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Employer Attitudes towards Peak Hour Avoidance

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Peak Hour Avoidance is a relatively new Dutch mobility management measure. To reduce congestion frequent car drivers are given a financial reward for reducing the proportion of trips that they make during peak hours on a specific motorway section. Although previous studies show that employers are not eager to support mobility management measures, employers are nevertheless an important stakeholder. They can provide their employees with alternatives such as other travel times, work locations or travel modes and encourage their use. This paper investigates the attitudes of Dutch employers towards Peak Hour Avoidance. Exploring the factors that influence these attitudes may help to fully utilise employer support. The data from 103 employers were collected through a web questionnaire. A structural equation model on the employer support for Peak Hour Avoidance was estimated. The results demonstrate that the size of the organisation and sector only have an indirect effect on the support for Peak Hour Avoidance. Results reveal that most support for Peak Hour Avoidance can be expected from organisations who feel responsible for influencing the commuting behaviour of employees, that have human resource managers with a positive attitude towards Peak Hour Avoidance, with flexible working times and that have already implemented mobility management measures. The largest contribution to PHA that can be expected from employers is providing employees with flexible working times and encouraging employees to fully utilise this option as an alternative for driving in peak hours. This would not only be beneficial for PHA but for a wide range of mobility management initiatives as well.

Keywords: Employer Attitudes, Mobility Management, Peak Hour Avoidance, Pricing, Structural Equation Modelling, The Netherlands

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1. Introduction

Similar to many other countries, the road network in the Netherlands experiences severe congestion during peak hours (KiM, 2011). Changing travel behaviour by making use of mobility management measures can contribute to reducing the congestion externalities of road transport. Mobility management[1] measures aim to change travellers' attitudes and behaviour (EPOMM, 2010). There is a wide variety of mobility management measures (see e.g. Cairns et al. (2008)), including both carrots and sticks (Meyer, 1999). Carrots generally encourage individuals in their transport choices whereas sticks constrain, often increasing costs and decreasing availability (Ryley, 2010). Financial incentives play a significant role in mobility management (Van Malderen et al., 2012). Examples of financial sticks are road user charging and parking costs. The literature on road pricing is abundant and includes theoretical contributions (e.g. Arnott et al., 1995, Verhoef, 2002, Vickrey, 1969), contributions regarding political and social acceptability (e.g. Ison, 2000, Schade and Schlag, 2003, Viegas, 2001) and real-world implementation (e.g. Börjesson et al., 2012, Anas and Lindsey, 2011, Santos, 2005).

The general advantage of carrots compared with sticks is that it is often easier to gain stakeholder support for measures with a relatively low or no cost to the general public (Ison, 2000, Rye, 1999b). Financial carrots often include cheaper public transport fares. The use of subsidies to achieve behavioural changes for road users is, compared to road pricing, a rather novel concept. One of the few exceptions are cashing out employer-paid parking (Shoup, 1997) and the concept of credit-based congestion pricing (Kockelman and Kalmanje, 2005, DeCorla-Souza and Whitehead, 2003). Another example is the experiment discussed by Merugu et al. (2009) in which commuters were paid random rewards (a raffle mechanism based on credits) for not driving or using buses in peak hours. In 2006 a new subsidy-based mobility management measure was introduced in the Netherlands: 'Peak Hour Avoidance' (in Dutch 'Spitsmijden', henceforth referred to as PHA). The carrot comprises rewarding frequent car drivers with subsidies for reducing the proportion of trips that they make during peak hours on a specific motorway section. Although this instrument also aims to change the behaviour of car drivers with financial incentives, the most important differences with road pricing are that, instead of charging driving in peak hours and being applied to all drivers, PHA is based on subsidies for not driving in peak hours and only eligible to a small proportion of road users. One of the ideas behind the development of this measure was the suggestion that rewarding "can achieve a similar behavioural change to that of pricing" (Ben-Elia and Ettema, 2011:568). In a trial in the Netherlands under real highway conditions participants reduced the proportion of their car trips during peak hours by 50% to 70% (Spitsmijden Group, 2007b). After further development of PHA it is currently being applied as policy measure in the Netherlands.

The objective of this paper is to investigate employer attitudes towards PHA. The reason for focussing on employer attitudes is that employers are the "primary creators of commuting traffic" (Van Malderen et al., 2012:10). The majority of Dutch car drivers (68%) in peak hours consists of commuters (Rijkswaterstaat, 2006). Hence, employers can play a key role in PHA because they can provide their employees with alternatives to single occupancy car driving during peak hours such as other travel times, work locations or travel modes and encourage them to use these alternatives. This paper is of scientific interest because employer attitudes to PHA have not yet been investigated. The concept of PHA and the empirical effects are studied (see section 2 for references) but the potential role of the employer in achieving peak hour avoidance is not known.

Although employers have implemented workplace travel plans, the role of employers in commuting behaviour has been underexposed in literature (Van Malderen et al., 2012, Vanoutrive et al., 2010). The relatively few studies on employer attitudes towards mobility management conclude that it 'does not yet appear to have been taken up with great vigour by the vast majority of employers' (Rye, 1999b:14). Although this is not a promising perspective for PHA, the employers' involvement in mobility management is being encouraged by the European Commission (European Commission, 2011), the

[1] Commonly referred to as Transportation Demand Management in the USA.

Dutch government and 50 leading employers and employer associations (SWSR, 2011). The Netherlands has a particularly long history of promoting mobility management measures (Rye, 2002). Recent Belgian research demonstrated an increasing interest of companies in mobility management (Van Malderen et al., 2012). Hence, current employer attitudes to mobility management measures may have changed over the last decade. It could be that employers attitudes towards mobility management in general have become more positive over the years, because employer's have become more motivated to implement measures, the effort to implement measures has reduced or they could have become more experienced with it. In addition, PHA has several specific characteristics which could result in employers having a different attitude to PHA than mobility management in general. There are, for example, differences in the level of acquaintance and experience with the measure, the level of involvement of private parties (PHA was initiated by a public-private partnership while mobility management has traditionally been the domain of public parties) and the selection of road users able to participate. Employer attitudes to PHA are therefore currently unknown, making this a highly interesting study topic. By exploring the factors that are related to the employer attitudes to PHA and by exploring which factors have the largest effects, this research may help modify the PHA measure or the general mobility management implementation strategy such that employer support for PHA and mobility management can be fully utilised.

This paper is structured as follows. Section 2 discusses the PHA measure in more detail and discusses the role of employers in PHA. Furthermore, we propose and discuss a conceptual model of employer support for PHA. Section 3 presents the methodology. The results are presented and discussed in section 4. Section 5 summarises the main conclusions and discusses the main implications for public and private parties that want to initiate a PHA project or provide support for PHA.

2. Peak Hour Avoidance and employers

2.1 Peak Hour Avoidance

The objective of the first PHA project is "to extend the repertoire of management instruments that may be used to influence road usage during peak periods" and "to gain insight in the travel behaviour of commuters when confronted with positive incentives for not driving during peak hours" (Spitsmijden Group, 2007a:3). The first application of the PHA concept was during a trial under real highway conditions in 2006 (see for details Knockaert et al., 2007). This study involved 340 voluntary participants, frequently driving in peak hours, who were able to earn a reward (between 3 and 7 Euros, 2007 prices) relative to their driving frequency in peak hours (defined between 7:30 and 9:30 am) during the pre-test. During the trial, the participants reduced the proportion of their car trips during peak hours on a specific motorway section by 50% to 70% (Spitsmijden Group, 2007b).

Table 1 lists the most chosen alternatives to driving in peak hours by PHA participants. Using rewards to change commuters' behaviour in the short-term seems to work (Ben-Elia and Ettema, 2011). This confirms that commuters are willing to change behaviour if the incentive is sufficiently strong or effective (Giuliano et al., 1993, Meyer, 1999). The first trial sparked a number of follow-up initiatives across the Netherlands (Spitsmijden, 2010) with longer project durations, more participants and a larger geographical scope (see for examples Bliemer et al., 2009, Spitsmijden Group, 2009b). For three projects the effects on traffic conditions were studied and positive results were reported (Bliemer et al., 2009). PHA is now being applied as a measure mainly when there are roadworks. The objectives include enhancing short term regional accessibility and making employers and employees more conscious about travel alternatives (Ministry of Infrastructure and the Environment, 2011).

Table 1. Alternatives chosen by PHA participants, adapted from Knockaert et al. (2007)

Behavioural response*	Before implementing PHA	With a reward of 3 Euros	With a reward of 7 Euros
By car before 07.30h	20.1%	33.0%	38.5%
By car 07.30-08.00h	17.8%	8.9%	6.0%
By car 08.00-09.00h	27.4%	15.1%	10.9%
By car 09.00-09.30h	4.8%	2.4%	2.2%
By car after 09.30h	10.3%	16.0%	15.1%
Passenger in carpool	0.8%	1.9%	2.2%
Public transport	3.9%	9.5%	11.4%
Bicycle	5.2%	4.1%	3.5%
Other means of transport	2.8%	2.1%	2.2%
Teleworking	2.6%	3.1%	3.9%
Other work location	3.2%	2.7%	3.4%

* route choices were not rewarded in this project

In our view there are two major drawbacks to PHA which mean that it is not a real alternative to road pricing. Firstly, PHA can only be implemented temporarily. In contrast to road pricing which (even when using relatively expensive systems to collect the charge) raises net revenues, PHA results in net costs due to the payment of the rewards. It is uncertain whether there would be sufficient financiers to accommodate a (more) permanent implementation. This study shows that, at least from employers, no significant contributions can be expected. What complicates the matter of a more permanent implementation is that PHA requires information about the participants' reference behaviour to determine the amount of subsidy that a participant receives. For PHA projects which last longer, it becomes more likely that this reference behaviour is no longer correct, e.g. due to changes in either working patterns or origin/destination of the trips. If these changes are not included in the calculations, participants will receive an undeserved or insufficient amount of subsidy. Secondly, PHA raises a specific equity issue. Although participating in PHA is voluntary, people who have already chosen alternatives or have no alternatives are not eligible to become a PHA participant (Ben-Elia and Ettema, 2009).

2.2 The role of employers in Peak Hour Avoidance

Employers are an important stakeholder in PHA (Spitsmijden Group, 2009b). Reasons why employers are interested in PHA is because they expect it reduces congestion, thus keeping their region accessible, and because the flexible work arrangements required to facilitate PHA may contribute to attracting and retaining employees (Ben-Elia and Ettema, 2009). The involvement of employers in the PHA projects has been rather limited (Spitsmijden Group, 2009a). Several new PHA projects intent to change this and are involving employers in the region to recruit participants, to promote PHA by providing alternatives to single occupancy car driving during peak hours to their employees and encouraging them to use these alternatives (e.g. Spitsmijden Haaglanden, 2011, Spitsmijden Brabant, 2011).

Employers can support PHA through providing and encouraging employees to make use of work-related alternatives such as teleworking, working at another location and driving outside peak hours. These alternatives require flexible working hours or places or a combination of both. Both PHA participants and non-participants have indicated the importance of flexible working schedules. The probability of participation in PHA is greater when an employee's weekly working schedule is more flexible (Ben-Elia and Ettema, 2009). Of the local residents who did not participate and were unwilling to participate in the first PHA trial 65% mentioned work-time restrictions as the reason for not participating (Ben-Elia and Ettema, 2009). In the second PHA project restrictions relating to working hours were also the most frequently cited reason for non-participation (39%) (Spitsmijden Group,

2009b). Besides the flexibility offered by employers, employees also face employee-imposed constraints such as fixed appointments and work times of colleagues (Emmerink and van Beek, 1997). Almost 65% of the participants in the first PHA trial had to make special arrangements at work in order to be able to participate. This concerned arrangements with the employer about working times or teleworking and arrangements with colleagues about working times (Spitsmijden Group, 2007a). Furthermore, 13% of the participants mentioned work-related requirements as the reason for not avoiding (or less frequently avoiding) peak hours (Knockaert et al., 2007) and 40% indicated that arrangements with the employer were facilitating their behavioural change (Ben-Elia and Ettema, 2011). The importance of flexible working hours is also illustrated by the fact that the preferred alternative of the PHA participants in the first trial was to drive before or after the peak hours instead of during peak hours (see Table 1).

In addition, employers can support PHA by providing their employees with carpooling or alternative modes of transport (see table 1 for examples) or encouraging them to use these alternatives through information and financial incentives. In this study employer support is defined as the organisations' willingness to support PHA through (a combination of) flexibility in working times, working places and mode choice for commuting trips. These options provide employees with the opportunity to participate in PHA.

2.3 A conceptual model of employer support for PHA

Employers support mobility management measures for a variety of reasons. Gerwig (1996), as cited in Meyer (1999), Shoup (1997), Roby (2010), Van Malderen et al. (2012), Vanoutrive et al. (2012) mentions the following reasons: (supposed) legal requirements, business growth, cost reductions or revenues through commuting costs, office space, access infrastructure for new developments, productivity, extended hours of service, link to core business, company image, leading by example, recruitment and retention, demands from the workforce, health benefits for employees, Corporate Social Responsibility, environmental concerns, improved regional mobility, enhanced customer access and less car parking and congestion.

To the authors' knowledge there is no conceptual model for the factors that affect employers' attitudes to mobility management measures, let alone PHA. In this section a first conjecture of a conceptual model on employer support for PHA is proposed which consists of the hypotheses that will be tested in this study. The selection of factors and the hypotheses for the relations between these factors is primarily based on the mobility management and transport literature. All hypothesised relations between the variables included in our conceptual model can be found in the appendix. Below only the eight most important factors and relations are discussed.

Generally smaller organisations are less interested in mobility management (Coleman, 2000). It is hypothesised in our conceptual model, firstly, that the larger the size of the organisation, the greater the willingness to support PHA will be, as larger organisations usually have more HR staff members and can therefore create the conditions, such as flexible working times and places, to allow employees to participate in PHA more easily.

The support of mobility management can differ between sectors depending on the type of the workforce (Vanoutrive et al., 2012, Van Malderen et al., 2012). As a second factor in our model, it is assumed that organisations in sectors in which employees have very flexible working times and places are able to support PHA more easily and will therefore be more willing to do so. Financial institutions and business services are sectors that are assumed to have more flexible working conditions. In addition (semi) public sector employers are expected to be more willing to support PHA because they might feel obliged to lead by example (Roby, 2010).

Thirdly, accessibility is probably an important factor (Rye, 1999a, Vanoutrive et al., 2010) and is therefore included in our conceptual model. One of the reasons why employers implement mobility management measures are parking problems or traffic congestion (Roby, 2010, Rye, 1999a). These problems might also make employers feel more responsible for influencing commuting behaviour.

However, several studies did not find a link between accessibility problems and measures taken by employers (Van Malderen et al., 2012, Vanoutrive et al., 2010, Vanoutrive et al., 2012). Another factor is the workplace characteristics in terms of accessibility by public transport and car. These factors determine which alternatives for peak hour driving are available (Vanoutrive et al., 2010). Workplace location affects which modes are most suitable for employers to promote (Van Malderen et al., 2012). High public transport accessibility offers PHA participants with an alternative for not driving in peak hours and could therefore contribute to the organisation's support for PHA. However, for PHA driving before and after peak hour is the most chosen alternative (see table 1). Precondition for this alternative is that employees have flexible working conditions. Hence, our model anticipates that employers with a high car accessibility and flexible working conditions are most able to support their employees in peak hour avoidance. Furthermore, high car accessibility is expected to be accompanied by higher levels of car commuting amongst employees, increasing the likeliness that employees can participate in PHA and therefore that the employers at these locations will be the most willing to support PHA.

In this study several indicators are included to test the influence of accessibility on the organisation's willingness to support PHA. The ABDCR indicator, a combined indicator of public transport and car accessibility of work locations in The Netherlands, is included. A indicates high car and public transport accessibility, B high car and good public transport accessibility, D good car and public transport accessibility, C good car accessibility and R other (see Hilbers et al. (2006) appendix 2 for details). Besides this combined indicator two simpler indicators, being the 'distance to the nearest highway entry/exit' and the 'distance to the nearest train station' were tested.

In 1999 17% of Dutch companies had implemented mobility management measures (Rye, 2002). Van Malderen et al. (2012) found that Belgium companies between 2005 and 2008 on average increased the number of implemented measures. Therefore, as a fourth factor, it is expected in our conceptual model that employers who already have mobility management measures implemented are more willing to support PHA.

Fifthly, a factor included in the conceptual model which also might explain why organisations are willing to support PHA could be because it suits their Corporate Social Responsibility (CSR) (Roby, 2010), their "voluntary firm endeavours which benefit society" (Sprinkle and Maines, 2010:446). Taking CSR by supporting PHA can be beneficial for the organisation's image and positively contribute to the environment (Spitsmijden Brabant, 2011, Spitsmijden Haaglanden, 2011). Moreover CSR can contribute to attracting the most qualified employees (Albinger and Freeman, 2000). In this study CSR is operationalized in how responsible an organisation feels itself to be in influencing the commuting behaviour of employees, specifically the number of peak hour trips. This factor is expected to positively influence the HR manager's attitude and the organisation's support for PHA.

Work schedules also have an important impact on travel behaviour of employees (Vanoutrive et al., 2010, Vanoutrive et al., 2012). Therefore, the flexibility of working times as a sixth factor, and the flexibility of working places as seventh factor, are included in the model because they determine whether it is possible in terms of work-related options for employees to avoid peak hour driving. It is expected that these working times and places are less strict in larger organisations and in flexible sectors. The more flexible the organisation's working times and places, the higher the support for PHA will be.

Finally and eighth, the HR manager is assumed to be of key importance in an organisation's willingness to support PHA in the model (see also section 3.3). The more positive the HR manager's personal attitude is, the more likely it is that (s)he will convince the other members of the management team to support PHA. The conceptual model therefore includes the hypothesis that organisations with flexible working practices might have HR managers who are more positive towards PHA and that those organisations will be more willing to support PHA. The reason is that generally employers prefer to support measures with low costs or that require little effort (Rye, 1999a, Vanoutrive et al., 2010, Vanoutrive et al., 2012). The effort required to ensure employees can participate in PHA depends on how flexible the working practices already are and how much effort would be required to

implement a more flexible working practice. As most other mobility management measures also benefit from flexible working practices, it is possible that organisations that already support other mobility management measures offer more flexibility. If flexible working practices are already present, supporting PHA requires little additional effort.

3. Data and method

3.1 Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) was chosen as the method to explore the factors affecting employers' attitudes towards PHA. SEM is a suitable technique to verify a complex conceptual model consisting of multiple exogenous and endogenous variables (Golob, 2003) and is being increasingly applied in the field of transport (e.g. Bamberg et al., 2011, Molin and Brookhuis, 2007, Shiftan et al., 2008). SEM has been used for a path analysis in order to test hypothesised interrelationships between constructs (Weston and Gore, 2006). A path model includes covariances, direct and indirect effects and is composed from a series of linked regression equations with each equation representing a path being a (causal) relationship between two variables (Bollen, 1989). SEM distinguishes direct and indirect relations and estimates each single effect which gives insight into the composition of the total effect. For each path the path coefficient is calculated which demonstrates the strength of the relationship (Weston and Gore, 2006). The indirect effects cannot be modelled simultaneously in simpler analysis techniques such as regression analysis. Using simpler techniques could result in ignoring these indirect relationships and oversimplifying the conclusions. Hence, a major advantage of SEM is its ability to test more complex relations between factors (Golob, 2003). The fit indices for the complete model give an indication of how well our hypothesised conceptual model matches with the collected data.

However, both the application and interpretation of the results of a SEM analysis should be treated with caution. There is no general consensus on which model fit indicator and values of these indicators are representing an acceptable overall model fit. The Chi-square value is an indicator for the model fit and compares the observed with the estimated correlation matrix and should not be significant. If this is not the case, the model fit indices can be examined and the overall model fit might be improved by adding paths. However, SEM confirms or disaffirms specified relations so modifying the SEM model should be based on plausible theoretical assumptions.

3.2 Measurements

The data for this study were collected by means of a self-explanatory web-based questionnaire. Several open questions were included because PHA is a new measure and new arguments regarding the support for mobility management might have emerged. The questionnaires from the study of employer attitudes towards employer transport plans by Rye (1999a) and the insights from a semi-structured face-to-face interview with a transport management association (VCCR, 2009) were used as inspiration for drafting the questionnaire. The draft questionnaire was tested by several test respondents, including two Human Resource (HR) advisors. Their comments and feedback were incorporated into the final version of the questionnaire. The suggestions largely concerned the wording of individual questions and the general lay-out of the questionnaire. The appendix lists the items enclosed in the questionnaire and indicates for which items open or closed questions were formulated. The questionnaire included items on PHA, mobility management and current working practices.

3.3 Sampling

As especially web questionnaires seem vulnerable to a sampling bias (Bonsall and Shires, 2009), special attention was paid to this. The selection of employers was based on location and size. Employers in the province of South Holland were selected in order to include organisations with

employees who have and who have not had the opportunity to participate in PHA. Only large employers with more than 100 employees were selected. Coleman (2000) concludes, based on a study of the attitudes of small employers towards green commuter plans, that a focus on large employers is the best way forward given the low priority this topic gets from smaller employers. Also other empirical studies on mobility management focus on employers with more than 100 employees (e.g. Rye, 1999a, Vanoutrive et al., 2010). The Netherlands Chamber of Commerce trade register contained 947 employers from all private sectors that matched our criteria. It was supplemented with a number of contacts, including public sector employers, from the Peak Hour Avoidance project team.

Providing employees with alternatives for driving in peak hours is related to the HR policy, including flexible working practices and contributing to employees' commuting costs. As the HR department is primarily involved in flexible working practices (Roby, 2010), HR managers are considered to be the primary decision maker on PHA and best capable of capturing an organisation's current practices and viewpoints. The names and email addresses of the majority of HR managers and directors were collected by telephone. This enabled us to carefully target the questionnaire by using personalised emails. In July 2009, 562 personalised e-mails and 101 e-mails addressed to the HR departments (to companies from whom no name or personal e-mail address was received) were sent with the link to the web-based questionnaire. Non-respondents were sent another e-mail two weeks after the first invitation was sent.

3.4 Sample description

In total 141 respondents participated in this study, a response rate of 21%. This level of response rate is reasonable for an unsolicited web questionnaire (which was lengthy and distributed during summer holidays) and similar to the response rates in the studies on employers by Coleman (2000) (19%) and Rye (1999a) (15%) and high compared to the response rate of Bonsall and Shires (2009) (≤1%). The sample is likely to reflect the self-selection of employers who generally are more interested or find the subject more relevant than the employers who did not respond. In fact, several HR managers explained that they did not fill in or complete the questionnaire because they felt it was not applicable to them due to a lack of flexibility in their business activity. Our effort to personalise the invitation email helped to increase the response. The group of respondents who had received personalised emails showed a significantly higher response (Pearson Chi –Square 7.6, Sig. 0.006) and completed more questionnaire items (Kruskal-Wallis Chi –Square 7.4, Sig 0.007) than those who had been approached by emails addressed just to the HR department. In total 37 questionnaires with missing data were excluded from the analysis. It was assumed that the missing data was mainly due to the length of the questionnaire (completing took up to 20 minutes) and because the last part of questionnaire included questions on reasons for supporting PHA which were, for many employers, hypothetical and probably less interesting to answer. In total 103 fully completed questionnaires were included in our data analysis.

Most respondents were HR directors or managers (60%) and HR assistants (30%). The other respondents were general managers (7%) or had other positions (3%). Our sample includes all sectors but is not representative of employers in South Holland with more than 100 employees. The construction, transport and communication, financial services and business services sectors are slightly over-represented. Under-represented sectors include public administration and social security, education, healthcare and public welfare. Most respondents (68%) estimated the average employee commuting distance to be between 10 and 30 kilometres, which is consistent with the average commuting distance of 17 kilometres measured in the Netherlands in 2009 (KiM, 2011). On average, respondents estimated that 21% of their employees' commuting trips were made by public transport, and 62% were made by car. Although not asked explicitly, it is likely that the most dominant mode for the rest of the trips is cycling. In 2009 50% of the commuters in South-Holland used the car, 12% public transport and 26% cycled (Rijkswaterstaat, 2010).

4. Results

4.1 PHA, mobility management and current working practices

This section briefly presents the descriptive statistics from the questionnaire. About 35% of the respondents stated that they were not well acquainted with PHA. After providing all respondents with basic information about PHA, 51% expressed (very) positive personal opinions regarding the concept of PHA (32% were neutral and 18% were (very) negative). About 60% of the respondents who reported (very) positive attitudes towards PHA were also personally (very) willing to engage in the active promotion of PHA in their own organisations. Reasons for having a positive attitude towards PHA included the measure's contribution to reducing traffic congestion and the potential benefits it offers to employees. The primary reason for a negative attitude towards PHA was the inability to support PHA due to the business activities. Other reasons for having a negative attitude included a preference for measures other than those based on subsidies (PHA) and doubts about the measure's effectiveness.

Slightly more than one third (34%) of the respondents perceived their organisations as willing to support PHA by offering flexible working times or places (20% neutral, 46% (definitely) not willing to support PHA). Employers were asked (regardless of whether they were (un)willing to support PHA), to indicate how important they considered four specified reasons to – now or in the future – support PHA. The most important reason was that PHA was in line with the organisation's (corporate social responsibility) policy (indicated by 60% of the respondents as (very) important). The other reasons (costs savings, already flexible so support is hardly any additional effort, mobility problems such as local accessibility, parking problems or general congestion problems) were each considered important by half as many respondents. A further step in the commitment of employers to support PHA is their willingness to pay or contribute to the PHA subsidy. Of the respondents that answered this question (n=56) 20% thought their organisations would probably be willing to contribute to paying the PHA subsidy.

The majority of employers (83%) indicated that they already had mobility management measures in place. Table 2 lists the most important reasons for implementing or not having implemented mobility management measures. Nearly half (45%) of the respondents were of the opinion that employers are responsible for influencing the commuting trips of their employees.

Table 2. Reasons for having implemented and for not having implemented mobility management measures

Reasons for having mobility management measures (n=84, 83%)	**Reasons for not having mobility management measures (n=19, 17%)**
Benefits to employees (satisfaction, health, work-life balance) (n=48)	Not possible due to the nature of the business activities (which makes flexible working times and places impossible) (n=12)
Benefits to employer (n=45)	
Costs	No priority (n=4)
Attractiveness to employer	
Local problems (lack of parking/ office space, reduced accessibility)	
Benefits to society (n=26)	
Less congestion/ improved accessibility	
Improvement environment	
Corporate social responsibility	
Other (n=11)	Other (n=3)

The vast majority (94%) of the responding employers contribute to the travel costs of their employees, and only 6% have no arrangements. Half of the employers indicated that their working times were not (very) strict. The strictness of working times varied greatly among the respondents' organisations. Respondents have more flexible working times compared to having flexible working places, with 62% of the respondents indicating that their working places are considered (very) strict. A quarter of the respondents answered that their working places are not strict. The experiences of employers with flexible working times and places and mobility management measures varied from no experience to having had experience for several decades. For 64% of the respondents, the average working day in their organisations starts between 8:00 and 9:00 am and ends between 5:00 and 6:00 pm.

4.2 Estimation procedure and model fit

The initial recursive model was estimated following the relations specified in the appendix. The path analysis was conducted with Amos 18 using the maximum likelihood method as this is the standard method for estimating free parameters in structural equations models. Path coefficients that were not statistically significant at the 90% reliability level were fixed to zero. As the path between strictness of working place and organisation's willingness to support PHA was insignificant, this variable was excluded from the model. Accessibility was also removed from the model because the accessibility indicators also proved insignificant. This could be explained by the regional bias in the sample. All organisations are located in South-Holland and the public transport and car accessibility of organisations included in this sample is probably more homogeneous than when organisations from the entire country were included. As PHA participants prefer driving before and after peak hours to using public transport this could explain why using the public transport accessibility indicator did not result in significant effects. Some paths turned out to be significant at the 90% reliability level. The final SEM model, as illustrated in figure 1, has a satisfactory model fit ($\chi 2(2)$, p=0.505; RMSEA=0.000; CFI=1.000).

4.3 Direct and indirect effects

Figure 1 presents the estimated path model. The estimated standardised effects are included which gives an indication of the magnitude of the effect of an independent variable on a dependent variable, when controlling for all other variables in the model. It was found that almost all estimated paths were in the expected direction and the relations, as discussed below, seem plausible.

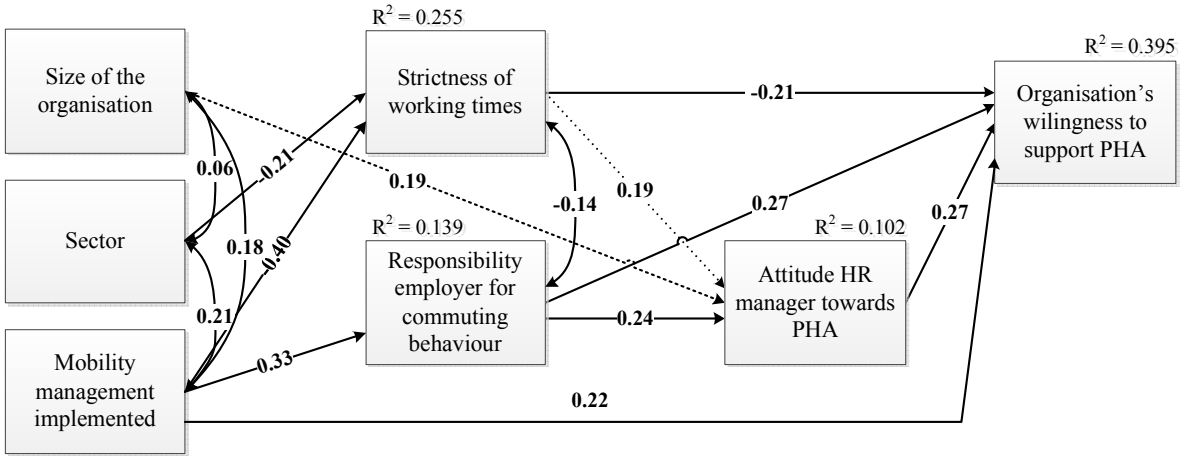

Figure 1. Path diagram of the estimated structural model - Dotted arrow indicates a significant effect at the 0.1 level

Sectors hypothesised as being flexible have less strict working times (a direct effect of -0.21). Also employers who have already implemented mobility management measures have less strict working times (-0.40). Furthermore, having implemented mobility management also positively affects the employer responsibility for commuting behaviour (0.33). The attitude of the HR manager towards PHA is directly influenced by the size of the organisation (0.19), the strictness of working times (0.19) and more strongly by the extent to which the employer feels responsible for influencing the commuting behaviour of employees (0.24). The sign of the relationship between strictness of working times and the HR manager's attitude is not in the anticipated direction. This result cannot be explained. As it concerns a relation that is less significant (p- value 0.077) than other relations in our model, it is considered less important. The organisation's willingness to support PHA is directly influenced by the strictness of working times (-0.21), the extent to which the employer feels responsible for influencing the commuting behaviour of their employees (0.27), the attitude of the HR manager towards PHA (0.27) and whether an employer has already implemented mobility management measures (0.22). Organisations with more flexible working times, who feel more responsible for influencing the commuting behaviour of their employees, with HR managers who have a positive attitude towards PHA and who have already implemented other mobility management measures are more likely to support PHA. The responsibility for commuting behaviour has a positive indirect effect on the organisation's willingness to support PHA of 0.64, strictness of working times of 0.052 and implementation of mobility management of 0.18. Remarkable is that two exogenous variables – size and sector – only have an indirect effect on the organisation's willingness to support PHA. The indirect effect of size through the attitude of the HR manager is 0.063 and of sector through the strictness of working times is 0.087. Generally more support for PHA was expected from larger organisations. As the total effect of organisation size is small (0.06) compared to the total effect of having implemented mobility management (0.40), the responsibility for commuting behaviour (0.33) and the attitude of the HR manager (0.27), the strictness of working times (-0.16), and the sector (0.12), involving only large organisations seems no guarantee for the successful involvement of employers in PHA. Moreover, as the most important factors require employer information that is much less easy to obtain than organisation size and sector, identifying employers willing to support PHA ex ante will be challenging and a more general strategy for employer involvement might be more practical.

5. Conclusions and discussion

5.1 Employer attitudes to PHA

This paper investigated the attitudes of Dutch employers towards PHA. It was found that there is a large variation in employer attitudes to PHA. Slightly more than one third (34%) of the respondents perceived that their organisations would be willing to support PHA by offering flexible working times or places. When exploring the factors that influence this willingness to support PHA, it was found that organisation size only has an indirect effect through the attitude of the HR manager. Sector has an indirect effect through the strictness of working times. The highest willingness to support PHA was found among organisations with flexible working times, and from organisations known to feel responsible for influencing their employees' commuting behaviour. Moreover the HR managers of these organisations are more likely to have a positive attitude towards PHA which also makes it more likely that the organisation will support PHA.

Employers are an important stakeholder in PHA. This study found that almost half of respondents (45%) feel that the employer is responsible for influencing the commuting behaviour of their employees. It is as yet uncertain how much effort these employers are willing to invest to translate their responsibility into concrete actions.

Based on these conclusions, our recommendation is to encourage employers to take up this responsibility. Many employers were not well acquainted with PHA, implying that promotion of this measure among HR managers seems appropriate. Our recommendation is to focus the marketing on

the benefits of PHA for the employees, the society and the employers. Focussing also on the benefits for employers – such as the potential cost savings in expenses on commuting costs (see Martens and Zuiver (2005) for an example) or the effects of being an attractive employer – is particularly important as these employer benefits were not acknowledged by our respondents. Furthermore, best practices can illustrate how PHA can contribute to an organisation's (corporate social responsibility) policy, as this turned out to be a very important factor. Furthermore it would be helpful to reduce HR managers' doubts about the measures' effectiveness. Although half of the respondents already expressed positive personal opinions regarding the concept of PHA further promotion might convince even more HR managers.

5.2 The role of employers in PHA

The largest contribution that employers can be expected to make to PHA is offering employees a range of alternatives for single occupancy car driving. Contrary to many other mobility management measures, PHA is not solely aimed at a modal shift. From all the alternatives that an employer can offer and promote, PHA benefits most from employers encouraging flexible working times. Many employers indicated that they already support flexible working times and, to a lesser extent, flexible working places. Incentives (e.g. information, subsidies) could therefore be used to encourage many more commuters to use these alternatives than are currently doing so. Hence, a general policy aimed at achieving more flexible working times might be a viable supporting policy to enhance employer support of PHA. There is a small opportunity that some employers might even be willing to contribute to paying the PHA subsidy for a certain period. A less demanding opportunity, however, viable in countries where travel allowances are common, is to use existing travel allowances to encourage alternatives for peak hour driving among employees. As 94% of Dutch employers already contribute to their employees' travel expenses, there seems to be room to use these contributions in a more flexible way to support PHA.

5.3 Limitations of the study

This explorative study into employer attitudes to PHA has several limitations. The conclusions cannot simply be transferred to all employers because the relatively limited number of respondents included in the sample are not representative of all employers. It is expected that Dutch employers are more willing to implement mobility management measures than employers in other countries due to contextual differences. Positively contributing to the willingness of Dutch employers to implement mobility management measures are their ample experience with mobility management measures, their tradition of contributing to employees' commuting costs, the government funds that have been available throughout the years for mobility management initiatives (Rye, 1999a, Vanoutrive et al., 2010) and because commuting costs can be partially deducted from taxes (Potter et al., 2006). It is expected that this more than offsets the absence of legal incentives in the Netherlands (in contrast to other countries, see Rye et al. (2011)). Several other drawbacks also need to be taken into account. First, the sample is likely to reflect the self-selection of employers who are generally more interested or find the subject more relevant than the employers who did not respond. Second, our sample included large employers (> 100 employees) only. It was expected that smaller employers are less willing to support PHA as they generally have less interest in mobility management (Coleman, 2000) and fewer options for providing alternatives to their employees (Rye, 1999a, VCCR, 2009). Third, the employers included in our study are located in South-Holland, part of the urban Randstad region, which has different accessibility characteristics than less urbanized regions (KiM, 2011), which might affect employer attitudes. As some sectors were slightly overrepresented and others underrepresented in our sample it is difficult to indicate the implications of that. The limited number of respondents made it impossible to distinguish subgroups (e.g. based on sector) within our sample or make comparisons between or within the subgroups. Lastly there is the issue of how to capture the organisation's attitude through one respondent that fills in the questionnaire on behalf of the organisation (Lyons et al., 2009). The HR managers' estimations of the organisation's attitude is not necessarily an accurate reflection. However, in our view the HR manager is for PHA best capable of estimating the organisation's viewpoint. In

fact, one of the merits of this study is that the questionnaire was carefully targeted at the HR department and by using personalised emails most of the data was collected among high level managers and directors. Not included in this study, but interesting directions for further research, is the importance of the relationship between the employer and employee (Brewer and Hensher, 2000), the socio-economic status of the workforce and the organisational culture (Rye, 1999b). Overall the respondents are expected to be more positive towards PHA and mobility management than the average employer. Hence, the results reflect the uppermost positive boundary and the results for all employers are likely to be less optimistic. Despite these limitations, a number of interesting conclusions are derived from this first study on employer attitudes towards Peak Hour Avoidance.

This study had an explorative nature and because PHA is a new measure which has been studied only to a limited extent, the conjecture of our conceptual model should be seen as a first attempt for which alternative specifications might very well be possible too. Furthermore, when a relation is confirmed it only means that this relation is plausible. Hence, the results of this SEM as part of the explorative study should be carefully interpreted. Especially with a complex model that cannot be based on firm hypothesis, further testing and validating is always necessary.

5.4 PHA as a policy tool

PHA has already proved its value in practice as a temporarily implemented policy instrument. Rewards are effective in changing the behaviour of participants (Spitsmijden Group, 2009b) and when implemented temporarily during road constructions works it can have a positive cost benefit ratio (Rienstra, 2009). To determine the cost effectiveness of PHA for wider applications more research into the traffic effects of PHA is recommended. PHA has no incentives to suppress induced demand. Although Bliemer et al. (2009) showed that in two cases (both bridges) PHA has significantly contributed to a reduction of traffic sufficient to compensate for the induced demand, this might not be true for other locations where induced demand might be larger or the reduction of peak hour trips is more dispersed over the network. In addition, further research is needed to determine the lasting effects of PHA.

Policy makers considering implementing PHA should avoid conflicting financial incentives. For example in the Netherlands it is possible to deduct costs of commuting from taxes (KiM, 2011) which encourages car driving and living further away and this conflicts with the aim of PHA to reduce car driving. The same recommendation applies to employers. For example many employers provide free parking or a company car which may contribute to being an attractive employer but make it harder for employees to choose alternatives to car driving (O'Fallon et al., 2004, Vanoutrive et al., 2010, Vanoutrive et al., 2012). This is counterproductive when simultaneously having policies aimed at less car driving (in peak hours).

This research has shown that there are employers who have a positive attitude towards PHA and are willing to support PHA. More importantly, the PHA initiatives have contributed to the wider discussion on the responsibility of employers in influencing the commuting behaviour of employees and on flexible working conditions in the Netherlands. The largest contribution to PHA that can be expected from employers is providing employees with flexible working times and encouraging employees to fully utilise this option as an alternative for driving in peak hours. This would not only be beneficial for PHA but for a wide range of mobility management initiatives as well.

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Appendix Variables

Variables: The variables in brackets are included in the conceptual model and the hypothesized relations were tested. Only the significant relations are included in Figure 1. - = relation ~ = correlation	**Type of question:**	**Assumed relations between variables:**
General questions		
Check: is respondent the right contact person	Closed	
Position	Open	
Location to check if located in South-Holland	Open	
Organisation size: total number of employees (all branches) (**A**)	Open	A-EFGHI, ~ B,C
Sector: flexible sectors are assumed to be financial institutions, business services and public administration and social security (**B**)	Closed	B-EFI ~ A,C
Average percentage commuting trips of all employees by public transport	Open	
Average percentage commuting trips of all employees by car	Open	
Average commuting distance employees	Closed	
Mobility management		
Implementation of mobility management measures (examples included in question) (**C**)	Closed	C-EFGHI
Reason for implementing mobility management measures	Open	
Reason for not implementing mobility management measures	Open	
Start implementation mobility management	Open	
Responsibility of the employer for influencing the commuting behaviour of their employees (**G**)	Closed (likert scale)	G-HI, ~ E,F
Attitudes towards PHA		
Familiarity with PHA	Closed (likert scale)	
Personal attitude PHA (**H**)	Closed (likert scale)	H-I
Reason for personal attitude PHA	Open	
Organisation's willingness to support PHA through a (combination of) flexibility in working times, working places and mode choice (**I**)	Closed (likert scale)	-
Organisation's willingness to contribute to the PHA subsidy	Closed (likert scale)	
Participating employees in PHA	Open	
Potential share of employees that could participate in PHA on the A12	Open	
Willingness to personally promote PHA in own organisation	Closed (likert scale)	
Reasons to support PHA. Are the following reasons important to include in the decision on supporting PHA?		
Cost saving	Closed (likert scale)	
Organisation's (corporate social responsibility) policy	Closed (likert scale)	
Already flexible, so support is hardly any additional effort	Closed (likert scale)	
Mobility problems such as local accessibility, parking problems or the general congestion problem	Closed (likert scale)	
Open category	Open	
Working practices		
Travel allowance	Closed	
Normal start time workday	Open	
Normal end time workday	Open	
Strictness of working times (**E**)	Closed (likert scale)	E-HI, ~ F,G
Strictness of working place (**F**)	Closed (likert scale)	F-HI, ~ E,G
Start implementation flexible working times and places	Open	
Accessibility (**D**)	Not included in the questionnaire	D-EFGHI