

# THESIS AWARD - LUSTRUM BOOK

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# INFLUENCE PARKING CHOICE BEHAVIOUR

## Student information

Author: Barbara Jepma

Institution: Erasmus University Rotterdam

Graduation year: 2016

## Providing information to influence dynamic parking choice behaviour in urban areas

This thesis discusses how information should be provided to support the optimisation of dynamic urban parking choice behaviour.

To influence motorists' dynamic parking choice behaviour the right information should be provided at the right moment in time.

By means of survey based research, it is studied what information sources are typically utilised, what factors influence parking choice behaviour and at what moment in the decision making process, motorists make their parking choice.

To bridge the gap between academic knowledge and practical questions, the theoretical findings are applied to the current parking situation in Leeuwarden.

Eventually recommendations for investing in information supply infrastructure for the municipality of Leeuwarden are provided, and an experiment is designed to measure the success of the recommendations based on actual behaviour.



# EFFECTS OF AVS ON PARKING CHOICE

## Student information

Author: Daphne Elisabeth Maria van den Hurk  
Institution: Delft University of Technology  
Graduation year: 2017

## An empirical study into the effects of private automated vehicles on motorists' parking location choice: an application to the city of The Hague

Automated vehicles (AVs) have been receiving increased attention all over the world, since the first fully AVs are already operating on the public road network. AVs could not only have a tremendous impact on the urban environment but also on human travel behaviour. With the capability of AVs to ride and park themselves instead of being operated by a human driver, it is likely that parking choice behaviour will change when conventional vehicles (CVs) are replaced by AVs. In order to make investment decisions, it is important for governments to gain insight into the impacts of AVs. The objective of this research is to find the importance of different factors and constraints that could influence drivers' parking location choice for a future situation in which private highly AVs will become available for passenger transport. The results of this study have been used to provide guidelines for governments on how to develop their parking policy for this future situation. The main research question of this thesis is formulated as follows:

“What is the effect of private highly automated vehicles on drivers' parking location choice, based on parking constraints?”

AVs can either be privately used or shared with others. This research is focused on the private use of AVs. A schematic overview of a trip with a private highly AV is visualised in Figure 1. The trip with a private highly AV starts from the 'passenger origin' and develops in the direction of the 'passenger destination'. Space to drop-off the passenger is needed to avoid congestion caused by dropping-off passengers on the road itself. On-street

parking space is used for the drop-off manoeuvre. When the passenger is dropped-off at a drop-off point, the passenger walks to the destination.

Simultaneous to this walking leg, the private highly AV drives empty from the drop-off point to a parking facility. The two considered parking locations are 1) parking in the inner city (PIC) and 2) parking at the edge of the city (PEC), both at off-street parking facilities. When the passenger's activity has ended, he/she walks to a pick-up point. On-street parking space is used for the pick-up manoeuvre. Simultaneously, the private highly AV drives empty from the parking facility to the pick-up point. When the passenger and the private highly AV have both arrived at the pick-up point, the vehicle trip from the pick-up point to the passenger's home or to another destination starts.

A literature review and brainstorm sessions with experts were conducted to define factors and constraints that could influence drivers' parking location choice. Factors and constraints for the Stated Preference (SP) experiment were selected by means of a Multi-Criteria Analysis (MCA). The selected factors and constraints can be divided into different categories: context factors, attributes, perceptions and exogenous variables. A SP data collection method was used in this research to examine which factors and constraints, and to which extent, influence a driver's parking location choice. Private highly AVs as described in this study are not operating on the public road network yet, which makes the need for hypothetical choice situations necessary. SP data is based on individuals' reactions to hypothetical situations: it is asked what an individual would choose in a specific situation. In this research the environmental conditions, road network configuration and parking constraints of the city of The Hague are used specifically, however, the generic methodology applied in this study could be applied to any large scale city.

Two pilot surveys were conducted in order to design the final questionnaire. An orthogonal design was used to create the hypothetical choice situations for both pilot surveys, because there is no information on prior