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start2park – Determining, Explaining and Predicting Cruising for Parking

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Abstract English

The research project “start2park” closes a research gap by precisely measuring parking search duration (cruising for parking) – especially the starting point of search – using a mobile app developed for this purpose. Complete journeys’ location data and durations are recorded, including driving until the start of the parking search, the parking search process, and the footpath from the parking spot to the final destination. Therefore, the causal effects of parking search on driving duration as well as journey duration can be estimated. Cruising for parking is traffic that results from car drivers looking for (free) kerb parking that meets their expectations (for example, free of charge or close to their destination point) and drivers being not (fully) informed about available kerb space parking locations. Parking search traffic causes external costs. Therefore, traffic-planning options should be designed to reduce unnecessary parking search traffic. However, this requires reliable data on urban cruising for parking traffic. Previous empirical results on the share of cruising traffic in total traffic, average parking search durations and average parking search distances differ widely. We show that the causal effect of parking search on driving duration and journey duration has not yet been validly estimated in empirical studies, and we explain how this is done in the research project.

Abstract Deutsch

Das Forschungsprojekt „start2park – Parksuche erfassen, verstehen & prognostizieren“ schließt eine Forschungslücke indem die Dauer der Parkplatzsuche präzise gemessen wird. Insbesondere wird erstmalig der exakte Weg- und Zeitpunkt des Starts der Parkplatzsuche über eine eigens dafür entwickelte App erhoben. Für Autofahrten werden neben den Standortdaten auch die Fahrtdauer bis zum Beginn der Parkplatzsuche, die Dauer der Parkplatzsuche als auch die Dauer des Fußweges bis zum Zielort aufgezeichnet. Daher können die kausalen Effekte der Parksuche sowohl auf die Reisedauer als auch auf die Fahrtdauer geschätzt werden. Parksuchverkehr oder „cruising for parking“ ist der Verkehr, der sich daraus ergibt, dass Autofahrer*innen einen freien Parkstand im öffentlichen oder bewirtschafteten Straßenraum, suchen, der ihren Erwartungen entspricht (etwa gebührenfrei oder nahe am Ziel) und dabei nicht (vollständig) über die Orte freier Parkstände informiert sind. Parksuchverkehr verursacht externe Kosten. Daher sollten Maßnahmen der Verkehrsplanung so konzipiert werden, dass unnötiger Parksuchverkehr reduziert wird. Dafür bedarf es verlässlicher Größen zum städtischen Parksuchverkehr. Bisherige empirische Ergebnisse in Bezug auf den Anteil des Parksuchverkehrs am Gesamtverkehr, mittlere Parksuchzeit sowie durchschnittliche Parksuchwege gehen allerdings weit auseinander. Wir zeigen, dass der kausale Effekt der Parksuche auf die Reise- und Fahrtdauer in empirischen Studien noch nicht valide geschätzt wurde, und erläutern, wie dies im Forschungsprojekt geschieht.

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1. Background

Cruising for parking is traffic that results from car drivers looking for available kerb parking that meets their expectations (for example, free of charge or close to their destination) (Sieg, 2018). Even if attributes of all parking spaces were identical and parking demand corresponded to parking supply, parking search would result from drivers not being (fully) informed about the locations of available free kerb space parking locations (see, e.g., Arnott and Rowse, 1999). Cruising for parking traffic causes external costs (Inci et al., 2017), and traffic-planning options should be designed to reduce unnecessary parking search traffic. Ideally, parking management is designed in such a way that searching for cheaper parking spaces is not worthwhile (Sieg, 2018): Arnott and Inci (2006) find, based on modelling for a city centre, that increasing parking charges for on-street parking spaces (kerb parking) is an effective way to reduce parking search traffic. Given suboptimal parking charges, increasing on-street parking supply is the second-best way to reduce it.

So far, there is no commonly accepted concept for measuring parking search duration. As Rikus et al. (2015b) point out the most important question in the study of parking search traffic may be the question of when, during a journey, the search for a parking spot actually starts. Does the parking search already start at the beginning of the journey? When a vehicle enters the destination area? When the vehicle arrives at the destination? In previous research not based on direct driver-interviews the starting point of parking search is arbitrarily defined by the researchers. For example, Weinberger et al. (2020) and Montini et al. (2012) define a radius of 400 and 800 metres around the destination point.

2. Research project start2park

Within the framework of the research project start2park, the starting point and starting time of the parking search are directly recorded for the first time. Complete journeys' location data and durations are recorded, including driving until the start of the parking search, the parking search process, and additionally the footpath from the parking spot to the final destination. Since the end of August 2021, the start2park mobile app, which was developed as part of the research project, has been in use to track car journeys and to record their corresponding floating car data. For the first time, the exact location and time of the starting point of parking search are recorded based on a signal by the driver – therefore, assumptions are avoided (see Figure 1).

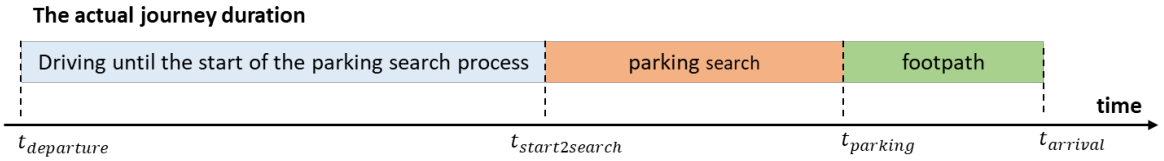

Figure 1: Journey, which is recorded via the start2park app

Parking search durations and routes, as well as factors influencing parking search durations collected via the app, will be combined with existing floating car data and will be used in the further course of the project to determine parking search durations according to urban

area types and times of day. Finally, a forecasting model will be developed that can be used to predict parking search for planned journeys. These can then be added to the expected travel durations in navigation devices and navigation apps. With this information, alternative modes of transport – for example, cycling – might be perceived as more attractive. Unnecessary parking search traffic could thus be reduced.

The research project is funded by the Federal Ministry of Transport and Digital Infrastructure with a financial assistance programme called mFUND. Cooperation partners of the ReLUT of the Frankfurt UAS in this research project are two business partners, Fluxguide Ausstellungssysteme GmbH and Bliq GmbH.

3. Estimating the effects of parking search

In essence, the question for drivers and society is, how the total duration of a journey (including the walk from the parking location to the final destination) and traffic change due to the existence of the parking search phenomenon, compared to the so-called "counterfactual situation" of no parking search at all ("perfect world"). Such a counterfactual situation is, of course, not observable and must be estimated or simulated using appropriate methods. Estimating the counterfactual situation for the journey duration can be a query to a navigation app, which does not include the parking search. In our case, the estimation of the counterfactual situation is obtained using the prediction of Google Maps for driving and walking durations. The navigation of Google Maps leads the driver to the drivable street, which is closest to the final destination regardless of whether parking is possible or not. Figure 2 represents a stylised comparison of an actual and a counterfactual journey duration.

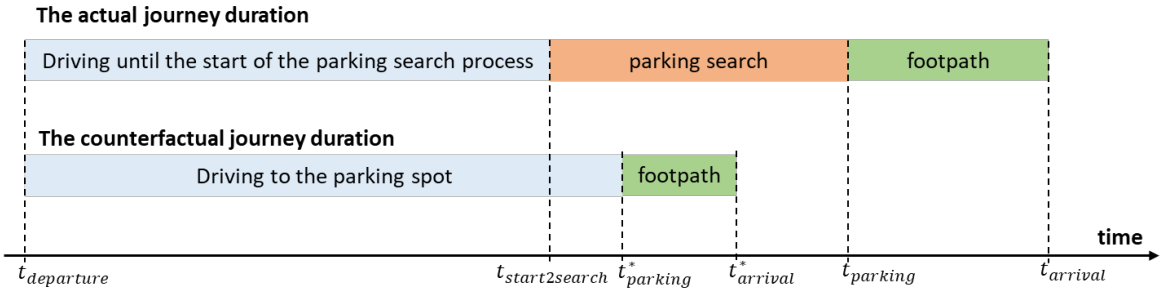

Figure 2: Actual and counterfactual journey duration

Our aim is to estimate the causal effects of parking search on driving duration ($\delta_{driving}$) and journey duration ($\delta_{journey}$). Figure 3 shows these effects graphically. Table 1 gives an overview of the time variables as well as duration variables and their calculation steps. Asterisks (*) indicate the corresponding counterfactual variables.

$T_{journey}$	$t_{arrival} - t_{departure}$	Journey duration
$T_{drive2search}$	$t_{start2search} - t_{departure}$	Driving duration until the search begins
$T_{searching}$	$t_{parking} - t_{start2search}$	Gross parking search duration
$T_{driving}$	$t_{parking} - t_{departure}$	Driving duration
$T_{walking}$	$t_{arrival} - t_{parking}$	Duration of walking to final destination
$T^*_{driving}$	$t^*_{parking} - t_{departure}$	Counterfactual driving duration
$T^*_{walking}$	$t^*_{arrival} - t^*_{parking}$	Counterfactual walking duration to final destination
$T^*_{journey}$	$t^*_{arrival} - t_{departure}$	Counterfactual journey duration
$\delta_{journey}$	$T_{journey} - T^*_{journey}$	Effect of parking search on journey duration (Net parking search duration)
$\delta_{driving}$	$T_{driving} - T^*_{driving}$	Effect of parking search on driving duration
$\delta_{walking}$	$T_{walking} - T^*_{walking}$	Effect of parking search on walking duration
T: duration; t: time; δ: effect of parking search		

Table 1: Time and duration variables

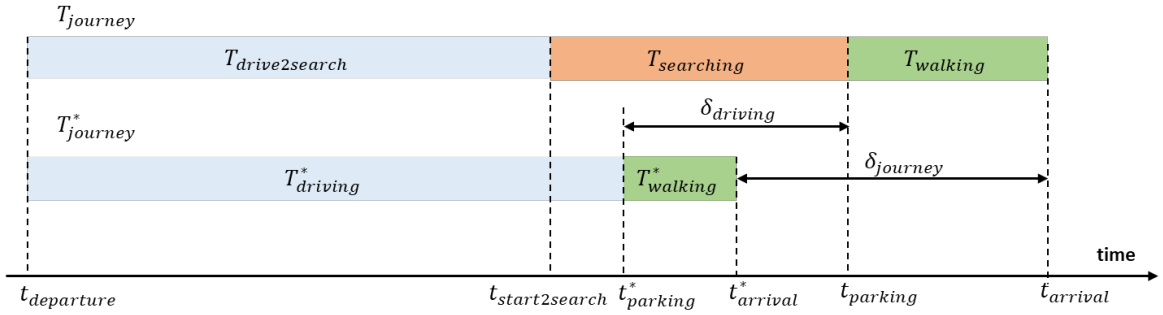

Figure 3: Effects of parking search on driving duration and journey duration

The difference between journey duration determined by the start2park app and the counterfactual journey duration predicted by Google Maps is an estimate of the "**effect of parking search on journey duration**". This parameter may also be referred to as "**net parking search duration**" ($\delta_{journey}$), in order to distinguish it from gross parking search duration ($T_{searching}$). Net parking search duration or the causal effect of parking search on journey duration ($\delta_{journey}$) is important from the drivers' perspective as it determines the direct cost of parking search of the individual driver and affects the choice of mode of transportation. However, it is neglected in navigation apps and has not been validly estimated yet. Note that $\delta_{journey} \geq 0$ must be true for all journeys.

Weinberger et al. (2020), Montini et al. (2012) and Dalla Chiara and Goodchild (2020) make an attempt to determine the effect on driving duration by comparing the actual driving duration to a parking spot with an "ideal" driving duration to the same parking spot. Hence, these studies implicitly assume that the actual parking spot is identical to the counterfactual parking spot. In most cases, this assumption does not correspond to reality, as will be shown below. The false determination of the counterfactual situation in these studies results from the fact that the final destination of the journeys is unknown to the researchers.

The **gross parking search duration** ($T_{searching}$), the time elapsed from the beginning of the parking search process until the parking spot is found, can be measured directly. This parameter is comparable to empirically determined values in previous studies. Apart from the individual perception of drivers, this variable has no significance in itself. For all journeys it must hold $T_{searching} \geq 0$.

As mentioned above, the effect of parking search on driving duration ($\delta_{driving}$) has not been validly estimated yet. $\delta_{driving}$ could be used for estimating the negative impacts of cruising for parking on the environment, the society, etc. Note that $\delta_{journey}$ can be decomposed into $\delta_{driving}$ and $\delta_{walking}$, with the latter being the effect of parking search on the walking duration ($= T_{searching} - T^{*}_{searching}$).

$\delta_{driving}$ can be negative or positive, a finding not mentioned in previous studies. For example, Figure 4 illustrates a journey, where finding an available parking spot before reaching the final destination leads to a driving duration less than the counterfactual driving duration. This results in $\delta_{driving} < 0$, while $\delta_{journey} > 0$ due to $\delta_{walking} > 0$. The blue, red and green routes show the driving route until the parking search begins (blue), the parking search route until an available parking spot is found (red), and the walking path from the parking spot to the final destination (green), respectively.

Figure 4: Example for a journey with a negative effect of parking search on driving duration

© Background map: OpenStreetMap contributors

4. Previous empirical studies on cruising

In previous empirical studies, different outcome variables are analysed: shares of cruising traffic in total traffic, average parking search durations, and average parking search distances. In these studies, the mean parking search durations and the average parking search distances are usually "gross" values, i.e., a comparison with a counterfactual situation does not take place. Moreover, the possibility of parking search to have a negative effect on an individual driving duration has never been considered yet.

The results with regard to all three outcome-variables diverge significantly in the available studies. So, the question arises, whether parking search traffic is only a minor, selective problem in larger cities (Sieg, 2018)? Or, in contrast, does the annual parking search durations in German cities sum up to 560 million hours (Rikus et al., 2015a)?

The share of parking search traffic in total traffic in evaluated studies ranges from 1% to 15%. For the city of Stuttgart, for example, Hampshire and Shoup (2018) find that parking search traffic accounted for 15% of total traffic in 2017, while Weinberger et al. (2020) find that parking search traffic accounts for less than 1% of vehicle traffic in the cities studied. Hampshire and Shoup (2018) summarise empirical "cruising" studies from 1927 to 2015. The mean share of total urban traffic in this meta-analysis is 34%. The mean gross parking search duration in this meta-analysis is 8 minutes. This duration of parking search duration is partially confirmed in the empirical literature. For example, Cookson and Pishue (2017) calculate the mean parking search duration as 9 minutes and Lee et al. (2017) as 13.4 (on-street) and 15.7 (off-street) minutes. However, empirical studies with significantly lower values can also be found. Brooke et al. (2018), for example, calculate this with an average of 1.7 minutes and van Ommeren et al. (2012) for the Netherlands with an average of only 36 seconds. Belloche (2015) determines average parking search durations between 50 seconds and approx. 11 minutes for different districts of Lyon. The mean parking search durations for different French cities obtained by Gantelet and Lefauconnier (2006) also vary widely, ranging from 3.3 minutes (Grenoble) to 11.8 minutes (Lyon).

Thus, the results regarding the average gross parking search duration do not provide a uniform picture and vary greatly. The selection of the study area, e.g., urban area types with high or low parking pressure, as well as the time and the period of the study (time of day, weekdays, seasonal effects), plays a central role (Barter, 2021). For example, if cruising for parking is studied in areas with high parking pressure, the result is inevitably higher parking search durations than in areas with low parking pressure. It is, therefore, obvious that the results obtained in the empirical studies are not easily comparable due to the different spatial dimensions, urban area types and structures in the study areas.

The previous empirical results also vary greatly due to different methods. For example, parking search durations are obtained by directly interviewing drivers after parking or by observing vehicles. In park-and-visit tests, the time it takes to find a parking space after reaching a given destination is recorded. Recent studies are also increasingly using GPS data to determine parking search traffic. For example, Weinberger et al. (2020) use GPS data and determine the parking search distance as the difference between the actual and the shortest possible travel route to the actual parking spot once the vehicle enters a predefined radius around the destination. The start of the parking search is, in this study, uniformly determined by the researchers for all parkers (radius of 400 metres around the

destination point). Table 2 summarises the different survey methods and the consideration of the counterfactual situation.

Methods to measure parking search traffic	Explanation of the method	Outcome variables and consideration of the counterfactual situation	
		with counterfactual	without counterfactual
Observing cars in the traffic flow	Cruising is present when cars pass repeatedly.		Share of cruising traffic
Survey of drivers	Survey after the parking process or query of average values		Gross values of search duration and distance
Park-and-Visit-Tests: Measurement of the time it takes to find a parking space from reaching a destination	Assumption: All parking search start at the destination point		Gross values of search duration and distance
Analysing GPS data on trajectories	Assumption about start of parking search necessary (e.g. radius around destination)		Gross values of search duration and distance
Direct GPS tracking of parking search traffic (Project start2park)	Exact measurement: starting time of parking search, location and time stamps of parking search	Net Values via Google Maps query	Gross values of search duration and distance
The typology of methods follows Hampshire and Shoup (2018)			

Table 2: Survey methods – cruising for parking

Some empirical studies focus on determining factors. Factors influencing the gross parking search duration (e.g., Assemi et al., 2020) or the parking search process (Qin et al., 2020) are analysed. For example, the cruising time seems to increase with travel duration and with parking duration (van Ommeren et al., 2012). A summary table of the available empirical cruising studies can be provided upon request.

5. First results from the research project

Within the research project start2park, pre-test drives were carried out between November 2020 and June 2021. These pre-test drives precede the data collection using the start2park app and deepen the understanding of the parking search process. Most of the 205 pre-test drives took place in Rostock and Frankfurt/Main (Germany). The complete journey duration, including the driving duration until the start of the parking search, the gross parking search duration, and the walking duration to the final destination, is measured. Furthermore, GPS tracking data was recorded with smartphones. Potential explanatory variables were also collected, such as trip-related factors (e.g. purpose of trip), driver-related factors (e.g. gender), vehicle type, regional factors (city size), parking-related factors (e.g. parking fees), situational factors (e.g. weather conditions), and temporal

factors (e.g. planned parking duration). In addition, the counterfactual journey duration (how long would the journey take without parking search?) was collected using Google Maps in order to be able to determine net parking search duration.

The median (arithmetic mean) of the gross parking search durations of all pre-test drives is 30 seconds (1 minute and 15 seconds). In 33% of the pre-test drives, it was not necessary to search for a parking space because there were free parking spaces at the destination, which corresponds to a gross parking search duration of zero. For 34% of pre-test drives, gross parking search durations are greater than zero seconds but less than 1 minute. For 30%, gross parking search durations are between 1 minute and 5 minutes, and for only 3%, they are greater than 5 minutes. The median (the arithmetic mean) of the gross parking search durations of journeys where a parking search occurred is 1 minute 2 seconds (1 minute 52 seconds). On average, drivers start searching for a parking space 91 metres (air distance) from their destination.

Navigation apps neglect parking search duration (Assemi et al., 2020). In order to find out to what extent the estimate of navigation apps deviates from the actual journey duration, including the parking search duration, the estimation of Google Maps of journey duration is compared to the actual journey duration. To consider the current traffic situation, the driving duration predicted by Google Maps was recorded at the start of the journey. This comparison, which is the same as estimating the net parking search duration, is conducted for 192 trips. The median (the arithmetic mean) is 1 minute 23 seconds (2 minutes 5 seconds). This result shows not only that Google Maps underestimates journey duration, but it also underlines the need to predict individual parking search durations and implement them in navigation systems.

Gross parking search duration correlates significantly with the number of points of interest (POIs) in a radius of 500 metres around the destination point. POIs are geo-objects that may be of interest for users of navigation systems (e.g., shops, restaurants, etc.). This means, on average, the more POIs there are around the destination point, the higher the time spent on parking searches.

It should be emphasised that the available data from the pre-test drives are not representative and influenced by the pandemic. However, this data collection and analysis serves to deepen the understanding of the parking search process, which was necessary for the development and design of the start2park app.

6. The start2park app

So, is parking search traffic an overestimated or underestimated phenomenon? What are the causal effects of parking search on the driving durations and journey durations? These questions will be answered in the start2park research project.

Since the end of August 2021, the start2park app has been in use to track parking searches and to determine factors that influence the time spent searching for a parking space. After one year of data collection, a model will be constructed with the aim of predicting the effect of parking search on journey and driving duration.

Since the end of August 2021, the start2park app has been in use to track parking searches and to determine factors that influence the time spent searching for a parking space. After one year of data collection, a model will be constructed with the aim of predicting the effect of parking search on journey and driving duration.

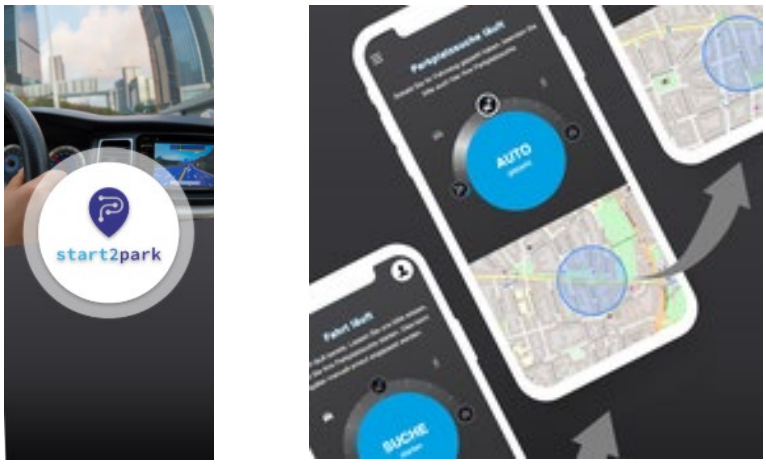

Figure 5: start2park app
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If you are located in Europe, you are invited to support us. Download the free start2park app on your mobile phone and record your cruising for parking. By doing so, you support mobility research and get an insight into the time you spend on parking search. The app is available in the app stores. Further information can be found on the project website www.start2park.com.

7. References

Arnott, R. and Inci, E. (2006), "An integrated model of downtown parking and traffic congestion", *Journal of Urban Economics*, Vol. 60 No. 3, pp. 418–442.

Arnott, R. and Rowse, J. (1999), "Modeling Parking", *Journal of Urban Economics*, Vol. 45 No. 1, pp. 97–124.

Assemi, B., Baker, D. and Paz, A. (2020), "Searching for on-street parking: An empirical investigation of the factors influencing cruising time", *Transport Policy*, Vol. 97, pp. 186–196.

Barter, P. (2021), "Is 30% of traffic actually searching for parking?", available at: https://www.reinventingparking.org/2013/10/is-30-of-traffic-actually-searching-for.html.

Belloche, S. (2015), "On-street Parking Search Time Modelling and Validation with Survey-based Data", *Transportation Research Procedia*, Vol. 6, pp. 313–324.

Brooke, S., Ison, S. and Quddus, M. (2018), "Analysing Parking Search ('Cruising') Time Using Generalised Multilevel Structural Equation Modelling", *Journal of Transport Economics and Policy*, Vol. 52 No. 3, pp. 202–220.

Cookson, G. and Pishue, B. (2017), *Die Folgen der Parkplatzproblematik in den Vereinigten Staaten, Großbritannien und Deutschland*.

Dalla Chiara, G. and Goodchild, A. (2020), "Do commercial vehicles cruise for parking? Empirical evidence from Seattle", *Transport Policy*, Vol. 97, pp. 26–36.

Hampshire, R.C. and Shoup, D. (2018), "What Share of Traffic is Cruising for Parking?", *Journal of Transport Economics and Policy*, Vol. 52 No. Part 3, pp. 184–201.

Inci, E., van Ommeren, J. and Kobus, M. (2017), "The external cruising costs of parking", *Journal of Economic Geography*, Vol. 17 No. 6, pp. 1301–1323.

Lee, J., Agdas, D. and Baker, D. (2017), "Cruising for parking: New empirical evidence and influential factors on cruising time", *Journal of Transport and Land Use*, Vol. 10 No. 1, pp. 931–943.

Montini, L., Horni, A., Rieser-Schüssler, N. and Axhausen, K.W. (2012), *Searching for parking in GPS data* (accessed 27 April 2021).

Qin, H., Yang, X., Wu, Y.-J., Guan, H., Wang, P. and Shahinpoor, N. (2020), "Analysis of parking cruising behaviour and parking location choice", *Transportation Planning and Technology*, Vol. 43 No. 7, pp. 717–734.

Rikus, S., Hoffmann, S. and Ungureanu, T. (2015a), "Informationen zum verfügbaren Parkraum in Städten", *Internationales Verkehrswesen*, Vol. 67 No. 3, pp. 86–88.

Rikus, S., Hoffmann, S., Ungureanu, T., Rommerskirchen, S. and Plesker, M. (2015b), "Auskunft über verfügbare Parkplätze in Städten. FAT Schriftenreihe 271".

Sieg, G. (2018), "Politikoptionen für die Übergangsphase zur City-Maut", *ifo SCHNELLDIENST*, Vol. 71 No. 9, pp. 14–16.

van Ommeren, J.N., Wentink, D. and Rietveld, P. (2012), "Empirical evidence on cruising for parking", Transportation Research Part A: Policy and Practice, 46(1), 123-130, *Transportation Research Part A: Policy and Practice*, Vol. 46 No. 1, pp. 123–130.

Weinberger, R.R., Millard-Ball, A. and Hampshire, R.C. (2020), "Parking search caused congestion: Where's all the fuss?", *Transportation Research Part C: Emerging Technologies*, Vol. 120.

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