

**Identifying Number:** MPC-358

**Project Title:**

Connecting Supply Chain Interregional Freight Flow

**University:**

North Dakota State University

**Principal Investigators:**

Denver Tolliver  
Associate Director UGPTI  
Phone: (701)231-7190

**Description of Research Problem:**

Freight flow data such as the Freight Analysis Framework (FAF) predict freight flows among regions based on commodity forecasts. The actual truck traffic may actually be the resultant effect of supply chain decision by a large number of business enterprises and who seek to minimize their total logistics cost by making the best supply chain decisions. The supply chain decisions and the domain of freight movement are not restricted within domestic boundaries but with the present trend in globalization there is an ever increasing trend of freight movement between different parts of the world. The supply chain decisions are not only limited by business objectives but there to a large extent affected by administrative rules and public policies. To have a better understanding of regional freight flow it is essential to have better comprehension of the supply chain factors which determine trade and product flows and mapping commodity forecasts to interregional freight flows. In particular, a typology or systematic classification of supply chain and their relationships to product flows could be useful in this regard. Business decisions are a set of complex interactions between shippers, carriers and service providers in Supply Chain. In order to gain insight into the supply chain process adapted by diverse commodities a reasonable step would be subdivide the commodities into subgroups and determine a prototype a supply chain model for each group. For each of these groups of commodities effective of public investments, response of business to regulations in transportation, parameters determining mode choice, trading partners, location of facilities can be determined.

## **Research Objectives:**

The existing freight modeling technique does not have the capability to capture the intricacies of supply chain that determine the flow of good from manufactures to the final consumers through a series of warehouses and distribution centers. The structure of supply chain and freight movement which has evolved in the last few decades is complex and dynamic.

In this project which is an extension of a previous project, the researchers will try to develop their understanding of the logistics and supply chain process that shape the flow of goods. In the previous project the concentration was on urban freight movement, in this project the objective would be to capture the flow across regions and study the supply chain relationships and the impact of agent interaction on freight system performance. There had been considerable development in technologies used in freight modeling. Some of those technologies are use of GPS for tracking truck movement, use of remote sensed data, and use of AVI technologies. In this project the researchers will try to assimilate the available technologies in the modeling framework and examine whether that helps to better understand the supply chain process. The other objective would be to indentify the response of the supply chain model to the changes in government regulation and investment in infrastructure.

## **MPC Critical Issues Addressed by Research:**

*Focus Areas Addressed by Research: #14 Traffic Operations and Management*

*Critical Issues Addressed by Research*

- Better freight modeling capability.
- Enhanced capability to predict mode choice and size of shipment.
- Innovative data collection methodology.
- Improved freight forecasting capability.

## **Contributions/Potential Applications of Research:**

(1) Improvement in transportation planning. (2) Justify infrastructure investment for highway expansion. (3) Identify intermodal locations to reduce truck traffic. (4) Study sensitivity of fuel price and highway cost on mode choice.

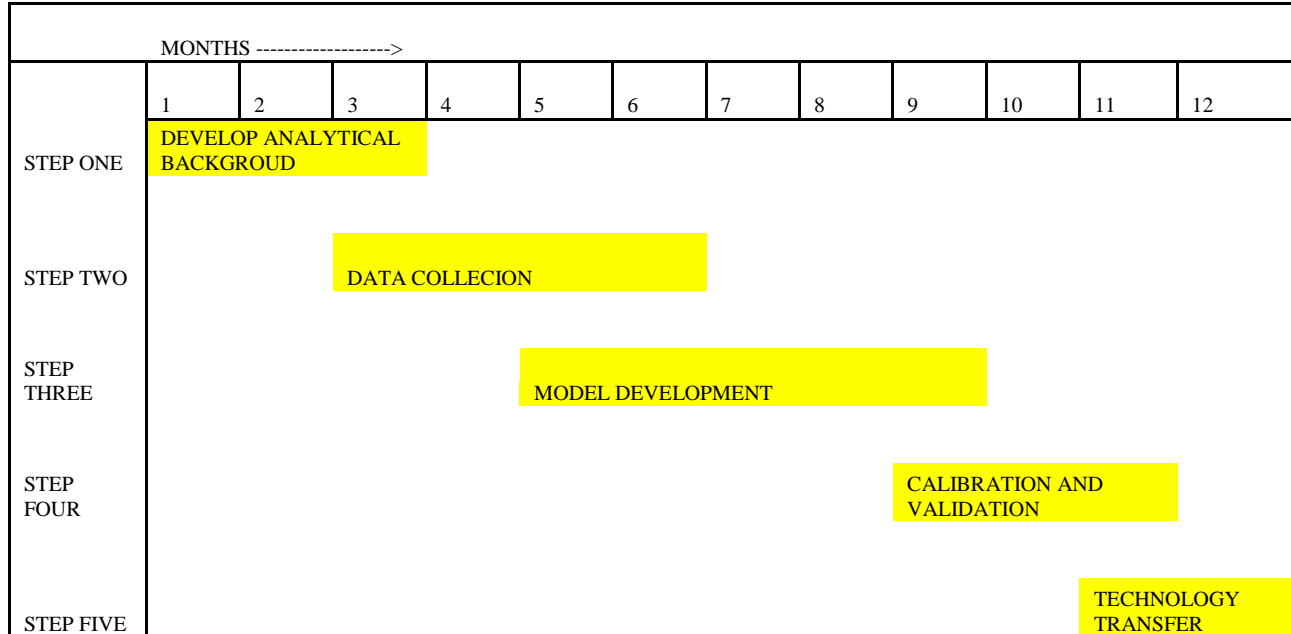
## **Potential Technology Transfer Benefits:**

The project will produce several tangible benefits for researchers and transportation practitioners, including: (1) improvement in freight modeling technique (2) freight demand modeling to support to public-sector decision making (3) public private partnership to exchange information and improve highway performance.

**Time Duration:**

July 1, 2010 – June 30, 2011

**Schedule**



**Total Project Cost:**

\$87,535

**MPC Funds Requested:**

\$61,000

**Source of Matching Funds:**

Contributed university resources and potential MPO department match  
\$26,535

**TRB Keywords:**

Supply Chain, Logistics, Distribution Center, Freight, Urban Planning

**Literature review**

Jong, de G., Ben-Akiva, M and Florian, M. Specification of a logistics model for Norway and Sweden, European Transport Conference 2005

Deste, G. Urban freight movement modeling, Handbook of transport modeling, Pergamon, 2005

Clarke, M. Initial Development of an Innovative Commodity Flow and Truck Model for the Greater Los Angeles Basin, International Chinese Transportation Professionals Association Annual Conference, 2005