

# Impact assessment and user acceptance of geofencing-supported parking regulations for e-scooters in the City of Munich

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## Introduction

Improperly parked shared e-scooters are often cited as a major challenge for cities with this new mode of transport. Misparked e-scooters block access and right of way on sidewalks, pose a danger to pedestrians, especially the visually impaired and those with walking difficulties, and are perceived as unappealing clutter in the city space. In Munich, shared scooters are on streets since 2019 (currently about 17.500 e-scooters are available from four operators). Problems

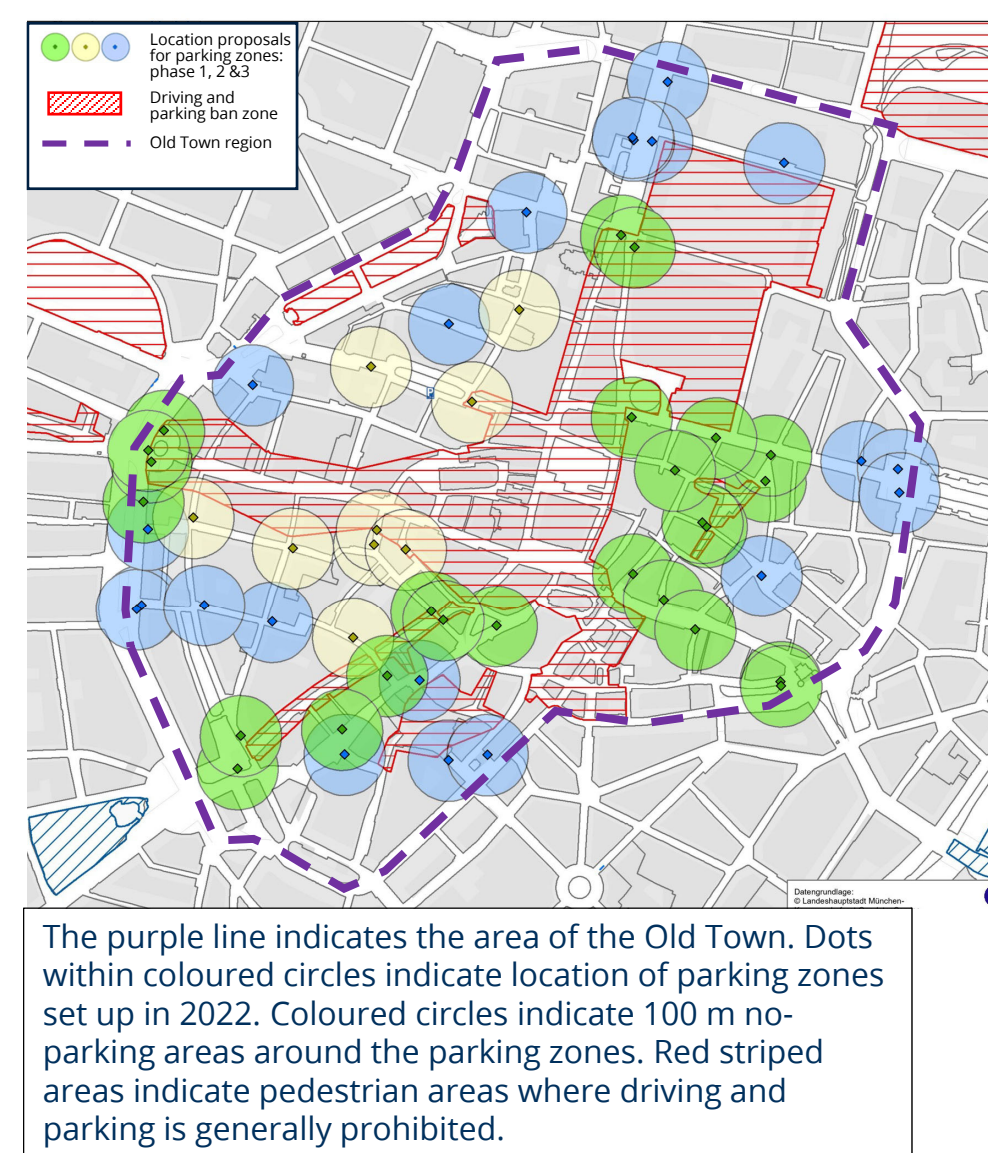
with misparked e-scooters have been reported in Munich since their introduction, but culminated in 2021 with increasing numbers of rentals and the resulting complaints about irregular parking. Given this situation, a new parking regulation was developed at the beginning of 2022 in cooperation between the municipal authorities and the e-scooter operators.

## Geofenced based regulation for e-scooter parking

Geofencing was used to digitally define parking and non-parking zones. Forty-three designated parking zones (incl. street sign and lane markings) were established in the area of Munich's Old Town. From Oct 2022 parking is now allowed only in these zones and restricted everywhere else in the area.



Examples of established parking zones



The purple line indicates the area of the Old Town. Dots within coloured circles indicate location of parking zones set up in 2022. Coloured circles indicate 100 m no-parking areas around the parking zones. Red striped areas indicate pedestrian areas where driving and parking is generally prohibited.

## Assessment of impact and acceptance among e-scooter users

*Approach:* online survey (spring 2023)

*Target group:* e-scooter users (parking in the old town after Sep 2022)

*Promotion:* Email/push message invitation from e-scooter provider

*Contents survey:*

- E-scooter usage characteristics
- Ease of use / usage problems of parking zones
- Effectivity for improving parking behavior
- Effects on e-scooter usage
- Acceptance/Intention future usage
- Demographic data

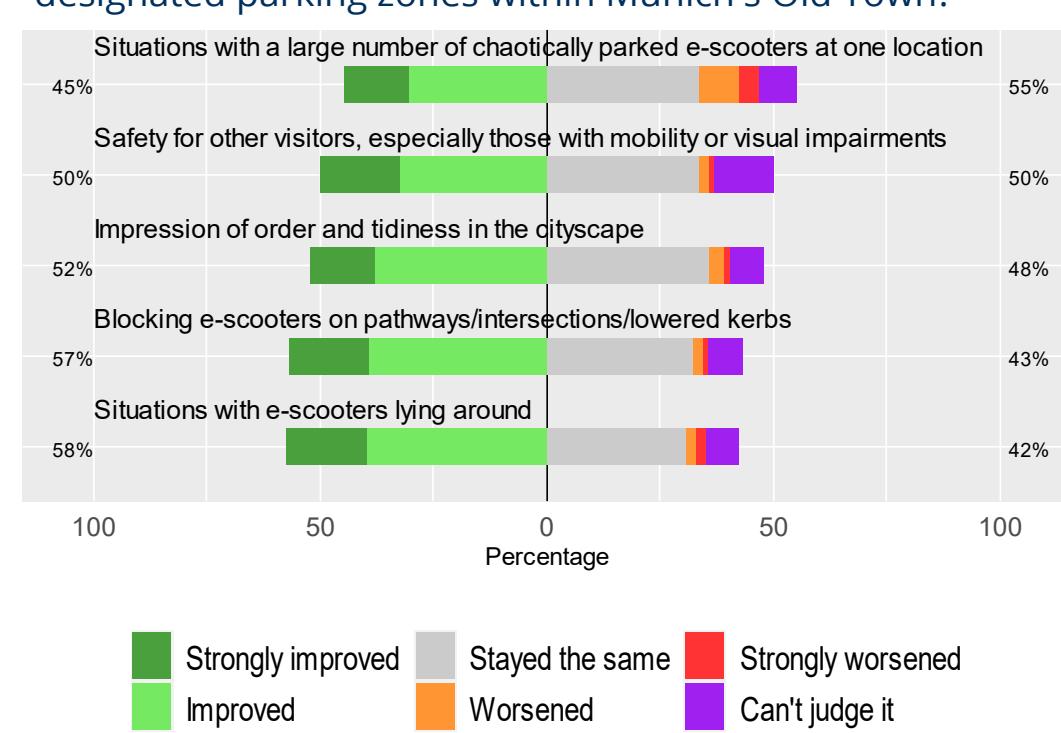
*Survey and group statistics:*

- ~ 96.000 invitations
- 730 site visits
- 346 completed surveys
- 74/23% male/female
- Mean age: 36-45 y

## Results

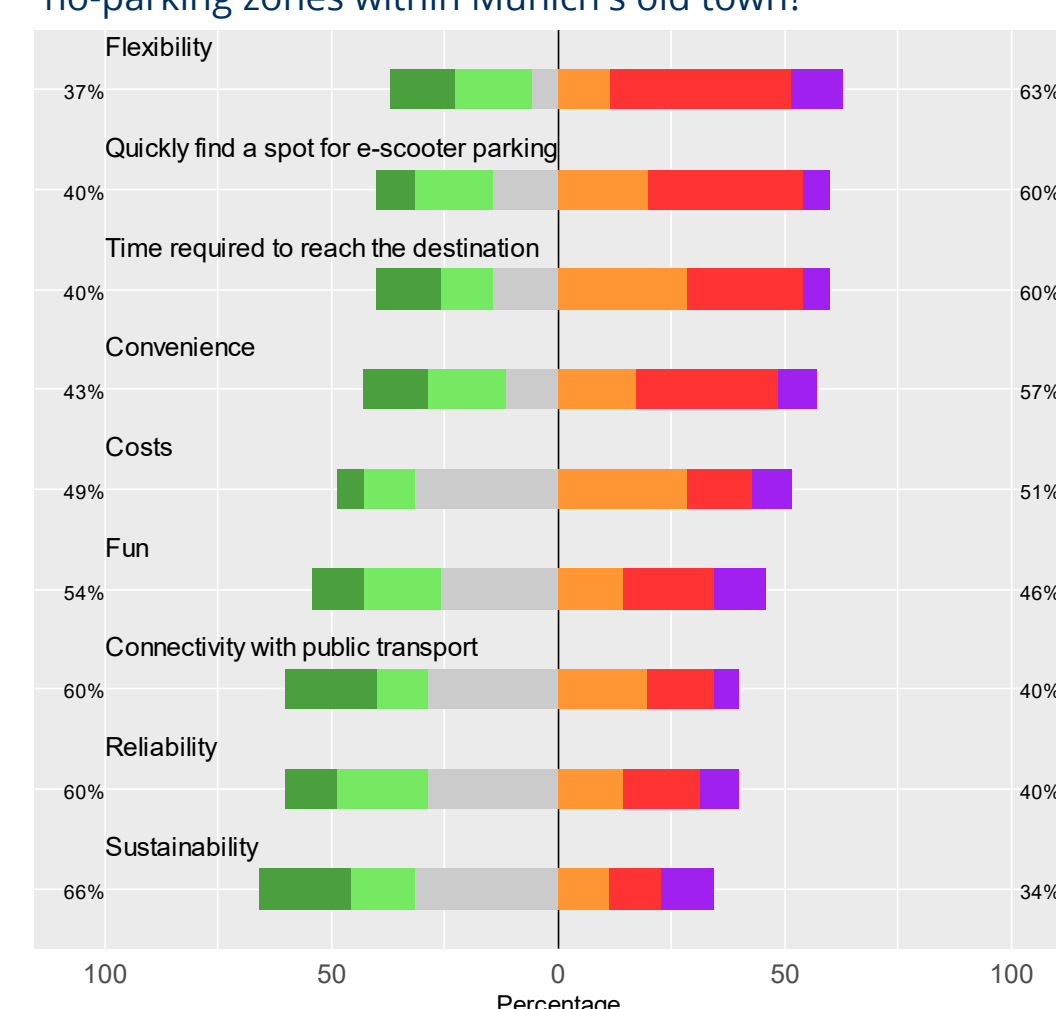
### Effectiveness to improve e-scooter parking

How do you think the following aspects observed in relation to e-scooter parking have changed after the introduction of designated parking zones within Munich's Old Town?



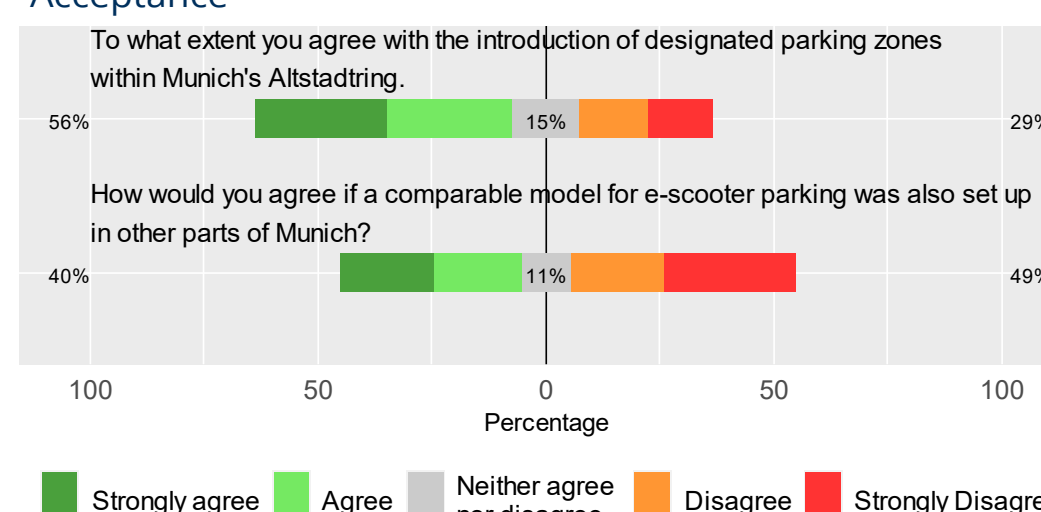
### Effect on e-scooter usage

How did the following aspects of e-scooter usage change due to the introduction of designated parking zones and no-parking zones within Munich's old town?

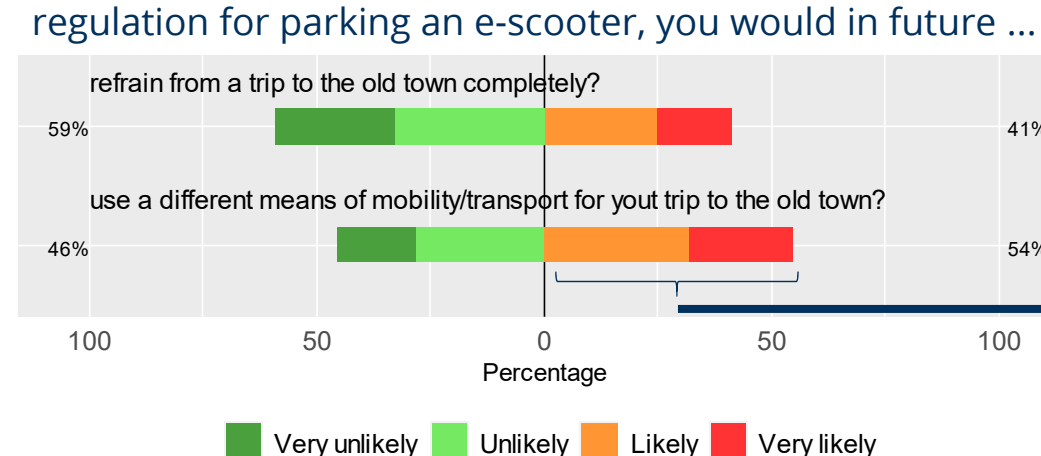


### Acceptance and Future Usage Intention

Acceptance

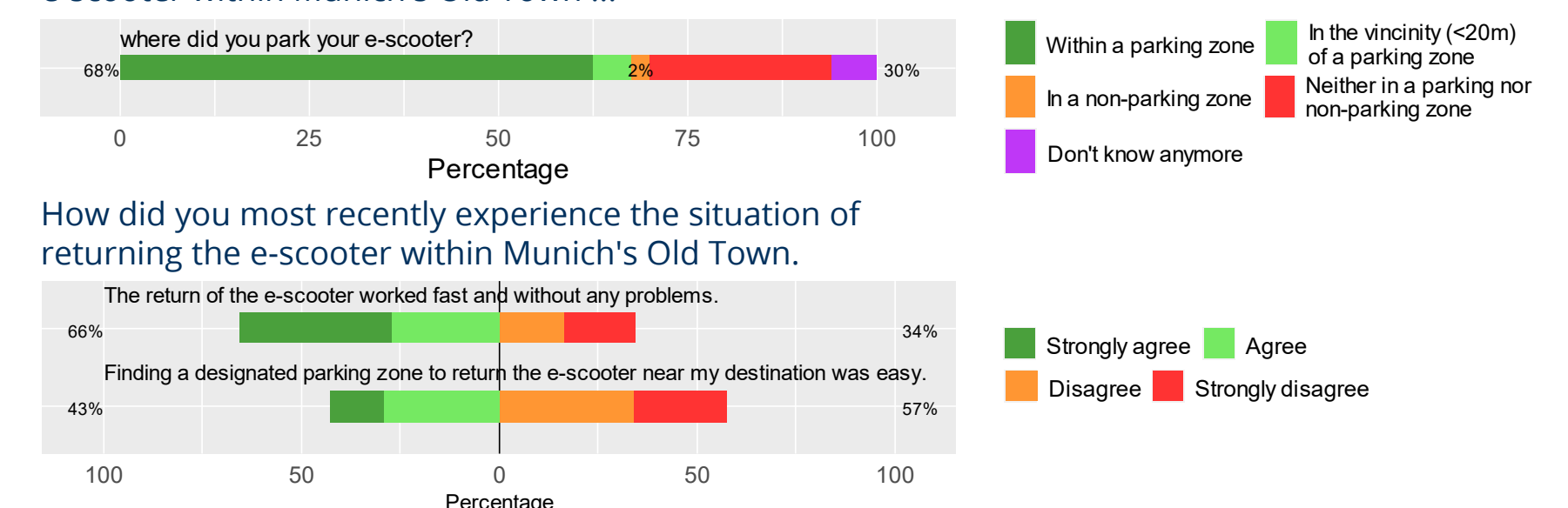


How likely is it that, due to the introduction of the new regulation for parking an e-scooter, you would in future ...

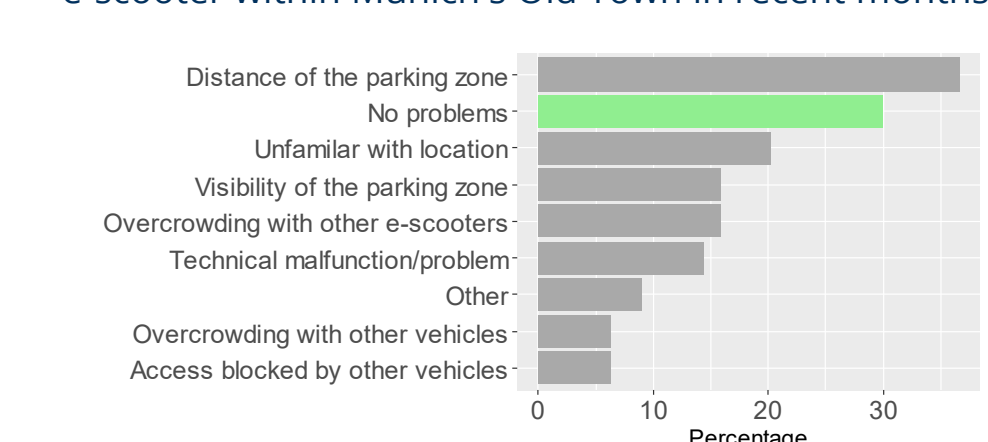


### Ease of use /Usage problems of parking zones

Concerning your last ride that you completed with an e-scooter within Munich's Old Town ...



Did you have any specific problems with returning an e-scooter within Munich's Old Town in recent months?



## Conclusion

A majority of e-scooter users reported an improvement for e-scooter parking related issues resulting from the new parking regulation. At the same time, they perceived the regulation as a restriction for important aspects of e-scooter usage. Our analysis also revealed a number of problems experienced by users. Finding quickly a parking zone near to a destination was reported a problem by more than one third of the participants. This may be related to their visibility in city space but sometimes also to overcrowded parking zones, requiring users to look for a place to park somewhere else with negative side effects for travel time and costs. In addition, a number of reports indicated that parking zones

were not displayed consistently in the providers' software. And finally, technical problems occurred, e.g. the positioning in a parking zone was not recognised. Despite these problems, a majority of users agreed and accepted the introduction of the regulation in Munich's Old Town. However, at the same time a majority also rejected an extension of the scheme to other areas of the city. In addition, the collected responses indicated that there is a risk that users will either forego travelling to the city centre sometimes or switch to less sustainable forms of mobility in the future due to the regulation.