

## Abstract

Against the background of a global shortage of resources and increasing efforts to protect the environment new requirements on logistics arise. Thus when planning logistics systems not only classical logistical cost and performance requirements, but also ecological requirements have to be considered. These ecological requirements have to include the much discussed topics of energy efficiency and carbon dioxide emissions. Moreover, further ecological impacts such as particulate matter and noise emissions have to be taken into account when planning logistics systems in the future. Such localized ecological impacts are of particular importance with regards to automobile production plants, as the traffic flow of procurement and distribution logistics leads to a concentrated exposure to the nearby population. Due to the numerous ecological impacts and the logistical cost and performance requirements that have to be considered at the same time, a multi-dimensional planning problem occurs, which is hardly manageable by automobile manufacturers.

Therefore, the aim of this research work is to develop a comprehensive planning support method which assists automobile manufacturers when planning ecological logistics systems. On the one hand, the question occurs of how logistics systems can be designed in a more ecological way. This question will be answered in the first part of this research work as ecological design measures will be identified and analyzed by a structured approach.

On the other hand, the question occurs of how the effects of the previously identified ecological design measures can be evaluated according to the mentioned ecological as well as cost and performance requirements. For this purpose an integrative evaluation method will be developed that enables a simultaneous evaluation of ecological, cost and performance aspects. Interrelated causal relationships between these logistical objectives can therefore be analyzed quantitatively. The developed evaluation method is finally tested by means of three case studies. Altogether, the developed planning support method leads to increased transparency within automotive logistics planning and thus supports decision-making.