



Transportation Consortium of South Central States

Key Points

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\$55,000

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Tran-SET
Oklahoma State University

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\$110,000

Study the Impacts of Freight Consolidation and Truck Sharing on Freight Mobility

Brief Project Description

The purpose of this project is to examine impacts of truck sharing on freight mobility. The research team will obtain freight movement data to identify truck sharing opportunities and develop mathematical models to evaluate the impacts of truck sharing on freight mobility and traffic reduction.

Problem Statement

The trucking industry has become an indispensable part of U.S. economy. According to the American Trucking Associations, U.S. companies transport over 70 percent of their goods across the country using freight trucking services. The trucking industry contributes around \$650 billion dollars of revenue to U.S. annually. This constitutes over 84% of revenue in the country's commercial transportation sector. The trucking industry is also one of the largest employment opportunities provider in the nation. The truck drivers alone are paid with \$30 billion dollars annually. This industry also provides indirect employment opportunities involving cargo loading and equipment maintenance. Any major disruption in trucking industry tends to impact the country's economy on a large scale.

However, the trucking industry in the U.S. is very fragmented. According to the Department of Transportation, the 50 largest trucking companies handle just 30 percent of freight activities across the U.S. The trucking industry is composed of 110,000 carriers and 350,000 independent owner-operators. Around 97% of carriers in America own less than 20 trucks and around 90% of carriers own 6 or lesser trucks. The number of businesses which want to transport less than full truckload is also high and scattered across the country. Many logistics companies work as the middleman between these scattered groups.

This fragmentation presents a big barrier to improve the efficiency of the trucking industry. It is difficult for small carriers to get enough shipping demand to fill the truckload for every trip. Some trucks travel empty in the returning trip. It is estimated that around 20 percent of trucks on roads are traveling empty, which is a huge cost to the transportation companies. The low efficiency of the trucking industry causes high price to the shippers. Traveling empty trucks also contributed to traffic congestion and air pollution.



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Thanks to development of internet and mobile computing technology, newly established online freight-equipment matching marketplaces can help small carriers find shippers to fill the truckload quickly. However, online freight consolidation is very complicated. In freight transportation, there are many different types and sizes of freight, and every type of trucks has its own size and weight limits. Only certain types of freight may be shipped together in the same truck. Although highly demanded, currently there are no online freight consolidation algorithms available, due to the complex nature of the problem itself. Most online freight-matching marketplaces are small start-up companies, and they lack the recourse and expertise to develop freight consolidation algorithms.

There is considerable amount of literature on heterogeneous fleet of trucks and vehicle routing. However, to our best knowledge, there is no research on online freight consolidation or the impacts of freight consolidation on freight mobility. We will try to fill this void in the literature through this project. We hope our results will lead to future studies on online freight consolidation algorithms for the trucking industry.

Objective

The goal of this project is to show the impacts of online freight consolidation on freight mobility, and thus draw the attention of transportation authority and logistics companies to this problem. This project will lead to more resources and experts devoted to study online freight matching problems and thus further improve the efficiency of freight transportation.

Intended Implementation of Research

The research team will help a third-party logistics company design cost sharing structures to encourage truck sharing and thus improve freight mobility and reduce traffic congestion.

Anticipated Impacts/Benefits of Implementation

Truck sharing can improve freight mobility, reduce traffic congestion and greenhouse gas emissions, and thus help preserve the environment.

Weblinks:

<http://transet.lsu.edu/research/research-in-progress/>

<https://rip.trb.org/view/1467124>