FinEst Centre
for Smart Cities

SMART CITY CHALLENGE 2025

City Challenge

Max 3 pages

send to smartcity@taltech.ee by Sept 30, 2025

Challenge Title – Safer and attractive cycling infrastructure

City/county and country – Barcelona (Spain)

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1. What is the future urban challenge that would need a solution to?

The future urban challenge we aim to address is the advancement of sustainable and safe mobility in cities, with a particular focus on cycling infrastructure. The city of Barcelona already features nearly 2,000km of cycling routes and 264km of dedicated bike lanes. As part of its strategy to promote active mobility, the Barcelona City Council plans to increase the modal share of bicycles from the current 3.8% to 5.7% in the coming years, as outlined in the Barcelona Sustainable Urban Mobility Plan (SUMP).

The challenge is to support this transition while ensuring safe, efficient, and accessible infrastructure through a twofold objective:

- Evidence-based assessment of current cycling network:
  - We need a tool, methodology or system that can analyse existing cycling network using a methodology that classifies risk levels and cyclist comfort.
  - Investments in active mobility would be more efficient by identifying and prioritizing segments of the network that require improvement to enhance safety, accessibility, and overall user experience.
- Scenario-based planning for future infrastructure:
  - Simulate potential new sections and types of cycling infrastructure to evaluate their impacts before implementation, at the design stage.
  - Ensure that investments are optimized to maximize safety performance, increase modal shift, and enhance inclusivity, particularly for children, elderly people, and women, who are disproportionately affected by unsafe cycling networks.

This approach aims to provide a systematic and data-driven framework for improving urban cycling infrastructure, ultimately promoting a safer, more inclusive, and efficient urban mobility system.

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Alignment with the categories of the challenge:

- **Safe Cities:** Enhancing cycling infrastructure through evidence-based assessment and scenario simulation reduces accident risk, improves comfort for vulnerable groups, and supports resilient urban mobility.
- **Happy Cities:** Safer, inclusive cycling networks encourage active mobility, access to urban spaces for all type of users, and social well-being, improving overall quality of life and more liveable cities.
- **Climate Resilient Cities:** Promoting cycling reduces emissions, mitigates congestion, and integrates with climate-adaptive urban design to create more sustainable cities.

Why is it important for Barcelona to solve it? How big priority it is for Barcelona and why? The promotion of cycling is a strategic priority for Barcelona as it directly contributes to multiple urban policy objectives:

- **Road safety and Vision Zero:** Improving cycling infrastructure enhances the safety of vulnerable road users such as cyclists and e-scooter riders, supporting the city's ambition to eliminate traffic fatalities and serious injuries.

- **Sustainability and emissions reduction:** Increasing the modal share of cycling is key to reducing motorised trips within the city, helping Barcelona progress towards a zero-emissions mobility system and better air quality in urban centres.

- **Health and well-being and social inclusivity:** Promoting cycling encourages active lifestyles and well-being while providing safe, accessible, and affordable transport for all, especially children, elderly people, and women.

Priority at European level: Improving and expanding cycling infrastructure is a strategic priority across Europe, supported by national and local policies aiming to increase the modal share of bicycles and reduce CO_2 emissions. In terms of safety, cyclists account for approximately 10% of all road traffic fatalities in the EU, a share that has risen over the last decade. Moreover, 57% of cyclist deaths occur in urban areas, highlighting the urgent need to improve city cycling infrastructure (ETSC).

Cities such as Barcelona, Tallinn, or Tartu are actively addressing these challenges and both cities are working to reduce accidents and improve safety, a hot topic for all mobility teams in Europe.

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2. Innovation.

The mobility team is currently analysing various parameters of the cycling network, including maintenance needs (operational) and potential network discontinuities (design/engineering).

There is significant room for improving efficiency through the implementation of an evidence-based tool capable of operating in Barcelona as well as in other European cities. Such a solution would need to have a holistic approach and the enabling the followin characteristics: systematic benchmarking, support data-driven decision-making, and serve as a strategic asset for planning and optimizing cycling infrastructure.

At present, safety is primarily assessed using crash data. A key limitation of this approach is that not all incidents are recorded, particularly those without serious consequences. In addition, the current methodology is largely reactive, responding to crashes (injuries/fatalities) rather than employing a preventive model. No significant legal issues are expected in the implementation of the methodology.

3. Expected impact of your pilot solution.

City environment: Reduction in CO_2 and other pollutant emissions (NOx and PM), improved air quality, and decreased acoustic pollution, while creating greener and more livable city for everyone.

Citizens: improve the safety of the all modes of mobility, in particular vulnerable users, while reducing the mobility poverty.

Governance: Improved city capacity to deploy innovative and sustainable solutions to tackle priority challenges, alignment with SDGs and climate-neutral and sustainable missions, enhanced governance through data-driven decision-making, stakeholder engagement, and integrated policy frameworks.

4. Piloting

The described challenge engages the entire mobility team in Barcelona and goes beyond a purely innovation-focused initiative. Policymakers and technical staff from different levels will be actively involved in the development of the pilot test. Our goal is to implement a risk-level analysis and simulate potential new scenarios in real-world use cases, aiming to validate a solution with impact beyond the pilot phase. In addition to the 2,000 km of cycling routes (+200 km dedicated bike lanes) available for testing, the City Council is committed to providing access to relevant open data sources and supporting the dissemination of pilot results through municipal communication channels and international events.