FinEst Centre
for Smart Cities

SMART CITY CHALLENGE 2024
Solution idea for the city challenges

Max 3 pages
send to smartcity@taltech.ee by Nov 30, 2025

Solution Idea Title (max 5 words, no acronyms) – **(Natural) Hazards Resilience Toolkit**

Planned pilot project duration – 24 months

Main contact/-s – Luiza Schuch de Azambuja, luiza.schuch@taltech.ee +372 53533766 - FinEst Centre for Smart Cities, Estonia; Edimara M. Luciano, eluciano@pucrs.br +5551 999097181 – Pontifical Catholic University of Rio Grande do Sul, PUCRS, Brazil

1. Which urban challenge or problem are you planning to provide a solution to?

1.1 Which city challenge/-s proposed by the cities / counties you are targeting?.

Safe and Climate Resilience Cities – Safety in case of natural or human disasters, focusing on Porto Alegre challenge of "communication and engagement failure", lack of real-time, two-way and unified situational awareness.

2. The solution you are proposing

2.1 What is the solution you are proposing for the challenge above?

2.2 How does it solve the city challenge you target?

The initial proposal aims to collaboratively develop a smart community toolkit that empowers communities to better manage natural hazards. We aim to enhance communities' capacity to understand and share disaster-related data, increase risk awareness, and facilitate humanitarian actions, such as organizing volunteer activities and managing logistics during emergencies. Our vision is for the community to collaboratively analyse data—sourced from both official city channels and crowd inputs—and make informed decisions based on this information. We aim to allow citizens to report information regarding floods (or other hazards) via social media and other channels (to be defined with the cities) and this information will be available in a real-time map, showing risk areas and areas that need attention. We believe that the concept of collective crisis intelligence (CCI), combining large scale data from communities with AI, merging top-down and bottom-up approaches in a two-way communication system holds high promises in crises situations. CCI platform allows to analyse locally produced data on the evolving situation on a larger scale and thus, gaining better situational awareness for more efficient decisions on all levels.

3. Innovation and piloting of your pilot solution.

3.1 What are the best solutions available now that solve the challenge you target? How will your solution be better? What is the innovation in it?

There are various commercial and non-commercial solutions available; However, there is a lack of solution addressing top-down and bottom-up communication gap. Current solutions are fragmented, based on manual checks, so, are slow and inefficient. They fail primarily because they rely on top-down approaches (not collecting crowd data). Alerting citizens is

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usually one-way and delayed. Conversely, any existing bottom-up communication relies on informal sources like social media and WhatsApp, but are not unified or visible for the citizens.

Our solution will be collaboratively developed to support timely crisis management decision making based on Collective Crisis Intelligence (CCI) principles. We would like to develop a solution that is allow multi-source data integration; allow top-down and bottom-up communication; and be community-centric design, including non-technical elements like awareness campaigns, simulations and citizen training to ensure people know what to do when a crisis arrives.

Our proposed solution is better because it bridges the bottom-up and top-down information flows. Currently, the systems used are mostly one or the other, not allowing for trustworthy and timely enough information sharing that would help to reduce the cost of damages. Both the technical and non-technical solutions proposed aim to empower the crisis management network compromising of various actors to take decisions based on trustworthy and up-do-date information, especially crucial in natural disasters which evolve quickly, such as floods. The Planned pilot components include real-time monitoring and alerts for awareness and action; enhanced data collection including crowd source data from social media; public dashboard; preparedness training.

3.2 What do the cities need for piloting the proposed solution? How the piloting could work?

The cities need to provide key information about existing disaster management infrastructure, existing alerts, how the data is collected and shared with the public? Accessing this information is essential for tailoring our solution to fit the city's need.

3.3 Please provide short information about the capabilities of the research and development proposed team.

Our team is equipped with qualitative research expertise and strong knowledge transfer capabilities, including the development of training materials. Smart Sustainable City experts (engagement, co-creation methodologies) Luiza Schuch de Azambuja (Taltech), Edimara Luciano (PUCRS); Technical team: computer science and AI - Avleen Kaur Malhi, Mahtab Shahin (TalTech); methods and tools for embedded and wireless electronic systems, including sensors, cellular and non-cellular wireless connectivity, and edge computing for onsite data analysis – Yannick Le Moullec (TalTech) Crisis Management expert (Nurkse, Taltech). The first city identified for piloting is Porto Alegre. A possible Estonian city is Pärnu.

4. Expected impact of your pilot solution.

- *What is the potential impact for city environments, sustainability and citizens?*

The solution will result in empowered citizens through increased engagement and community preparedness. Critically, citizens will receive better, more trustworthy alerts and clearer guidance, allowing them to know "what to do" before, during, and after an event. This is all enabled by integrated, two-way communication, which will provide a constant flow of verified information and feedback between the city and its residents. Moreover, we expect to see a reduction in damage and long-term costs, as timely warnings will lead to less property and infrastructure disruption, lowering post-disaster recovery expenses.

Disclaimer: by submitting this form you will give the FinEst Centre for Smart Cities the right to share this idea with cities and other researchers, companies through FinEst Centre homepage. If this idea is selected, the FinEst Centre for Smart Cities has the right to implement this idea with offering you an active role in conducting the pilot. If this pilot is selected then the financing is an investment by the FinEst Centre for Smart Cities.

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CHECKLIST AND FAQ

Are you a researcher from TalTech? - Yes – you are warmly welcome to propose one or more solutions ideas.

Are you a researcher from another university? - Yes – you are warmly welcome to propose a solution but form a team with TalTech researchers. Need help with contacts, please ask.

Are you from a company? - Yes - you are warmly welcome to propose a solution but form a team with TalTech researchers. Need help with contacts, please ask. NB! But keep in mind that we cannot finance the costs of companies as partner. The companies are welcome to propose ideas in case they would need researchers to develop their solutions considerably further and they would like to become the commercialisation partners of these solutions. The companies need to be mature enough to cover their own expenses for participation.

Are you a city, municipality or a campus / private real estate developer? - Yes – do not propose solution ideas but wait the researchers and companies to propose the solutions and read their proposals from our homepage from Dec 2.

Which urban challenge can the solution idea address? - Please choose one from the list of the urban challenges chosen for the Smart City Challenge 2025, i.e. Round 5. The challenge needs to have minimum 1 city from Estonia and one from another country interested, the more the better.

How will the proposed solution ideas be evaluated? – We will not evaluate the proposed initial solution ideas but cities/municipalities/campuses/private real estate developers will say to you if they are ready to join your proposal and pilot the solution proposed by you or not. You will need minimum one Estonian city/county and one city/county from another country to make the pilot project proposal already together with them by Febr 28, 2026.

Can we have private real estate developers or campuses instead of cities as partners? – No, you need minimum one Estonian city/county and one city/county from another country but you are welcome to have private real estate developers and campuses as additional partners. In several cases they are more likely future customers for your solution. And there can be other possible customer segments who are worth to involve in one or other way as well. We can cover the costs of any private partner.

Do we need to send a confirmation letter from the cities with the challenges we address? – No, you do not. But you are very welcome to discuss and develop your idea with these cities already in this phase. That would raise the probability to be successful in the next phases considerably. The city contacts are available at FinEst Centre homepage under the Smart City Challenge 2025 challenge list.

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