant port in the region. The city of Long Beach, located in the state of California, has one of the busiest ports in United States. The port of Shanghai is the largest container port in the world, handling more than 40 million TEU, one-fourth of all import-export cargo traffic in China.

This research considers the rates for ports such as: Savannah, Houston, Plaquemine, and New York. Each port has a noticeable advantage. The port of Savannah (Georgia) is one of the most important seaports of the Southeastern Region of the United States; the port of Houston (Texas) is one of the main exporters of crude oil in the region; the port of Plaquemine (Louisiana) trades with 33 states and has a desirable location for trade due to its proximity to the Panama Canal, and finally, the port of New York, currently the third largest seaport in the US, handles cargo containers that are valued close to \$200 billion. This paper also includes a benchmark with the ports of Coatzacoalcos (Veracruz state) and Salina Cruz (Oaxaca state).

Costs

For data collection, we considered the use of available calculators for costs estimation. In this case we choose “SeaRates.com” which is a website that allows users to estimate the costs of shipping a vessel from a port to another.

The cost per container from Shanghai to the port of Balboa ranges from \$1,953-\$2,158 for 20-foot containers and \$2,437-\$2,694 for 40-foot containers. Similarly, the cost per container from Shanghai to the Port of Long Beach is \$1,117-\$1,234 for a 20-foot container and \$1,392-\$1,539 for a 40-foot container. Furthermore, Table 1 shows the cost of the other routes. However, the route from Shanghai to Plaquemine, Louisiana requires additional transportation as containers destined to Plaquemine are usually unloaded at Houston and New Orleans ports and transported by land (see Figure 1). Therefore, the cost for a 20-foot container to Plaquemine is \$5,872, while a 40-foot container costs \$7,612.

Table 1. Price per container shipped from Shanghai II.

Route	20' Container	40' Container
Shanghai - Savannah	\$3,465.00	\$4,946.00
Shanghai - Houston	\$3,633.00	\$5,156.00
Shanghai - Plaquemine	\$5,872.00	\$7,612.00
Shanghai - New York	\$3,465.00	\$4,946.00

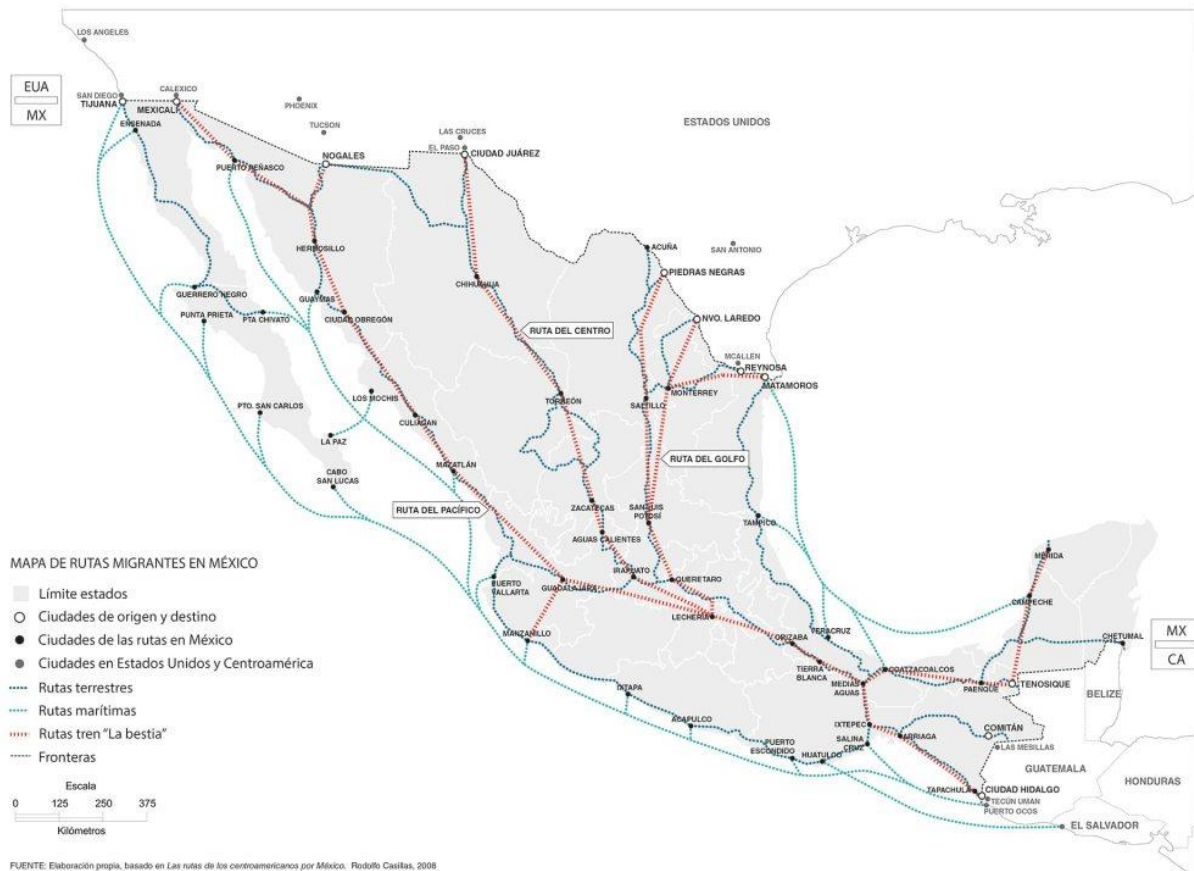
Figure 1. Transportation cost Shanghai-Plaquemine for container, depending on size [12]



Transit time Calculation

Similarly, the analysis uses “SeaRates.com” to estimate the transit time of each route. The analysis takes into account an average speed of 12 knots for the vessels, discarding the size of ship to get a theoretical result. The transit time through the Panama Canal for Shanghai-Savannah and Shanghai-Houston are 37 days, 36 days for Shanghai-Plaquemine, and 38 days for Shanghai-New York. To determine the Tehuantepec Isthmus project’s sustainability and competitiveness against the Panama Canal, the analysis must consider the time it takes to move a container from the port of Salina Cruz to the port of Coatzacoalcos by land transport. However, currently there is no data available to determine the exact amount of time it would take to go from the port of Coatzacoalcos to the port of Salina Cruz, as no containers movement is done between both ports. To solve this gap in the data, there are two approaches. First, calculating an estimate transit time using “La Bestia’s” and “SeaRates.com”; *La Bestia* is the network of Mexican freight trains used by U.S.-bound migrants to cross Mexico (see Figure 2). Second, assuming that a truck transporting a container between both ports will move at 50 km/h (~30 mi/h) in average.

Figure 2. Migrant Routes use in Mexico [11]



Currently, there are no container exchanges between Salina Cruz and Shanghai; therefore, the analysis considers the transit time from Shanghai-Lázaro Cárdenas (a port near Ixtapa, see figure 2), and adds a delay of two days for a worst-case scenario. It also considers that the migrant route passes through Ixtepec, a town 60 km (35 mi) north to Salina Cruz, so a correction factor for the railroad transport is also considered. In conclusion, the estimations show that moving a container from the port of Salina Cruz to the port of Coatzacoalcos, by train would take 28 hours, and by truck 4 hours.

Images 4a and 4b illustrate the estimated time between the two available routes from Shanghai to Houston, using the Panama Canal, and Shanghai to Lázaro Cárdenas, which as indicated above helps to better estimate the expected time to Salina Cruz. The correction factor to the estimation considered the time taken by a cargo truck between Lázaro Cárdenas to Salina Cruz.

Image 4a. Transit time Shanghai-Lazaro Cárdenas

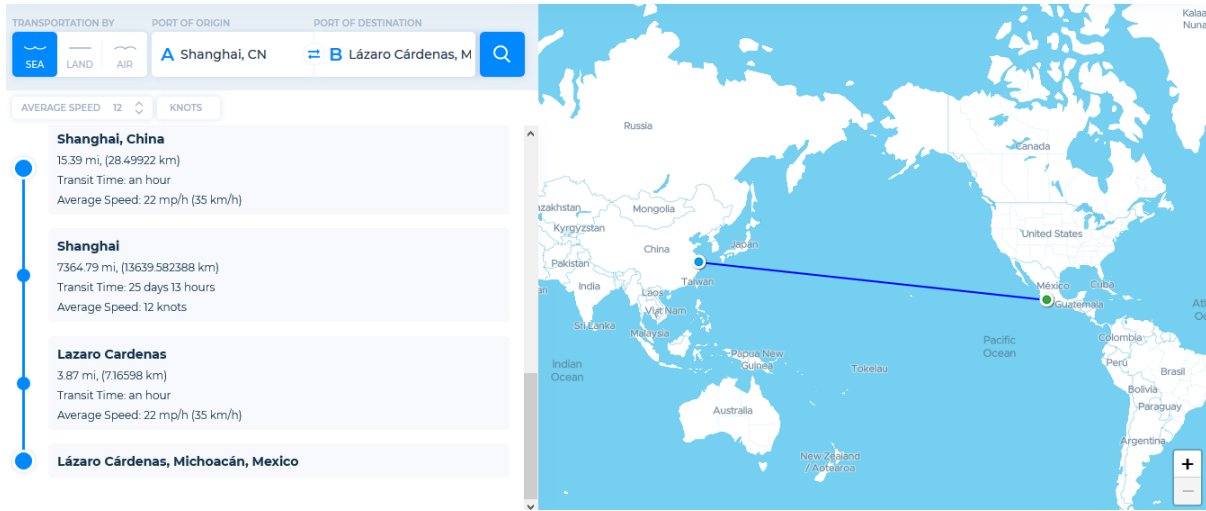
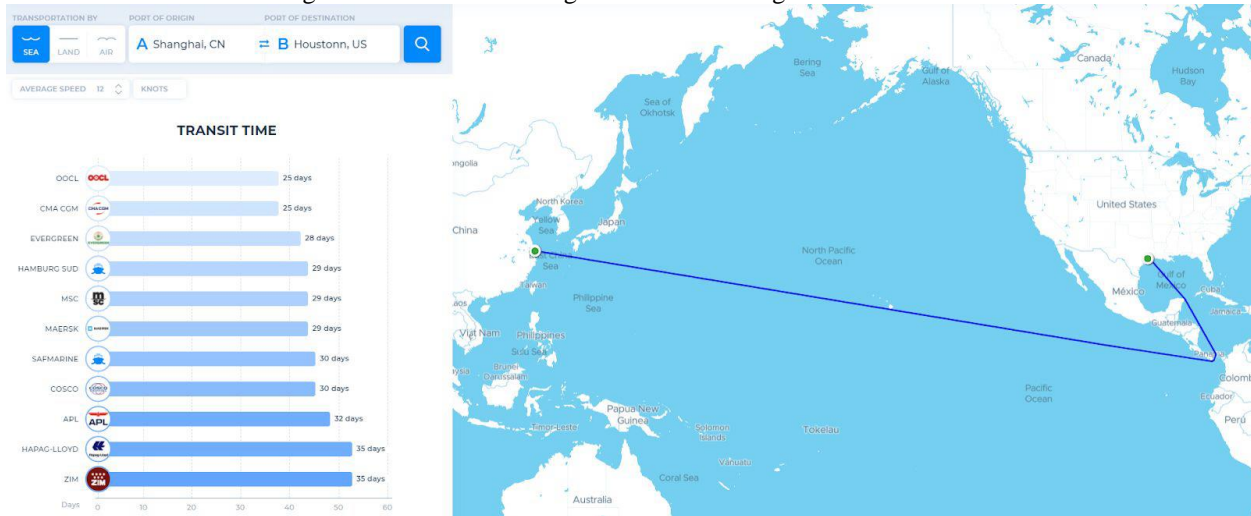


Image 4b. Transit time Shanghai-Houston through the Panama Canal



It is important to notice that concerning the Panama Canal we also considered the effect of the size of ships. With the opening in 2016 of the third set of lock chambers to allow bigger ships to cross the Canal, there has been an impact in the circulation of ships at the Culebra Cut. As big ships cannot circulate in opposite directions in that section of the Canal, an alternative one-way system has taken place and a restriction to circulate only in daylight; these regulations have had a negative effect in the time spent crossing the Canal.

To summarize this research, Table 3 provides a comparison for the most common routes using the estimates of the calculations studied with this approach. After considering all these factors within the selected routes, we offer a vision of the opportunity that the Tehuantepec Isthmus Corridor represents as a sustainable Logistics Route. Not only do these findings suggest that the Inter-Oceanic Corridor of the Isthmus of Tehuantepec reduces transit times, but it also highlights the project's sustainability and competitiveness compared to the Panama Canal.

Table 3. Transit time comparison between routes

Route	Estimated Transit Times (in days)					Using Isthmus vs Panamax Time saved (in days)		Using Isthmus vs Post-Panamax Time saved (in days)	
	Panama	Using Panamax	Using Post-Panamax	With actual and alternative infrastructure Isthmus of Tehuantepec	With theoretical infrastructure Isthmus of Tehuantepec	Using Actual/alternative infrastructure	Using Theoretical infrastructure	Using Actual/alternative infrastructure	Using Theoretical infrastructure
	Shanghai-Savannah	37	2	3	35	33	4	6	5
Shanghai-Houston	37	2	3	33	31	6	8	7	9
Shanghai-Plaquemine	36	2	3	33	31	5	7	6	8
Shanghai-Nueva York	38	2	3	37	35	3	5	4	6

Conclusion

In summary, the results indicate that the Inter-Oceanic Corridor of the Isthmus of Tehuantepec might be a competitive and sustainable project. Likewise, the research highlights that the ports that were considered in this analysis are major economic contributors to their regions. Therefore, it is possible that, in the near future, Mexico may become a more important player in international trade. However, the country needs to improve its infrastructure. It must also plan the costs for remodeling its railway system and any other investments that may be required to carry out the project. Socially speaking the use of the existing infrastructure is proof of a need for improvement; the interoceanic corridor may be for the benefit not only of the Mexican trade but for the benefit of both the USAMC treaty countries and for the benefit of the commerce and social development of Mexico and the Central America Region.

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