

# **Multimodal travel information in the region Maastricht**

Henri Palm, DAT.Mobility  
Johan Camp, Maastricht Bereikbaar  
Casper Stelling, MuConsult

## **1 INTRODUCTION**

Improving the utilisation of both road infrastructure and public transport system is an important strategy to reaching certain policy objectives (e.g. improving accessibility) in many countries. In the Netherlands, the Ministry of Infrastructure and the Environment, together with regional and local authorities, are working on a transport system that is user friendly and offers travellers sufficient pre-trip and on-trip information about different attractive modes of transport. Providing multimodal (real-time) travel information including alternative routes, is an important instrument to support the efficient use of the total transport system. Especially during big events or incidents it can prevent or reduce the existence of traffic jams.

Within this context a multimodal travel information service is developed for the region Maastricht. In this paper first the project outline for the region Maastricht is described. Then the service is explained in more detail.

In spring 2014 users of the multimodal travel information service were asked to complete a web survey. Besides satisfaction ratings for user-friendliness and usefulness, respondents were asked about the travel options they choose (or not) and what they had done without using the trip planner. So the web survey provided insights in travel behaviour changes due to the trip planner. In the paper the results of the survey will be presented.

On national scale the Dutch Ministry is aware of the high potential of multimodal travel information for increasing the efficiency of transport system use. Therefore, they are stimulating the market of travel information to improve the chain from data collection to delivering services to end users. In the paper a short opinion about the business model is given.

Finally, the paper concludes with some issues for improving the service.

## **2 MAASTRICHT BEREIKBAAR (MAASTRICHT ACCESSIBLE)**

### **2.1 The scope**

Maastricht Bereikbaar (Maastricht Accessible) works with a large number of partners in order to keep Maastricht and the surrounding area permanently accessible. Maastricht Bereikbaar stimulates structural changes to the travel and working behaviour of commuters, students, tourists, and lorry drivers. It also offers products and services to help these groups to make smart choices for the travels to Maastricht. Maastricht Bereikbaar inspires to travel and work smart.

The challenge of Maastricht Bereikbaar is to reach a modal shift of 10% from car to alternative ways of transport (such as public transport, bike and e-bike) during rush hour on the corridors shown below for the period 2012-2014 (as shown in figure 1).

Maastricht Bereikbaar participates in the Beter Benutten (Better Utilisation) program set up by the Ministry of Infrastructure and the Environment. Maastricht Bereikbaar executes the program Beter Benutten Maastricht Bereikbaar 2012-2014. The program will be continued until 2017. This consists of a number of measurements aimed to facilitate smart and easy travelling for commuters, tourists, students and lorry drivers in the Maastricht area.

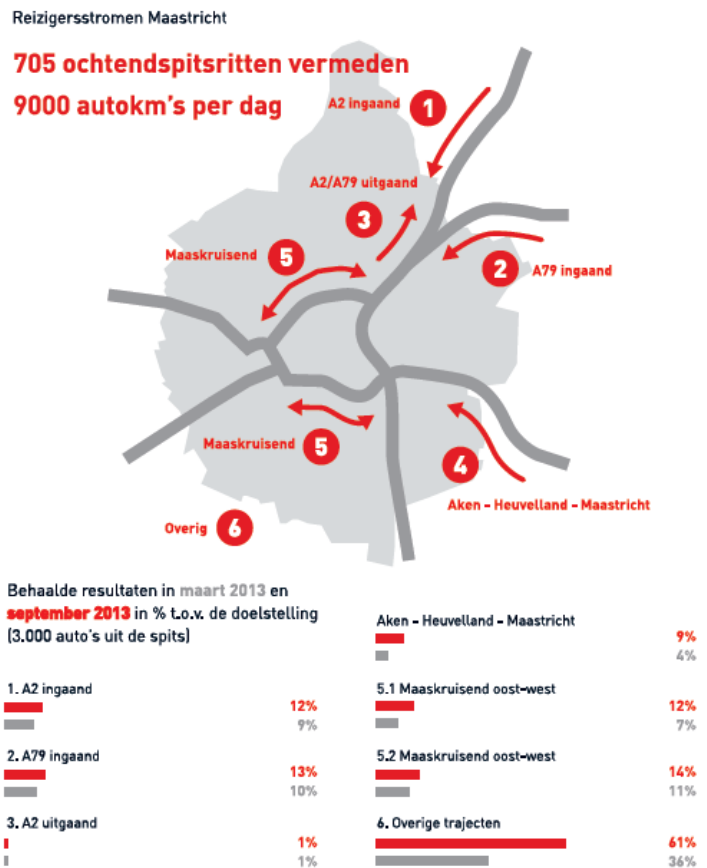


Figure 1: modal shifts on the corridors

## 2.2 The personal travel information project

The new personal multi-modal travel information tool has been operational on the Maastricht Bereikbaar website since December 2013 ([www.maastrichtbereikbaar.nl](http://www.maastrichtbereikbaar.nl)). This innovative travel information enables visitors to Maastricht and commuters to get information about the various alternatives to their planned journey before they travel. The goal of the travel information is to allow visitors and commuters to make a smart decision in advance about travelling.

The project dovetails with national developments and initiatives in other regions relating to the nationwide *Beter Benutten* ('Optimising Use') programme.

Maastricht Bereikbaar wishes to gain valuable experience in the area of pre-trip personal travel information that can also be useful for the developments in other regions and for the nationwide *Beter Benutten* programme.

Maastricht Bereikbaar has decided to provide financial support in the form of an incentive grant to improve the pre-trip travel information in the Maastricht region. The assignment includes the requirement that the service must be operational without interruptions at least until 31 December 2014. Maastricht Bereikbaar assumes that the service will be continued after 31 December 2014. The intention is to continue the project until late 2017. After the service has been evaluated, and on the basis of a business case, a decision will be reached regarding how the service will be continued after 31 December 2014.

### 3 THE MULTIMODAL TRAVEL INFORMATION SERVICE

#### 3.1 The frontend

For the end user a simple website is available. One simply adds from where to where and when one wants to travel and receives trip advice. You can also state whether you are a visitor or a frequent commuter to Maastricht. The effect of this will be discussed in more detail in the section on the special features.

In order to obtain a multi-modal trip, the user should identify what options he has available at the origin and destination. In checkbox format bike, e-bike and car can be selected, and will be taken into account for the trip chain. The centre part of the trip chain will always be public transport.

The trip advice will be shown in a different columns per mode, with some specifics like travel time and costs. The user get's more detailed information, like the route or platforms, by selecting the mode of his choice.

Figure 2 illustrates end user information from the travel information service Maastricht Bereikbaar.

**How to get to Maastricht**

From: Wilhelminalaan 1, Valkenburg  
To: Centrum, Maastricht  
Date: 15-03-2014 Time: 9:49  Departure  Arrival  
I am:  Visitor  Commuter [Give new trip advice >](#)

**Gedeeltelijk met het OV reizen?** [Bekijk ons reisadvies](#)  
Combination of different modes

Geef hieronder aan wat uw gewenste vervoersmiddelen zijn aan het begin en einde van uw treinreis.

**Van uw vertrekpunt naar het OV**  Fiets  E-bike  Auto  
**Van het OV naar uw eindbestemming**  Fiets  E-bike  Auto

[Bereken duur en kosten >](#)

Car information	Public Transport information	E-bike information	Bike information
<b>AUTO</b> <ul style="list-style-type: none"><li>Makkelijk en goedkoop parkeren op P+R</li><li>Slim Parkeren app</li><li>Voor het winkelen een frisse neus halen? P+W vanaf €6,- per dag</li></ul>	<b>OV</b> <ul style="list-style-type: none"><li>Vervoer tot in hartje Maastricht!</li><li>Geen zorgen over een parkeerplek</li><li>Onderweg nog even uw e-mail lezen</li></ul>	<b>E-BIKE</b> <ul style="list-style-type: none"><li>Heuvels in zicht? Geen probleem!</li><li>Gemakkelijk, Gezond én Goedkoop!</li><li>Volle tank benzine € 80, E-bike accu opladen € 0,08</li></ul>	<b>FIETS</b> <ul style="list-style-type: none"><li>Niet meer in de file</li><li>Snel én gezond!</li><li>Alvast de eerste zonnestralen opvangen</li></ul>
Journey time: <b>14 min.</b>	Journey time: <b>27 min.</b>	Journey time: <b>29 min.</b>	Journey time: <b>48 min.</b>
Costs: <b>€ 7,08</b>	Costs: <b>€ 3,70</b>	Costs: <b>€ 0,02</b>	Costs: <b>Geen kosten!</b>
<a href="#">Bekijk reisadvies &gt;</a>	<a href="#">Bekijk reisadvies &gt;</a>	<a href="#">Bekijk reisadvies &gt;</a>	<a href="#">Bekijk reisadvies &gt;</a>

Figure 2: frontend travel information Maastricht Bereikbaar

## 3.2 Special features

The planner contains several special features, most of them as an add-on to the car planner.

### *Advice on parking*

A visitor to Maastricht is guided to the nearest parking place and receives a walking route from the parking place to the destination. This instead of direct information to their destination. An example is shown in figure 3.

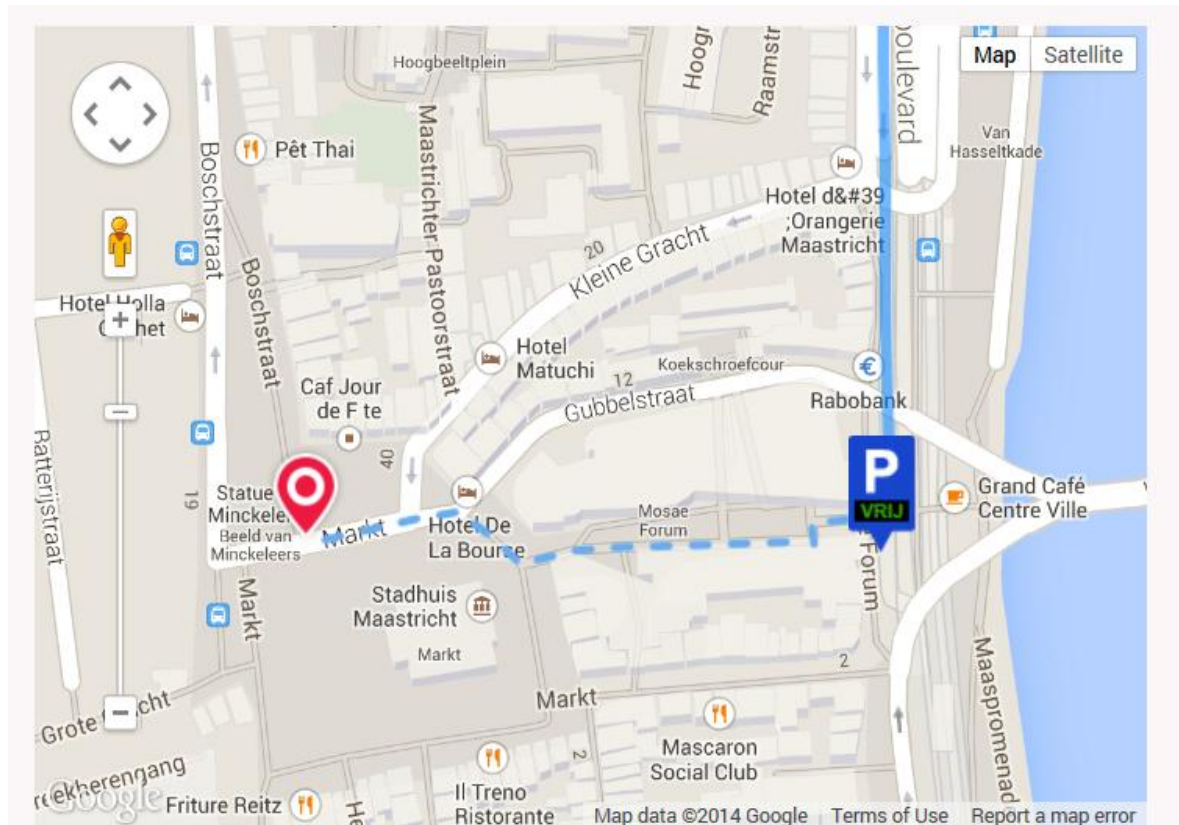


Figure 3: parking place and walking route as part of the travel information

### *Advice on peak days*

On 'peak days' (for example events, public holidays) parking facilities in the city are overcrowded. For such days visitors from the north are guided to the park and ride north of the city. Other visitors that want to travel by car are guided to the park and walk facilities. Of course, this advice is completed with the information of how the destination may be reached.

### *Cross-border travel information*

Most planners are bounded by the national border because of the problem of data availability. Maastricht is lying close to the border with Belgium and Germany, so it was desirable to deliver also cross-border travel information. Therefore the car network was extended with a part of Belgium and Germany. For the geographical network and historical velocity profiles HERE-data were used.

9292 offers already cross-border public transport information to or from the region of Aachen. For public transport trips to or from Belgium the Scotty service and 9292 planner are combined by using a smart selection of common border stations.

The bicycle planner could already handle cross-border trips because of the use OSM-network.

#### *Feedback from end users*

After every set of advice, the user is given the opportunity to supply feedback on the shown advice.

### **3.3 The backend**

The backend is comprised of multiple, unimodal planners and a system that integrates them. For the car planner we use the awarded planner called Tripcast ([www.tripcast.nl](http://www.tripcast.nl)). The travel times by car are determined on historic and actual traffic data, taking into account time, weekday, month, weather and possible holidays. The historic data used comes partly from loop detectors and partly from floating car data. These traffic speeds form a pattern over the day, with which future travel times are calculated. If the requested departure time is near the current time, actual traffic data is also taken along in the calculation.

For public transport we use the planner from 9292 ([www.9292.nl](http://www.9292.nl)). 9292 is a collaboration of all public transport companies in the Netherlands, and provides travel information for public transport at a national scale.

For the bike and e-bike we use our own public bicycle planning service ([www.fietseropuit.nl/routeplanner](http://www.fietseropuit.nl/routeplanner)). The cycling planner is based on the OpenStreetMap network and a route search algorithm from the Goudappel Group. This algorithm supplies route overview and a detailed description. This planner is used for both bicycle and e-bike trips, in which the riding speed of the e-bike is set at 25 km/h and the bicycle with 15 km/h.

The trip chain planner is developed by DAT.Mobility and uses a smart combination of the three planners to obtain a multi-modal trip.

Additional databases are used to provide information about (free) parking locations and information about the CO2 emissions based on speeds and road characteristics.

In figure 4 the architecture of the backend is shown.

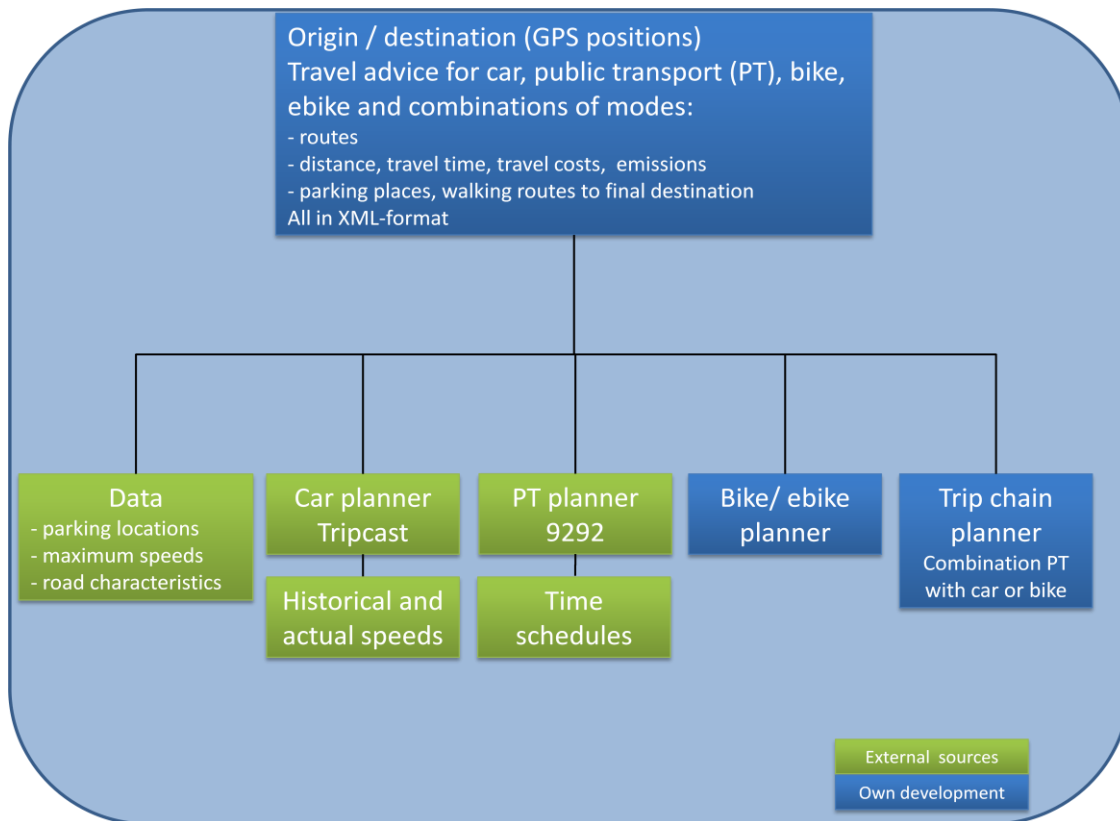


Figure 4: the architecture of the backend

## 4 THE USE OF THE TRAVEL INFORMATION SERVICE

In this paragraph we discuss the preliminary results of the user information and questionnaire. The results are based on the user information in the period from December 2013 until August 2014.

### 4.1 The number of provided travel advises

The number of travel advises provided on the website has been growing continuously in the first 9 months. In these 9 months, 15,000 multimodal trip advises have been given to visitors and commuters to Maastricht. Figure 5 shows the cumulative development of the number of provided advises.

## Cumulative number of advises given

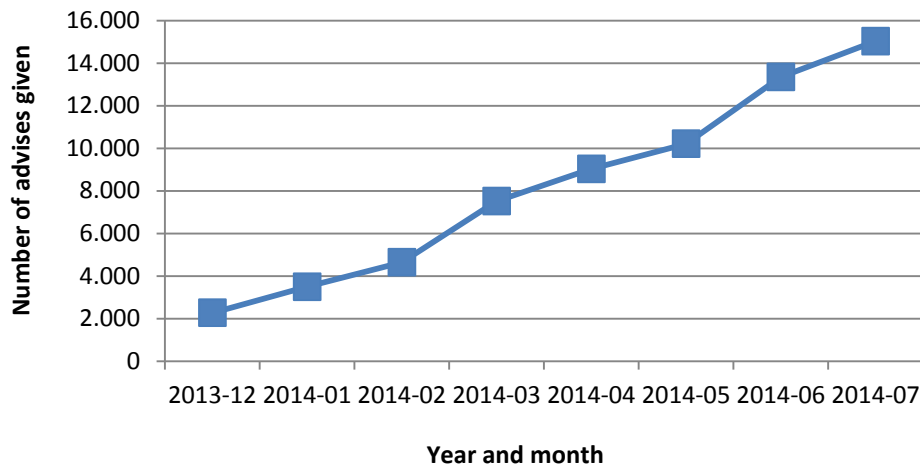


Figure 5: monthly use of the travel information service

### 4.2 Assessment of the trip advice

Visitors and commuters that take a trip advice via the website of Maastricht Bereikbaar give feedback about their experience. The easiest way to do this is to use the feedback button. 60% of the users that gave feedback were generally positive about the advice given.

The feedback has generated useful tips. A number of tips will be incorporated into the continued development after 2014. The positive feedback focused on the fact that various alternatives were offered and that the information could also be requested in Belgium (internationally). Negative feedback focused on the inaccuracy of information, in particular in relation to roadwork on the route, and the fact that information was lacking for the 'last mile' and the return journey.

### 4.3 Evaluation

In addition, the users of the travel information are invited to participate in an evaluation two times per year by completing a short survey. The results of these surveys are used to monitor the effects of the travel information on travel behaviour. In addition, the results provide information which is of great use with regard to the continued development of the project after 2014.

Forty users of the travel information have filled in the survey. They were asked their opinion of the travel information. Table 1 shows the results.

What score would you give to	Number of respondents	Average	Standard deviation
the ease of requesting information via the website	40	7.3	1.97
the usefulness of the travel information	35	6.5	2.28

Table 1: evaluation of the travel information

It is clear that the travel information is satisfactory. However, the differences between the scores are relatively high (in part due to the low response). Some people gave the travel information a very low score and some gave it a very high score.

*Effect on the choice of method of travel*

The respondents were asked which travel advice they followed and how they had originally intended to travel. Sixty-five per cent of the respondents (26 people) had originally planned to travel by car. See the figure 6 below. Thirteen of these car drivers (50%) did not change their travel behaviour and still took the car to Maastricht. The other thirteen car drivers (50%) requesting travel advice thought about alternatives to the car.

Of these thirteen drivers, five people (19%) decided to take public transport (sometimes in combination with P+R) instead of the car after receiving the travel advice. Four people (15%) who had originally planned to travel by car were still unsure which option was the best and had not yet made a decision. None of the drivers chose to travel by bicycle after receiving travel advice. Only visitors (not commuters) changed their method of travel on the basis of the travel advice. Finally, two respondents decided to travel to Maastricht by car after receiving the advice even though they originally had planned to travel using another method. This is a very low number, but it does indicate that in some cases, good multi-modal travel information will result in more car use.

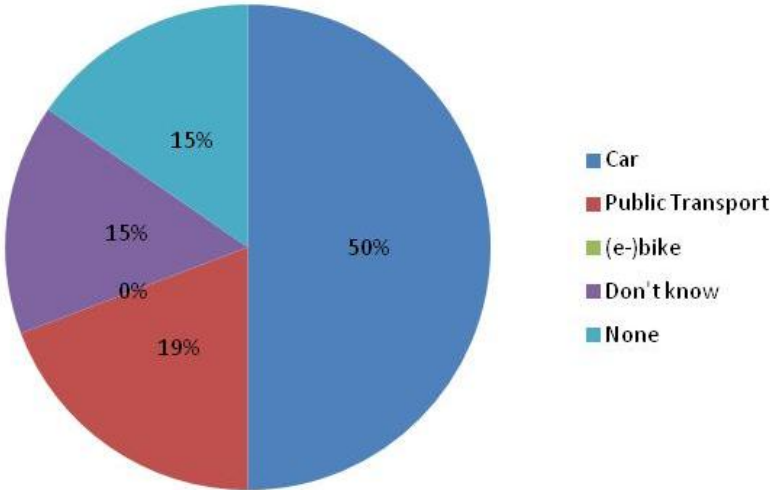


Figure 6: advice followed by car users

*Following travel advice*

The respondents were also asked how often they intended to follow the travel advice. The results in table 2 show that some of the respondents intended to follow the travel advice each time they travel, some intended to follow it sometimes, and some did not intend to follow it at all. It is not possible to draw any conclusions from this information, except to note that most people said they usually followed the advice. This implies that the users of the travel advice make a conscious choice regarding their mobility and that they therefore can be encouraged to use other options.



Options	Number	Percentage
always (100% of the time)	6	15%
usually (75% of the time)	11	28%
often (50% of the time)	6	15%
never (0% of the time)	5	13%
I'm not sure	11	28%
Total	39	100%

Table 2: How often the travel advice is followed

#### Contribution to the goals of Maastricht Bereikbaar

The goal of the travel information is to allow people to make smart choices for their mobility on the basis of time, costs, and available alternatives. In this way we hope to encourage car drivers to think about alternative methods of travel and, ultimately, to choose a different method of travel. The response to the survey evaluating the travel information is too low to enable reliable conclusions to be drawn about the effect achieved. On the basis of the available information, the following *tentative* conclusions can be drawn:

- In nine months' time, travel advice was requested in 15,000 unique instances; 9,000 of these instances (60%) were by visitors to Maastricht and 6,000 (40%) were by commuters.
- Travel advice was requested nearly 10,000 times by people who originally intended to travel by car.
- In 50% of these instances (5,000 times), after receiving the travel advice people decided to still take the car.
- In the other 50% of these instances (5,000 times), these drivers thought about alternative travel methods. Approximately 1,000 of these drivers (19%) decided to take public transport rather than travelling by car after they received their travel advice. Approximately 750 of these drivers (15%) were unsure what to do with the advice and were still thinking about alternatives.
- Regarding the frequency of travel, 68% of respondents make the journey several times per week and 32% make the journey occasionally.

It appears, therefore, that the multi-modal travel information contributes to Maastricht Bereikbaar's goal of encouraging car drivers to choose an alternative method of travel as a means of maintaining good accessibility to the city. Due to the low response to the survey, it is not possible to make concrete statements regarding how much the project contributes to the goal of 3,000 fewer cars on the road travelling to Maastricht during rush hour each day.

On the basis of the tentative results of the survey, the effect is estimated to be approximately 50 fewer cars on the road during rush hour per day. This number seems to be low, but because this project is merely one small aspect of a much larger programme, these results may be very good. If the number of unique instances of requests for travel advice per month remains constant, the project will make an even larger contribution over the coming months and years to the goals focusing on maintaining the accessibility of the city. Taking advantage of the possibilities for improvement mentioned can result in an even greater effect.

## 5 THE BUSINESS MODEL

Developing a travel planner is one, but making it economically viable is of a whole different scale. Clear is that the business model of multimodal travel information isn't simply offering the base data. Collecting the base data is mostly a job of the government, or paid for by the government in a larger contract. The recent development is that this data will be open to all users. For example, the traffic information on the roads is available free of charge through the NDW ("Nationale Database Wegverkeersgegevens").

As granter of the concession for public transport, the government decides what data the public transport supplier has input in the national database. This way, the last years the availability and quality of the public transport data has greatly improved. The 'static' time schedule is available for all concession area's in the Netherlands. The idea is that high-quality travel information to the passengers is a part of the public transport service, a service which isn't limited by the boundaries of the concession area. Providers of public transport now see that their data is put to good use, and that improved data leads to improved travel information, which in the end will lead to more passengers. Mainly accurate real-time data is an important addition for the passenger.

The expectation is that the snowball effect of open data will increase. Real-time data of parking place availability, as in Accessible Maastricht, and even in bicycle storages will be the basis in travel information. The technique to use the data is available, if only things get started.

### *Who will pay?*

The question still remains whether there is a viable business model to offer travel information. If it is not possible to earn money for the source data, where is the money to be earned? The best chance seems to be on the level of services, the products for end users. One business case lets the users pay for the service. Seeing that travel information is currently free of charge, this will be a challenge. As consumers are getting used to apps for which a small fee is charged, they may be willing to pay for special features. It will take time before the market is ready.

Considering services, a second business case is possible. Travel information often helps a greater good, like accessibility of a city or region, an incentive for public transport, the bicycle as part of a mobility service, improving the attractiveness of a shopping area or event location, etc. This means that stakeholders of these greater goods can be an important financier. In the current situation these stakeholders are indeed the (paying) clients for services based on travel information. For this second business case Accessible Maastricht is a good example: The travel planner helps travellers to find their way to the new Park and Ride location, which is the main goal of Accessible Maastricht.

## **6 FUTURE WORK**

The travel information service will be continued after 2014. Therefore improvements and new features will be added. Some of them are based on the feedback from the travellers. First, the travel information will be developed towards a more personal pre-trip travel advice. A pre trip alert service will be introduced. The user will be warned by email or SMS in case the travel time on his trip changes significantly, because of an unexpected traffic jam or a blocked railway.

In the Netherlands different travel cards for public transport are available. For the average public transport user, calculating the cost of a monthly or annual subscription can be complicated. Maastricht Bereikbaar wishes to develop a tool to advice commuters on the best subscription for their needs.

Furthermore, the service will be extended with information about roadworks. If a road is closed the traveller will be guided along the road closure.

Finally, an geographical extension will be implemented to make smart mode and route choices to the regions of Sittard-Geleen and Parkstad.