MULTI-MODAL TRANSPORT SERVICES IN URBAN AREAS: PUSH OR FORGET?

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1. Introduction

The car has brought us a revolution in social, economic and urban development. Many aspects of this revolution are evaluated as extremely positive, but there is also another side. Urban areas, especially those in the developed countries, suffer from the intensive use of cars. The growth in cars requires an increasing amount of space to facilitate driving or parking. The accessibility of inner city areas is at stake during peak hours, threatening the urban economic viability. Further undesirable effects are the production of noise and emissions, the contribution to many traffic accidents, and a reduction of the quality of the public urban space and urban scenery.

No easy answers exist to tackle this tension between the positive and negative impacts of car use. However, we simply cannot just wait and see how things develop as the negative effects of car use are dominant in urban areas. For example, European traffic safety policies focus on roughly reducing traffic accidents by 50% in the coming 15 years. Moreover, new European regulation on emissions pursues maximum allowable levels. Especially on main roads in and around cities accommodating high traffic intensities, these levels are often exceeded. Accessibility problems tend to push economic activities to the edge of cities, while family households move to quiet living zones in the urban periphery. Cities tend to explode, creating urban networks increasingly consuming scarce space in a direct (m^2) and indirect (quality loss) way.

So, the challenge is to keep the accessibility of urban areas at a good level and at the same time restore the quality of the urban living environment. Policy strategies vary between spatial planning decisions (locations of new living or business areas), pricing the access to areas (e.g. London), parking policies (parking guidance systems combined with permits and price of parking) or road infrastructure improvements (subsurface or lifted freeways to separate through traffic from local traffic). These policy measures are based on pushing public policies and car drivers just have to comply with the rules set by urban transport managers. The alternative is to introduce pull measures, seducing car drivers to switch to other modes, such as developing and offering high quality public transport, developing a good cycle network, offering special tax privileges for public transport users or regular bicyclists or concentrating services (shops, schools, sports) close to the living zones. Another seducing policy measure is the development of a system of P&R at the edge of cities. These facilities enable people coming from suburban or rural areas to park their car and switch to high-quality public transport services. In the Netherlands, the P&R initiatives have, in general, so far not been very successful in terms of the number of facilities being offered and their average use. A significant reduction of car mobility problems in the urban areas has not been measured. In many large European cities however, the concept seems to perform satisfactory.

This observation generates many questions: (1) Is this observation right? Can we substantiate the feeling that efforts in this field do not contribute significantly to solving the problems sketched before? (2) If we are right, can we explain it? One explanation is that our offer to the car drivers is not good enough. Another explanation is that the car drivers' attitude regarding multi-modal travel behaviour is not very strong due to complex spatial behaviour patterns of car drivers. (3) Should we try to strengthen the P&R policy strategy or should we just forget it and focus on the more enforcing spatial and transport measures?

These three questions form the basic structure of this paper. First, in section 2 we will explore in more detail recent developments in European cities regarding P&R policies: which policies regarding P&R use do they have and in which extent are car drivers sensible to those policies? Then in section 3, we will describe some of the results of our empirical study of the past years: what did we learn from it with respect to car driver's behaviour and the necessary conditions for successfully seducing them to use P&R? Section 4 offers a reflection on our findings focusing on the feasibility of the identified conditions. Finally, section 5 draws some conclusions.

2. European P&R policy strategies: state of the art

Public transport services are best used for the last part of the trip into the urban area, since providing a competitive door-to-door public transport alternative for all potential users is economically unfeasible. Public investments would become too high, especially for users living in under-populated areas where public transport is not highly developed. Combining cars and public transport into a multi-modal transport system allows us to take advantage of the individual strengths of the various systems while avoiding their weaknesses (e.g. Van Nes, 2002). The possibilities to exploit high-quality public transport are relatively good in densely populated areas as the demand in those areas is high and consequently travel flows can be clustered using high frequency services. In contrast, the car competes with public transport in rural areas where the demand density is low and public transport services are not well developed.

To facilitate a combined car/public transport journey, P&R facilities are required at the perimeters of urban areas, to act as node-transfer points between the car (as line haul service) and public transport (as egress service). This enables travellers to use their cars to travel to a P&R facility at the edge of the (congested) urban area, to park there and to continue their journey using connecting public transport to their final destination. This implies that P&R facilities surrounding inner urban areas provide extra parking capacity or replace existing parking capacity on scarce, valuable land (Parkhurst, 1999; Foote, 2000, Parkhurst & Richardson, 2002; Mingardo, 2003). Evidently, the bicycle is also a successful mode of transport around inner cities. However, this mode is generally used for intra-urban transport within limited distances, rather than for longer distances from the P&R facility located outside the city to inner-city locations.

The UK has the most experience with P&R facilities. A few P&R facilities were realised in a number of towns and cities during the 1960s, including Oxford and Leicester (e.g. Macpherson, 1992; Parkhurst, 1995; Cairns, 1997). Even as far back as 1930 P&R facilities had being realised as ad hoc car parks close to bus and rail routes (Bullard & Christiansen, 1983; Noel, 1988). The P&R facilities in the UK realised in the 1960s were short-lived and all had disappeared by the end of the decade. Research suggests that the main reasons for the disappearance of these early facilities were a lack of awareness of user needs and the lack of attention in providing the required connecting public transport services. The first permanent daily P&R service started in Oxford in 1973, and is still functioning today.

In most countries (e.g. the UK, France, Germany and the Netherlands) local P&R initiatives come from national policy makers. Additionally, sometimes a package of measures constraining car use is applied, such as high parking fees or toll charging. For example, in 1975, the accessibility of private cars to the city centre of Nottingham was limited by delaying private cars by traffic lights at peak periods (Banister, 2002). Further, long-stay city centre car parking was reduced and prices rose. In addition, many cities try to deter parking through limiting availability of parking spaces and widespread charging such as in London (EMTA, 2000). In Paris, only 9000 street spaces out of 80,000 parking lots are free of charge (EMTA, 2000). And this number decreases every year. Nowadays restricting policy measures are mainly focused on the pricing mechanism to limit car access in urban areas. Road pricing, congestion pricing and parking pricing are considered to be the most preferred restrictive policy measures (Banister et al., 2000). However, one has to realise that getting people out of their cars has proved to be one of the hardest and most politically sensitive transport policy objectives (see Banister, 2002). Therefore, restrictive policy strategies being ‘sticks’ are only acceptable when feasible alternatives being ‘carrots’ are offered for private car use in city centres.

P&R policy varies for different countries (CROW, 2005). For example in the UK, P&R facilities are located close to the radial supply roads to crowded cities with large accessibility problems and offer a dedicated bus service from and to the city centre. In Germany, P&R facilities are generally located close to the existing high-quality rail infrastructure. Route-information is offered to guide car drivers from the supply road to the P&R facility. As the connecting public transport is generally of high quality, most attention is paid to the provision level at the P&R facility itself. In France, P&R facilities are integrated in spatial policy. For example in Lille two automatically metro services were simultaneously realised with P&R facilities at the endpoints of the metro lines to stimulate public transport use. In addition, a number of existing parking provisions close to public transport stops at the edge of the city centre were upgraded to be P&R facilities. In Paris 320 P&R locations are realised around the inner city enabling car drivers to switch to public transport very easily. Other examples are Sydney where a network of 13 P&R facilities has been realised and Brussels with a network of 12 P&R facilities. In various countries policy measures are focused on maximising the quality of P&R facilities in terms of (social) safety, realising additional provisions such as a (heated) waiting room, a supermarket or a filling station. Moreover, policy is focused on optimising the quality of the connecting public transport. Upgrading the frequency of the public transport system is assumed to directly cause a higher chance to find a seat. Realising dedicated lanes to minimise travel times is another example of such policy measures. Finally, ‘carrots’ are used to make the P&R alternative more attractive such as free parking at the P&R facility and the offering of low-costs or free connecting public transport.

A limited number of evaluations have been performed to determine the effects of policy measures on P&R use. Some general observations are the following. Firstly, information about the availability of P&R facilities is essential for car drivers to use them. A number of examples (e.g. Newcastle, Rotterdam) have shown that dynamic P&R signage has considerable effects on using P&R as an intermodal way of travelling (Rogge, 2002). Secondly, from Bologna, where the P&R system did not achieve the desired effects, we learn that the location of the P&R sites was too close to the city centre and the frequency of the bus services was too low (Rogge, 2002). A third lesson can be learned from the Dutch *Transferia*: especially those focused on offering a high level of provisions did not attract the expected number of car drivers. Here, P&R facilities are sometimes offered as a 'solution' before parking or accessibility problems occur (e.g. Bos, 2004; CROW, 2005). In that case, car drivers do not need a P&R alternative.

Only a few studies have been performed to gain more insight into quantitative modal shifts after introducing P&R facilities (see CROW, 2005). This limited information for several cities is summarised in Table I. This table shows that the attraction of car drivers by successful P&R facilities is from about 2% until even 21% in the most favourable circumstances. However, it is obscure why the differences in attraction between the several studied P&R facilities are that large. We assume that the size of the reported impacts is (at least partly) a feature of the measurement approach, for example the impact of the total traffic performance in a city versus the impact on a specific inbound/outbound traffic flow.

Table I: Reported effects of policy strategies on P&R use

City (number of inhabitants)	Number of P&Rs (No. of parking lots)	Policy strategies	Reported decrease in car use
Strasbourg (250,000)	8 P&Rs (892 parking lots)	- Integrated spatial policy - High-quality light rail	3%
Oxford (134,200)	5 P&Rs (5,140 parking lots)	- Located around the ring road - Dedicated bus service	8% - 9%
Nottingham (270,000)	4 P&Rs (4,060 parking lots)	- Dedicated bus service with large number of destinations in city centre	7%
Leicester (283,500)	1 P&R (520 parking lots)	- Located on radial routes - Measures constraining car traffic in city - Direct dedicated bus route to city centre	21%
Chester (118.600)	4 P&Rs (3,170 parking lots)	- Availability of cameras and supervisors - One only has to pay for the connecting PT	2% - 3%
Swansea (223,500)	2 P&Rs (1,100 parking lots)	- Dedicated bus service	1% - 4%
Lausanne (130,000)	5 P&Rs (1,200 parking lots)	- P&Rs as outcome of traffic policy - Bad car accessibility of inner-city	5%
Vienna (1,600,000)	6 P&Rs (26,000 parking lots)	- High quality public transport network - High visibility of P&R - High parking fees at destination	12%

Apparently, P&R facilities are of varying success and it is uncertain which factors do influence car drivers' choices indeed. Thus, in order to develop attractive and successful P&R facilities, a minimum requirement is that we gain more insight in the mode choice behaviour of travellers.

3. P&R choice behaviour

As previously mentioned, some P&R facilities in different countries are undoubtedly successful. To gain a better insight into the criteria that makes one facility more attractive than another, several ex-ante and ex-post policy evaluation studies have been performed in the Netherlands and abroad. Figure 1 gives an overview of the relevant attributes influencing P&R choices, based on an extended literature study (Bos, 2004). Travellers notice these attributes from the moment they enter the P&R from the motorway, switch between car and public transport service at the P&R facility and travel to the destination.

Firstly, Sacramento (1987) and Foote (2000) argue that the P&R facility should be accessible without traffic jams and a plea for minimisation of the required detour time. Moreover, they stress that previous negative experiences by car drivers might influence their choices in the future. Therefore, the P&R service should also offer sufficient parking spaces (Bos, 2004). Once arrived at the P&R, travellers consider the quality of the P&R. This quality is described by several attributes concerning the safety at the facility and the additional services provided. Safety refers both to travellers' personal safety and the security of cars left in the car park (e.g. Foote, 2000), indicated by the level of supervision, the number of people present at the car park, the lightning at the facility during the evening hours and the walking distance between the car and the connecting public transport. The additional provisions actually have three functions. The *first* is to make the transfer from car to public transport more comfortable by realising for example a covered pedestrian walkway. The *second* is to allow travellers to experience their waiting time for the connecting transport as to some degree useful by using additional facilities such as a heated waiting room and a kiosk where they can buy coffee, food or a newspaper. The *third* function allows travellers to combine different activities (such as visiting a supermarket, filling station or day nursery) in the same trip and therefore indirectly contribute to reducing the number of car journeys.

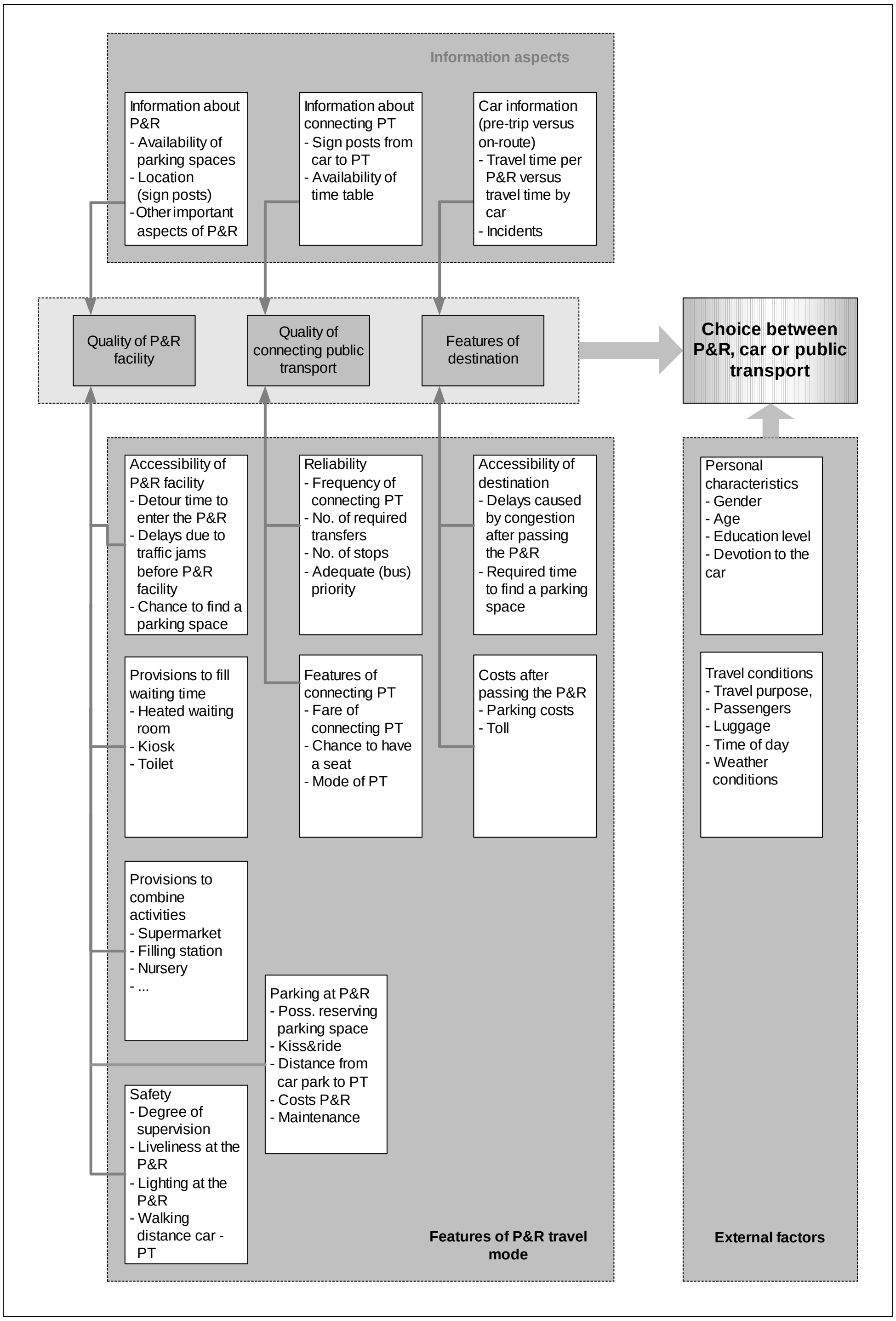

Fig. 1: Conceptual model of P&R travel behaviour of car drivers (source: Bos, 2004)

In addition, travellers' choices are influenced by the quality of the connecting public transport service to the destination (e.g. Dickins, 1991; Seik, 1997). This is indicated by the waiting time at the public transport stop, the average speed of the vehicle, the vehicle priority in urban traffic, the number of stops made, the number of transfers (between the P&R location and the destination) plus the transfer and waiting time of any extra transfers necessary between the P&R location and the destination. The waiting time for the connecting public transport service depends on the frequency of the transport service. When the frequency is low, it is particularly important that the connecting public transport departs on schedule. A high frequency of connecting public transport enables car drivers to arrive at the P&R location at a random time of day not taking the timetable into account. Finally, some attributes describing the quality of the vehicle itself are also important, such as the probability of finding a vacant seat and the cleanliness or level of maintenance of the vehicle.

Travellers, entering the urban area, will make a trade-off between the attributes describing the quality of the P&R alternative but will also consider the characteristics of the car trip. Where travellers have to cope with severe congestion and a long time to find a parking space at the destination, the door-to-door car alternative will seem less attractive. Apart from already mentioned cost measures, policy measures having influence on reducing attractiveness of the car alternative include limiting the number of parking spaces in urban areas and introducing traffic measures to limit the car accessibility of certain areas.

Beside the characteristics of the P&R and the car alternative, adequate information is required at three moments. *Firstly*, one has to be informed about the existence of an available P&R facility before entering a congested urban area by car through advertising and by adequate signposting on the main road showing opening hours, the nature of connecting public transport and the availability of free parking lots. *Secondly*, information is required about the departure times of the connecting public transport services, although such information is less meaningful when the frequency of services is high. *Thirdly*, to enable travellers to make a trade-off between using the P&R service or the car to enter the urban area, information might be provided about the estimated travel time (and perhaps also about the travel costs such as toll charges and parking fees) to reach the destination. This information could be static but more favourable is to provide dynamic (on-trip) information.

Finally, apart from the various features of the P&R option, personal and contextual characteristics are important in P&R choices. Examples are gender, age, education and devotion to the car. Relevant contextual effects are travel purpose, travelling as an individual or as a group, the need to transport luggage to the destination, the time of day for travelling and the weather conditions (see Bos, 2004).

Several studies have tried to prioritise relevant attributes that might influence P&R choice behaviour. Bos et al. (2003) prioritised the attributes describing the quality of the P&R facility and attributes describing the quality of the connecting public transport in two different ways. Table II summarises the results.

Table II: Clusters of attributes with values of influence on choice behaviour (n= 558; Source: Bos, 2004)

No	Attribute	Average importance
	1 Public transport (PT)	*4.8*
	Reliability	5.0
1	Number of transfers until destination	5.3
2	Frequency (number of departures per hour) of PT to the city	5.5
3	Separate free (bus) lane for PT to the city	3.8
4	Punctuality of PT from P&R (deviating from the time table)	5.3
5	Number of destinations in the city to be reached without transferring	4.9
	Comfort	4.2
6	Transport to city also possible by rail	3.8
7	Certainty of seat in PT to the city	4.5
	2 Time	*4.7*
8	Time needed to look for a parking place at destination	4.9
9	Amount of traffic toward/in the city	4.8
10	Extra travel time from principal road to P&R	4.4
	3 Parking	*4.0*
	Information	4.3
11	Information on the way about travel time per P&R and per car	3.7
12	Information on the way about occupancy of the parking place of the TP	4.2
13	Chance to find a parking place at the P&R	5.1
	Facilities	3.7
14	Possibility to reserve a parking place at the P&R	3.2
15	Parking lane to bring and meet travellers at the P&R	3.3
16	Walking distance from parking place at the P&R to platform PT	4.5
	4 Costs	*4.3*
17	Total costs of transferring (costs parking + costs PT)	4.9
18	Costs road pricing (per car kilometre) after passing the P&R	3.5
19	Parking costs at destination	4.6
	5 Staying at the P&R	*3.1*
	Safety	3.8
20	Supervision at the P&R	4.1
21	Surveyable, lighted pedestrian route from parking place to PT	3.8
22	A good state of repair P&R (clean, no graffiti, paved parking place)	4.2
23	liveliness at the P&R	3.1
	Human contact	2.8
24	Manned ticket service	2.8
25	Manned information desk at the P&R	2.8
	Provisions of P&R	2.8
26	Heated waiting room	3.2
27	Kiosk	2.4
28	Toilet	3.0
29	Additional provisions (e.g. dry cleaner's, supermarket, filling station)	2.6
	Extra	2.2
30	Possibility to rent a bike at the P&R	2.2

In the study, 558 respondents were asked to directly rate a pre-selected list of attributes on a 7-points rating scale from 1 (this attribute does not influence my choice behaviour at all) to 7 (this attribute does certainly influence my choice behaviour). According to this study, the attributes about the *reliability of the public transport* are considered to be most important. Secondly, *time* and to a lesser degree *costs* aspects considerably influence a traveller's decision to use the P&R or not. The parking aspects are less important, except for the information aspects about parking. Finally, respondents evaluated the attributes about *staying at the P&R* as least important.

In an additional study, importance scores were indirectly derived from data collected by asking 480 respondents to evaluate profiles describing the quality of the P&R facility and the connecting public transport described by pre-selected attribute levels in two separate conjoint experiments. The results of this decompositional measurement were as follows.

The *Quality of P&R facility* model revealed that car drivers attach most importance to social safety aspects, such as supervision by cameras and a safe, short pedestrian route. Additional provisions, for example a heated waiting room or supermarket, are less important. These results are in line with the findings of AVM (Adviesburo voor Mobiliteit, 1998) and Muconsult (2000), who asked respondents the extent to which they attach importance to previously selected attributes. They also correspond to studies by Davidson & Jefford (1992) and Seik (1997) who asked travellers which measures they would suggest for persuading people to use a P&R facility in a town. Moreover, the results of our first study (see Table II) support this finding.

The *Quality of connecting public transport* model shows that on average the certainty of finding a seat is considered to be the most important attribute. Additional fairly important attributes include the number of transfers required via the connecting public transport and the frequency of the connecting public transport. Polydoropoulou & Ben-Akiva (2001) found that the number of transfers is more important than the probability of finding a vacant seat. Differences between these studies might be explained by the use of different measurement scales. Apparently, the probability of a vacant seat as well as, the number of transfers and the frequency are considered to be attributes of large influence on travellers' choices. Also the results from Table II show that respondents attach higher importance to the number of transfers and the frequency. The measurement scale used in the conjoint experiment can explain this different as the lowest level for the attribute 'frequency' was four times in an hour and the most unattractive level for the attribute 'number of transfers' was one non-guaranteed transfer.

In our study (Bos et al., 2004) an overall conjoint experiment was applied to create a trade-off for respondents between the overall level of the quality of the P&R, the quality of the connecting public transport service and the time and costs components of the P&R and the car alternative. This experiment showed that the time and costs components were considered to be roughly of equal importance as compared to the overall quality of the P&R facility and the connecting public transport. This is in line with earlier performed studies (see also Van der Waerden et al., 1997; Van der Heijden et al., 2000).

4. Reflection on P&R policy: stop or go?

The previous analyses reveal a number of interesting things. The study by Bos indicated that individual mode choice is complex: it varies with individual circumstances and is therefore not easy to influence. Most car drivers are habit-users of their car and thus do not always make a rational choice based on good information on alternatives. On the other hand, the analyses showed that choice behaviour could indeed to some degree be influenced, though this influence is not mechanical and changes often take a long time. Various cities have shown that (moderate) successful P&R facilities have been implemented. It seems to us, that one of the most important aspects of these strategies is that they have a long lasting breath. Direct, full-swing success is not easy to reach because of the time it takes to influence choice behaviour. In the end, however, continuity of policy pays off. Therefore, urban planners and urban transport engineers should make P&R (or parking at a distance) part of an integrated long term view on transport in the urban area. They should work together to be consistent in investments and smaller initiatives to stimulate parking at a distance. Apart from public investments in some necessary infrastructures, planners should try to make arrangements with individual companies and organisations. Moreover, know that making P&R directly subject of market-based exploitation will only work in case the whole parking system in the city is subject of market-based competition. Moreover, policy makers sometimes take inconsistent decisions (for example supporting both the building of new parking housing in the inner city and simultaneously creating P&R facilities).

A recent paper by Bos et al (2005) describes the results of some forecasts of potential impacts of some specified policy strategies with the before mentioned P&R choice model. For details about the exact forecasting procedure, the reader is referred to the mentioned paper. It was found that on average, in a situation of no congestion, a standard P&R facility in the Netherlands (15 minutes public transport service, about 1-3 minutes walk, € 4 fee per day, 20 minutes extra travel time per trip), might generate between 0.5 and 1.0% of all travellers on a certain route. This is increased up to a level of about 3% in case of regular heavy congestion (car delay of 40 minutes per trip). Improving the quality of the P&R facility by features, such as extra supervision, a (heated) waiting room or shopping facilities, generated only marginal changes in these impact figures. A policy strategy focused on improving the quality of the connecting public transport service has somewhat more impact; especially the reduction of extra travel time per trip to 10 minutes (generating an increase to about 1.5% to 6%, depending upon the level of congestion) and in addition making the P&R alternative free of charge (generating a forecasted use of 4% in case of no congestion up to the level of 15% in the case of severe congestion). In a next step in the model-based forecast, the various potential policy strategies were combined. Table III reports the potential impacts of the different (combinations of) policy strategies (PT = Public Transport).

Firstly, Table III shows that a smart combination of pull-measures in a context of heavy congestion might cause a significant switch from door-to-door car use to multi-modal travelling. Secondly, Table III illustrates that car-restricting policy measures in case of a standard P&R alternative is forecasting to have a significant, though limited impact, on the use of P&R, whereas the use of door-to-door public transport services is significantly improved. Finally, it is interesting to see that the integration of both push and pull measures will have a large positive impact on the level of P&R use.

We learn from the experience in other countries and the analysis of the hypothetical impact assessment (though based on a model for stated choice behaviour) that there is a world to win for smart P&R policies in urban areas. The answer on the question “stop or go?” based on these insights is therefore: go.

Table III: Influence of packages of strategies to increase the number of car drivers switching to P&R

	Predicted use (%)		
	P&R	**Car**	**PT**
No congestion			
Basic P&R alternative	0.8	96.8	2.4
Improving quality of P&R alternative (P&R charge = € 4)	2.1	95.6	2.4
Improving quality of P&R alternative (free of charge)	5.8	91.9	2.3
Increase in costs when using car after passing P&R (up to € 3.50)	1.0	95.9	3.1
Increase in costs when using car after passing P&R (up to € 6.50)	1.5	94.0	4.5
Improving quality P&R, P&R charge of € 4.00, and fees at destination of € 6.50	3.9	91.7	4.4
Improving quality P&R, P&R free of charge, and fees at destination of € 6.50	10.5	85.4	4.1
Heavy congestion (car delay of 40 minutes)			
Basic P&R alternative	3.2	87.0	9.8
Improving quality of P&R alternative (P&R charge = € 4)	8.2	82.5	9.3
Improving quality of P&R alternative (free of charge)	20.7	71.3	8.1
Increase in costs when using car after passing P&R (up to € 3.50)	4.0	83.6	12.4
Increase in costs when using car after passing P&R (up to € 6.50)	5.5	77.5	17.0
Improving quality P&R, P&R charge of € 4.00, and fees at destination of € 6.50	13.6	70.9	15.5
Improving quality P&R, P&R free of charge, and fees at destination of € 6.50	31.5	56.2	12.3

5. Conclusions and discussion

In this paper, we reflected on the urban traffic problems, especially from the perspective of the viability of P&R strategies. This was triggered by the difficulties of the Dutch to make P&R to a success. We showed, based on connecting various pieces of information, that success can be reached. Of course, we have not the illusion that the strong impacts suggested by the forecasts mentioned in section 4 will be within reach easily. Strong policy initiatives during a long time are a prerequisite for that. Politicians should develop a consistent and integrated view on how to tackle traffic problems in their city and should accept that getting success takes a long breath.

This brings us to the question that triggered this paper: the unsatisfactory success of P&R strategies in the Netherlands. Although we did not provide any analysis on the institutional setting of policy making in this paper, we have some assumptions. Basically, we think that it is not a lack of quality of available policy analyses or the unavailability of means that might give an explanation. It seems to be a lack of continuity, consistency and long breath in Dutch urban development policy. Dutch spatial and traffic policy shows a strong tendency to compromise between different, often conflicting, interests. This often results in very incremental measures, too often resulting in too much muddling through. Or we can observe that strategies that are not more or less directly successful are abandoned after a few years. An example is the well-known Dutch ABC location policy for new living and working areas. This was announced in the early nineties as a spatial policy to bring together spatial and transport policy, but in the meantime almost forgotten. The same is observable with regard to P&R policy. We consider these thoughts interesting hypotheses that should be made subject of further research. In the near future, we intend to perform such analyses in the context of a new research program in co-operation with various regional authorities and other research groups.

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