



## Service-related traffic: An analysis of the influence of firms on travel behaviour

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### ABSTRACT

Services are becoming more and more important in industrialized countries. Yet very little is known about the traffic initiated by the provision of these services. Particularly the role of firms in this context is an unexplored field of research. To know how firms influence the travel behaviour of their employees, is however crucial for public authorities and for development of political measures.

The paper analyzes different types of travel behaviour and provides new perspectives on how firms affect this behaviour, focusing on the field of service-related traffic. Two different empirical data sets (from two German surveys) are used to reveal crucial predictors. These allow insight into the impact of firms on their employee's travel characteristics and patterns.

In a first step, applying cluster analysis, we show that four types of travel behaviour exist, which differ significantly in their travel parameters. In a second step, using regression modelling, we provide evidence that internal structure, internal process as well as external structure have a significant impact on travel patterns and behaviour. Against the background of increasing road traffic, especially in urban areas, public authorities can use the results to understand and mitigate service-related traffic.

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### 1. Introduction

Urban traffic is frequently characterized by congested roads. Passenger vehicles, light and heavy duty trucks cause traffic holdups, emit noise, contribute to air pollution (e.g., CO<sub>2</sub>, PM<sub>10</sub> and NO<sub>x</sub>) and thus burden today's society, environment and economy (see [European Commission, 2010a; b](#)).

The economic importance of commercial services raises the question of how much traffic is in fact generated by the provision or utilization of services. Service-related traffic caused by services such as facility management, home care, maintenance, consultancy services, gardening, etc. generates up to 20% of urban road traffic ([Senatsverwaltung fuer Stadtentwicklung, 2003](#)). In Germany, 34% of vehicle-kilometres-travelled (VKT) by light trucks (payload ≤ 3.5 t) are caused by service-related traffic ([Wermuth et al., 2003](#)). Looking at commercial passenger cars, this percentage is on the rise: in 2002, 4.57 million commercially owned cars generated 55 billion VKT due to service-related traffic. This enormous amount underlines the significance of this research field, especially for urban and metropolitan areas that attract most of the service-related traffic volume. Ways of

mitigating this particular field of commercial transport is therefore an emerging concern of urban and local policymakers.

Whereas for private trips, e.g., shopping and recreation, the decision of where and how to travel is made by the individual person, for service-related traffic it is foremost the firm employing the traveller that influences travel behaviour. Nonetheless the importance of the influence of firms on daily travel behaviour and mobility patterns is still highly neglected in transportation research. Today there are only a few studies concerned with how the activities of firms determine their employees' travel behaviour, focusing on travel plans ([Dft, 2002; Roby, 2010](#)) and business travel ([Aguliera, 2008](#)).

The objective of this paper is to counteract this knowledge gap and to provide an extensive basis of explanatory variables which help to assess and predict service-related traffic behaviour caused by firms. We therefore focus on the two following main questions:

1. Are specific travel patterns generated by the provision of service?
2. If so, how do firms influence the travel behaviour identified above?

On the one hand, gaining a broader picture of commercial transport beyond freight transport can be considered as fundamental research. On the other hand, the results are needed to facilitate transport planning and environmental policy-making.

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Answering the two questions, it becomes clear which structures and which processes of firms are responsible for influencing travel behaviour. This is useful for addressing specific policy measures of firms generating service-related traffic. The article moreover provides a sound basis for further theoretical and empirical research in the field of service-related traffic and commercial transport. The results will broaden the existing knowledge of transport researchers who are unfamiliar with service-related traffic as well as of urban and metropolitan planners. In addition, we provide new service-related traffic parameters for commercial transport management, prognosis and modelling.

## 2. Service-related traffic as a part of commercial transport

Commercial transport is more than just freight transport and movement of goods. The differentiation between freight transport and service-related traffic is generally acknowledged.

Service-related traffic is defined as traffic that is generated by the provision of services of economic entities or professional activities to the exclusion of freight transport (Steinmeyer, 2004; cf. Browne et al., 2002 using “service trips” or “service movements”). The English term “Service-Related Traffic” used refers to the German “Personenwirtschaftsverkehr” (“business passenger travel”; cf. Steinmeyer, 2004; Steinmeyer and Wagner, 2006) and includes service trips (based on the German term “Dienstleistungsvverkehr”) and business trips (see Fig. 1). Service-related traffic is therefore traffic strictly generated by professional activities and is a consequence of the necessary direct contact between the service provider and his/her customer (Menge and Lenz, 2008).

Today public transport planning pays very little attention to service-related traffic in the process of making urban policy decisions (Ruan et al., 2010). If commercial transport is considered at all, it is almost solely (heavy) freight transport that matters (especially because of its greenhouse gas emissions, noise, traffic safety, or infrastructure damages). This is largely due to a lack of appropriate data describing service-related traffic, as well as a lack of understanding of how the economic activities of firms cause such traffic.

There are some national studies considering aspects of service-related traffic (Schulz, 1999; Schad et al., 2001; Browne et al., 2002; Zuerich, 2004; Muenster, 2007; Ruan et al., 2010). Most of them however have a strictly regional focus, so that they do not give a broader picture of service-related traffic. They hint at several exogenous factors that could alter the travel behaviour of employees of firms, but do not present a generally acceptable answer to what service-related traffic travel behaviour actually looks like.

## 3. A firm’s influence on travel behaviour

Whereas household and individual characteristics, land use and transport infrastructure are well known for their “significant effect on individual daily activity-travel patterns” (Lin et al., 2009, p. 631), information about the influence of firms is rare. Research about work-related service trips and the influence of firms is scarce (Aguilera, 2008; Enoch and Potter, 2003). Only a few authors give systematic insights into how firms influence travel behaviour.

In an early paper about service-related traffic, Schuette (1997) concludes that the company can be understood as an agglomeration

Commercial Transport														
Freight Transport		Service-related transport		Passenger Transport	Transport of Government & Public Safety									
Hire or Reward	Own Account	Service Trips	Business Trips											
Transport of goods between spatially distributed places of production and consumption.	Freight transport on own account. As freight transport on own account it is to be separated from hired or rewarded freight transport.	Hybrid form of freight and passenger transport where besides the person who provides a service also tools, spare parts or other materials are transported.	Change of location due to job-related obligations, to meet internal and external partners personally.	Transport of person(s) other than oneself between spatially distributed origin and destination.	Transport of government and public safety, e.g. policy, customs, fire service, emergency rescue services and civil protection.									
<i>Relevance of trip purposes</i>														
0	0	+	+	++	<b>Passenger Transport</b>									
++	++	+	0	0	<b>Freight Transport</b>									
0	0	++	+	0	<b>Provision of Services</b>									
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Fig. 1. A division of commercial transport. Source: Steinmeyer (2004), enhanced and altered

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