



# Research Outlook on a Mixed Model Transportation Network

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## Abstract

The purpose of this paper is to present an outlook on the future research for a specific mixed model transportation network referred to as Foliated Transportation Networks (FTN). FTN is thus far a conceptual model that is based on the idea of foliating a direct shipment and a hub-and-spoke structure in order to achieve higher fill rates without an increase in the total traffic work at the same time. The conclusion is that the two principal areas of research are areas of planability (i.e., the ability to in advance and on a sufficient level of detail and precision determine the capacity requirements of the system) and network optimization (i.e., the optimization of the distribution of goods and resources between the different layers of the network).

*Keywords:* Foliated transportation networks, Mixed model transportation, Transport, Transport planning and control, Transport network optimization.

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## 1. Introduction

Looking at the road bound freight transportation industry; one will quickly encounter a system wide overcapacity and low utilization rates regarding load capacity of the transportation units, i.e., low technical efficiency. Previous research indicates a normal system fill rate span of 50-70% (Caputo et al., 2005, Nanos-Pino et al., 2005).

The technical inefficiencies in the road bound transportation systems have significant negative external effects, making efficient use of the physical resources an interest for society as a whole. Trucks and trailers impact the environment negatively both in terms of pollution (e.g., CO<sub>2</sub> emissions, air and water pollution, etc.) and in terms of noise pollution, congestion and traffic hazards (Kreutzberger et al., 2003, McKinnon, 1994).

The steady past and projected growth of the transportation demand (European Commission, 2003) amplifies the significance of this issue especially in light of the fact

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