Freight transportation companies use predicted travel time to optimize their delivery strategy and minimize waiting times for their clients. Accurate travel time predictions are easily understood by practitioners and the public [1], and concern both the users and the operators. Provision of accurate travel time information via Advanced Travel Information Systems (ATIS's) improves the awareness of travellers and enables them to make decisions for their departure time, route and mode choice. In addition, predicted travel time offer valuable information in developing Advanced Traffic Management System (ATMS) strategies. Most of these systems use travel time information as performance indicators or as their model input [2, 3].

Travel time prediction is a complex and challenging task. Resulting from the interactions among different vehicle-driver combinations and exogenous factors, such as weather, demand and roadway conditions, travel time often experiences strong fluctuations across different periods and traffic conditions. These rapid fluctuations are often complex and difficult to predict [4].

Travel time prediction and its reliability is important within the freight transportation sector [5–7]. Making accurate travel time predictions improves the reliability of travel times for freight transport, ensuring better prediction of arrival times and creating possibilities for re-routing. Furthermore, accurate travel time prediction for transport companies could help save transport operation costs and reduce environmental impacts. Accurate travel time information also helps freight transport to improve their quality of service by delivering on time [8]. Additionally, predicted travel time is valuable information required by drivers and transportation managers to improve the quality of travel and to make control decisions [9].

Improvement of predicted arrival times is important within the retail and freight industry, as it can help to optimize the number of trucks needed and allow to make strict arrangements about the arrival time. Lack of relevant data and methodologies have been an important reason that travel time prediction is not researched thoroughly yet [10]. Limitations of related travel time studies from literature include data availability, facilities of data collection, prediction techniques and interference from the traffic environment [8]. Consequences of poor travel time predictions are customer inconvenience and inefficient usage of vehicles.

In the past, multiple methods have been proposed to predict travel times for trucks. These methods are based on road characteristics, date and time and are only applied for highways [11, 12]. Within this study a truck speed prediction framework is proposed which uses car speeds, road characteristics and truck properties to predict truck speed. The expected time of arrival of trucks at the delivery

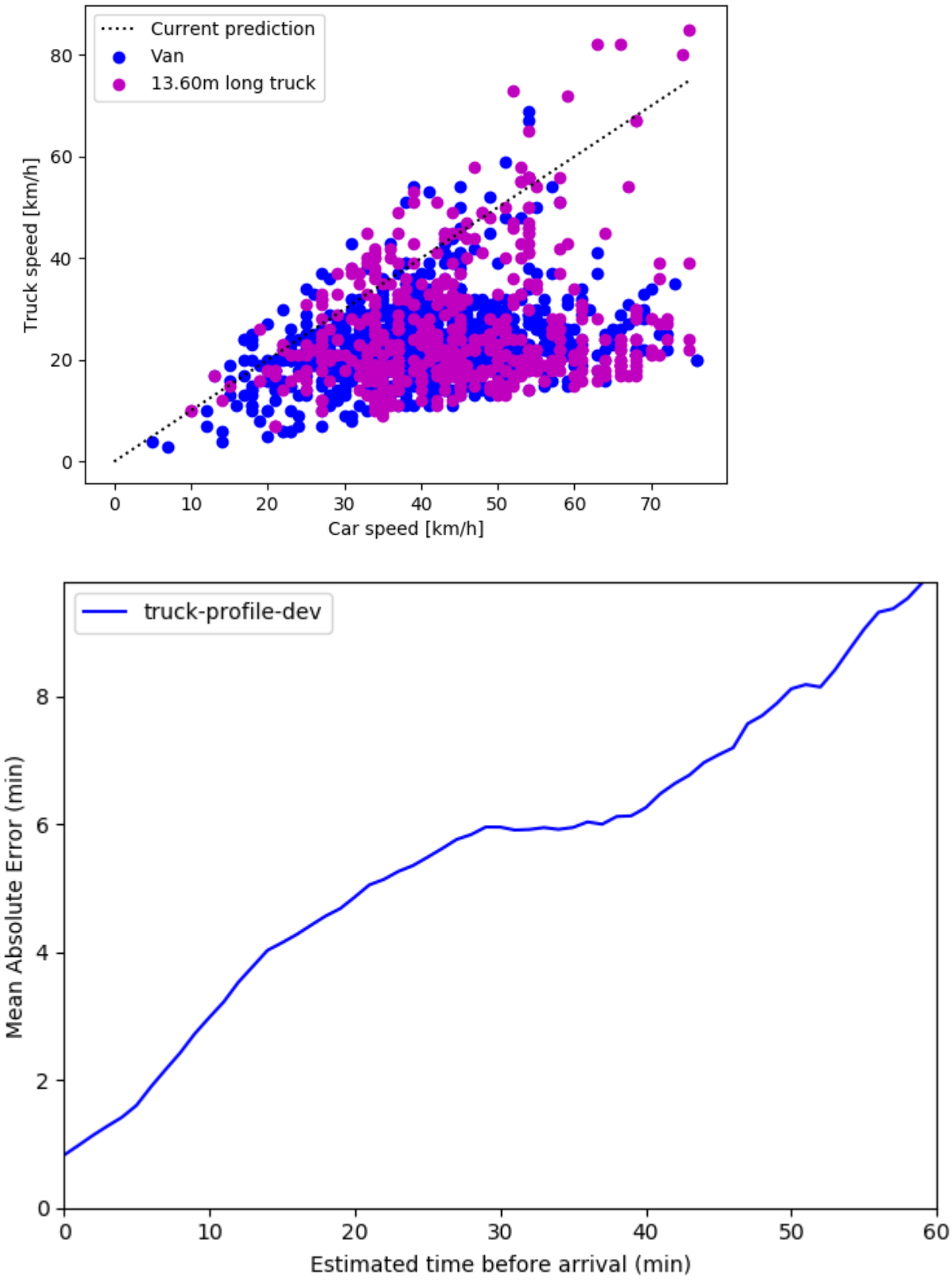

Figure 1.1: Current methodology and results of Simacan B.V. for predicting truck speed

points can be calculated using the itinerary and predicted truck speed for each road section.

Logistic practitioners typically use a combination of current travel speed and speed profiles over a day and apply this to predict truck speed. Examples of such predictions from a company within the Netherlands are shown in figure 1.1. At the moment, there is no distinction made between vehicle classes. What can be seen from figure 1.1a is that 13.60m long trucks are slower on a roundabout. In figure 1.1b the current prediction accuracy is shown by the Mean Absolute Error per estimated minute before arrival. An improved methodology is needed to predict truck speeds and a distinction has to be made between different vehicle types to ensure better prediction accuracy.