Intermodal Transportation Systems for Asian Goods to U.S. via Mexico: An Analysis

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Project Objective
The objective of our research is to investigate the potential advantages of importing Asian goods into the US through Mexico as opposed to bringing them in through ports in western United States.

Project Abstract
The U.S. economy has become increasingly dependent on imported goods, especially those from China and other Asian countries such as Japan, Malaysia, Taiwan, and Singapore. During the last decade the value of imported goods from China has increased from $51.5 billion to $287.7 billion. Ports located in California are the most commonly used entry points for products imported from China and other Asian countries. However, companies have two major concerns when using ports in California. The first issue is the capacity of ports. The port of Los Angeles, the busiest port in America (70% of the Asian imports through western United States arrive
through Los Angeles/Long Beach), has reached its saturation point. As a result, ships have to wait offshore up to 14 days during the peak months (July to December). Waiting offshore not only increases lead time but also increases the cost of goods because it costs an average of $300,000 a week in salaries and fuel to operate a ship. The second issue is the congested highway traffic and over-burdened rail traffic in California.

To overcome these issues, companies especially selling or distributing goods in the eastern and central United States can import goods into Mexico. The advantage of bringing goods into Mexico is threefold:

- Docking and unloading times for ships are considerably less in Mexican ports, which in the last few years have received renewed interest and investments (like Lázaro Cárdenas and Baja California).
- Companies can use suppliers in Mexico (e.g. maquiladoras) to perform assembly and customization operations on imported products before they are sent on to the United States. This postponement of final operations will allow companies to decrease inventory and lead time.
- Goods can be transported into the US via the rail or highway networks that are currently under extensive development. Kansas City Southern has established a new rail network from Lázaro Cárdenas to Kansas City through cities in Texas such as Laredo, Houston, and Dallas. In addition, there is a well established road network between the US and Mexico (e.g. Interstate 35 and Mexican Federal Highway 1 and 85 in Laredo and proposed development of Interstate 69 corridor in Texas).

The objective of our research is to quantify the benefits of these potential advantages of importing Asian goods into the US through Mexico as opposed to bringing them in through ports in western United States.

**Task Description**

There is a significant increase in transloading, freight manipulation and postponement strategies in the intermodal transportation of containerized goods with Asian origins. There are several types of postponement strategies such as labeling, packaging, assembling, manufacturing and time (pre-positioning). Each strategy has its own benefits and limitations and we will account for one or more of these strategies in this research.

For this project, we will survey the extant literature to identify current body of knowledge related to movement of Asian goods to the USA through ports in California, and ports in Mexico. Emphasis will be given to find the benefits of using one type of intermodal system to the other. Then the research team will identify potential strengths and weakness of using ports in California and Mexico. Performance of the distribution systems will be analyzed in terms of inventory cost, transportation cost, and lead time reduction opportunities. The effect of postponement strategies on these costs will also be accounted for.

In addition to that, the study will also include current trends and discussions pertaining to movement of Asian goods into USA. We also propose to see the impacts of many new initiatives such as the construction of the super highway, maquiladoras, and NAFTA.
The final report will help the academic and industry communities to better evaluate the impacts of bringing goods via Mexico.

The output of this research would be inputs to a mathematical programming model to best describe the problem. The data for this research will be collected using our resources at Texas A&M University’s Global Research Center at Monterrey and governmental agencies in the United States.

**Technology Transfer**

This research is one of the early academic studies to analyze the impact of new ports, road, and rail infrastructure in Mexico on distribution of Asian goods to the U.S. This will allow companies and government agencies to assess the benefits of utilizing this new Mexican based intermodal distribution system. The CSCMP annual conference is an outlet that we will be targeting to present the initial findings or the final results. The CSCMP conference is a global forum where practitioners from Industry and academicians share their experience and expertise.

Additionally, the outcomes of the project will be published in peer-reviewed journals such as Transportation Research Part A, IIE Transactions, and International Journal of Physical Distribution and Logistics Management. This will aid in knowledge dissemination among the academic community.

**Benefits of the Project**

To the best of our knowledge, this research is the first attempt to connect three different modes of transportation with postponement strategies on a global distribution network. Current postponement research focuses mainly on quantifying the benefits of delayed product differentiation. Also, there has been considerable work done on coordinating inventory and transportation decisions across multiple modes of transportation. Our research is an effort to analyze the combined effects of postponement, inventory and intermodal transportation decisions. The results of this research will help companies using ports in California to understand the outcomes of designing a new distribution network using ports in Mexico.