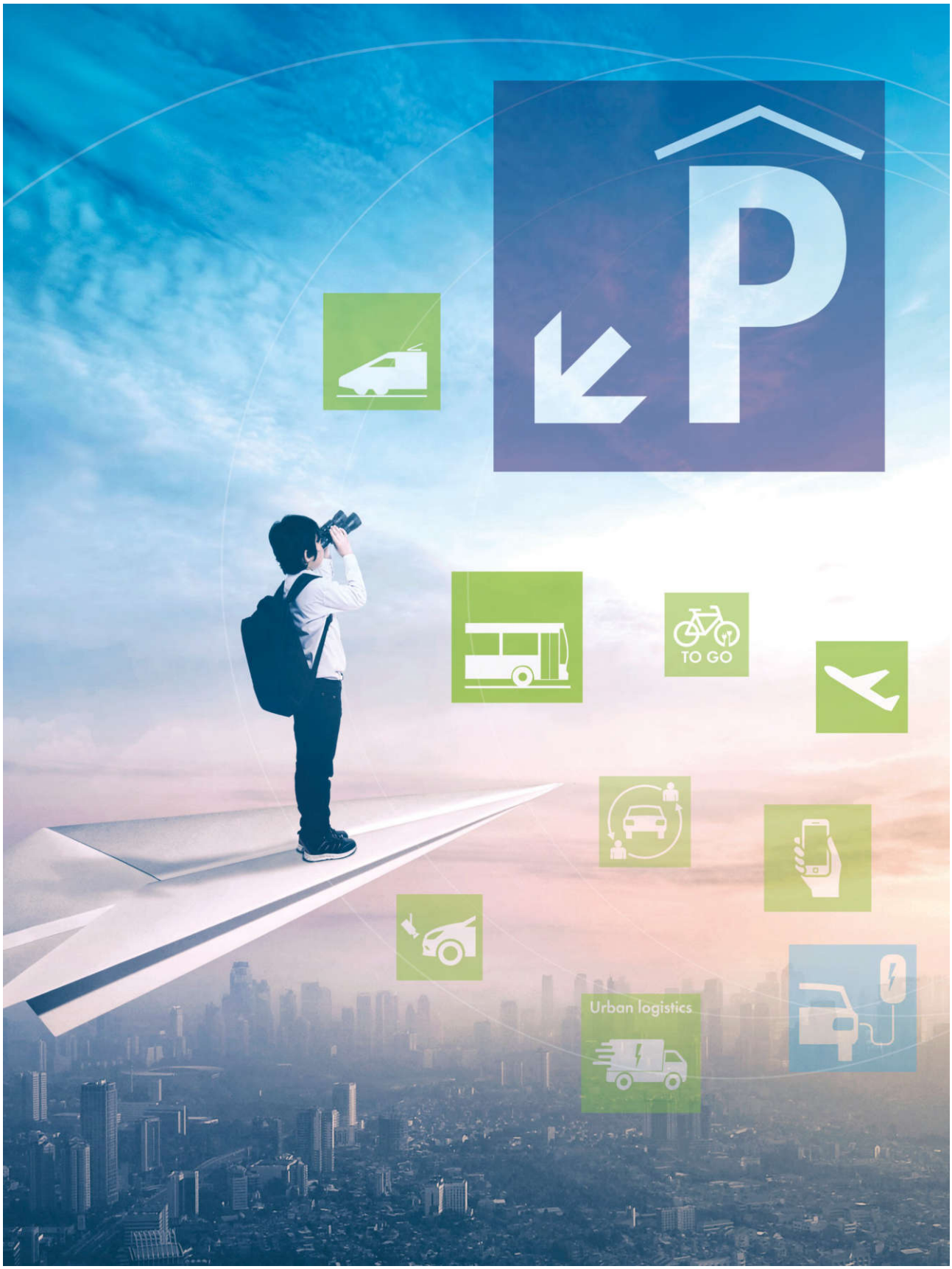
# STUDENT AWARDS




QPARK Quality in parking

# 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.