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PARKING AS MOBILITY TOOL

THE EFFECT OF PARKING MEASURES


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The effect of parking measures in an urban context

As the population of the world continues to grow, as well as the portion of people living in cities and the number of privately used cars, it becomes increasingly important to create an urban environment which is sustainable and of good environmental quality.

Decision makers and urban planners have a whole plethora of measures that they can use at their disposal. One category of those measures is traffic demand management or TDM for short.

Traffic Demand Management

TDM combines both pull and push measures which can be used in conjunction to create a more equitable and sustainable transportation system.

- Pull measures aim to increase the use of mode choices by improving them; either by appeal accessibility cost or performance.
- Push measures aim to dissuade particular behaviour by implementing economic costs or other measures. These usually raise revenue, as well as quantify the cost of particular transport behaviours.

One particular category within TDM is that of parking measures, which have been in use for quite a while.

Particular parking measure

Parking pricing is the most known example of this. While decision makers and urban planners are aware of the tools at their disposal, they are often less certain of their effects in the setting that applies to them specifically. This report aims to shed light into that unknown, identifying the possible reactions that car users may show when confronted with a particular parking measure.

By submitting a sample in the population of the city of Geel to a self-completion questionnaire, data is gathered regarding their current transport behaviour, mobility options and reactions to five hypothetical scenario's of parking measures.

First an online survey was used by distributing flyers with a URL, then a paper version was used to obtain a large enough sample.

This data led to the conclusion that road users indeed change their behaviour to evade parking measures, and the reaction to parking pricing is not as strong as a decrease in the number of available parking spaces.

Use of private car remains popular

Additionally, changing transportation modes, a switch to public transportation or the bicycle, is not as popular as continued use of a private car. Different people have different reactions, but no particular characteristic of individuals was influential across all distinct hypothetical cases and strategies.

Included in the report are recommendations for decision makers questioning how to shape their urban environments, as well as a reflection for future research on the topic.

"The reaction to parking pricing is not as strong as a decrease in the number of available parking spaces."

LESSONS FROM POLICY IMPLEMENTATION

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Mobility management at Erasmus University Rotterdam: lessons learnt from policy implementation and how to move forward

This thesis evaluates the mobility management policy that was put in place by the Erasmus University Rotterdam (EUR) in 2011. The goal of the policy was to see a reduction in car commuters in order to become a more sustainable campus.

Several policies were put in place. This thesis gives special attention to the introduction of parking charges since June 2013. The analysis is based on three years of data, which is provided by the EUR via surveys in 2010, 2014 and 2016.

The statistical analyses find four factors that predict car commuting:

- car availability,
- arrival time,
- type of function of the employee and
- number of days one commutes per week.

The perceived accessibility has decreased since 2010, and there has been a reduction of car commuters by 6.80% points. The introduction of parking fees shows a decrease in car commuting. Furthermore, an estimation of the reduction in CO_2 is made, which finds a total daily reduction of 1137.8 kg CO_2 in 2016 compared to 2010.

The results suggest that the EUR is well on its way to realise their aim in reduction of employee commuting, and that future policy measures are likely to be found in behavioural as opposed to parking measures. Overall, the EUR has become a more sustainable campus since 2010.

SMART MOBILITY: A STRATEGIC SOLUTION

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Smart mobility: a strategic solution in urban development

Shared and autonomous vehicles provide municipalities with a strategic solution in urban development. Smart mobility can be a game changer in realising the ambitions of a safe, liveable, sustainable, and attractive city.

Consider spatial implications of smart mobility

Former policies on mobility however have resulted in long term undesirable effects. This increases the urgency for municipalities to already consider the spatial implications of smart mobility. A lot of research has been carried out already on the effects of smart mobility, but these focus only on first order local effects.

To the best of the authors knowledge, no literature exists on how, where and if the effects of smart mobility can be used for the restructuring and transformation challenges of the public space.

The main question of this research is:

"To what extent can autonomous and shared mobility contribute to the restructuring and transformation of the public space and help to achieve a region's public ambitions, taking into account the different mobility scenarios?"

To answer the research question, both a quantitative and qualitative approach were used. First a conceptual model was developed using existing literature and findings out of the expert interviews. Secondly, the conceptual model was used to develop a mathematic model in the programming language Python.

The Python model helped to analyse several large datasets for the different scenarios. Subsequently, the Python output was visualised in Tableau. Tableau helped to analyse and discuss the different research questions.

Reduction of parking capacity

It was found that smart mobility can, depending on the scenario, result in a reduction of parking capacity between 0% and 88%. This bandwidth depends on the market share of shared and autonomous mobility, as well as on the change in extra kilometres travelled, the replacement ratio of shared vehicles, and the reduction of the parking footprint per scenario.

The reduction in parking capacity results in freed up space, which can be transformed into a new function and contribute to the restructuring and transformation of the public space.

How and to what extent smart mobility can contribute depends on the location and type of parking, the dynamics of the housing stock, and the policy of the government.

In urban areas with a dynamic housing stock and a relatively large capacity of the different types of parking, smart mobility can contribute the most to both the development of new houses and the improvement of the public space.

It can furthermore help to increase the housing density in urban areas, which has a beneficial effect on car use.

In more rural areas, where the housing dynamic is lower and where mostly street parking is available, smart mobility can only contribute to the improvement of the public space and the attractiveness of the region.

Smart mobility has shown to have an indirect effect on the economic, health, social, environmental, and ecological spatial value.

Spatial value

How the maximum spatial value can be realised during a restructuring and transformation challenge, will depend on the ambitions of the municipality, the characteristics of an area, but moreover on the governance of the government.

In order to realise the maximum effect, it should dare to significantly change its parking policies, while acting as a facilitator for smart mobility, in which it solves legal and trust issues, enables innovation and acts as partner in new mobility businesses.

The research discusses several important limitations, regarding the method and model. These need to be taken into account to avoid misjudgements and over-generalisation of the results.

The limitations regard the scope, the selection of the experts, the chosen municipality for the deep dive analysis, the sensitivity of the transition variables, and the assumptions that had to be made in order to do the analysis. These limitations give grounds for the recommendation for further research.

The effect of smart mobility on the road network was set outside the boundaries of this research, however it is expected that it will affect the public space.

It is recommended that further studies will be performed on these effects related to transformation and restructuring challenges. Furthermore, it is recommended that future research will analyse the effects on private parking.

Also, to reduce the uncertainty that exists with the transition variables, extra kilometres travelled and the replacement ratio, it is recommended that further research is conducted on both topics. Finally, it is recommended that the possible increase of the housing density is further analysed.