FinEst Centre
for Smart Cities

SMART CITY CHALLENGE 2024

City Challenge

Max 3 pages

send to smartcity@taltech.ee by May 15, 2024

Challenge Title – (max 5 words, no acronyms) **Smart communities' toolkit for enhanced flood resilience in Porto Alegre, Brazil**

City/county and country Porto Alegre, Rio Grande do Sul, Brazil

Main contact from your city/county – Liana Rigon Rojas Lima, Porto Alegre City Hall Information Technology Agency (PROCEMPA), Innovation Project Manager, liana.rigon@procempa.com.br, +55-51-98410-7762 – in partnership with Edimara Luciano, Pontifical Catholic University of Rio Grande do Sul, professor, eluciano@pucrs.br, +55-51-999097181

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

- **Please describe the challenge of your city / county neighboring a city?** Porto Alegre, the capital of the Rio Grande do Sul (RS) state, the southernmost Brazilian state, has been suffering from intense rains since late April 2024. These rains generated flooding 5.35 meters above the riverbed on the Guaíba River waterfront. Even though the Guaíba is known as a river, it is technically a lake and an estuary with a 72-km coastline, receiving the waters from the four biggest rivers in the RS state. This flood reaches 46 neighborhoods (out of 96), directly impacting around 157 thousand people (14% of residents) and 39 thousand buildings in the city. About three weeks after the start of the floods, around 28 thousand people are living outside their houses, and 14 thousand are living in shelters set up in the city. At least three neighborhoods were completely destroyed. The city stayed isolated for several days due to falling points, highway ruptures, or serious cracks in streets or roads, and this situation caused risks of shortages of potable water, food, medications, oxygen for hospitals, and even the possibility of receiving aid to help victims from other cities by land. On average, 60% of residents had water shortage for six to 10 days, including the city's three largest hospitals, which stopped offering 1,300 hospital beds for a few days until they were supplied by water trucks. Amidst all this, it is possible to observe difficulties in articulating communities to understand and act in the face of it. Thousands of people had to be rescued by helicopters or boats because they did not heed civil defense warnings to leave their homes before the flood. A preliminary analysis of citizens' reasons for not leaving their houses in time to avoid risky rescues brings the following: a) fear of robberies in their homes; b unwarranted hopes that nothing bad is about to happen based on a very religious population; c) difficulties in interpreting simple data and facts; d) and the absence of smart community mechanisms. In this proposal, we intend to address the last two aspects. This proposal aims to collaboratively develop a toolkit for developing and consolidating smart communities in the context of smart, sustainable, and resilient cities, enhancing communities' resilience to natural disasters and crises.
- **Why is it important for your city to solve it? How big priority it is for you and why?** Addressing this challenge is crucial for empowering communities to evolve into smart communities. Apart from all the recovery measures to be developed by the city hall, supported by the state and the federal government, this proposal assumes that no measure works effectively without citizens' engagement. Citizens can develop a more autonomous protection of their communities, even deciding collectively when leaving a region under flood risk. It may help to deal with the two causes for assuming a higher risk mentioned previously, i.e., difficulty in interpreting simple data and facts and the absence of smart

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community mechanisms. The creation of a toolkit to improve and develop smart communities can help them to collect and analyze data to help them in the decision-making on what to do in an extreme climate event, on how to interpret the messages from civil defense and to better-developed community leadership that can be a proxy governmental actors during the of response to an event, and also on the recovery. Moreover, after using the toolkit for a while, improving and consolidating smart communities' capacities, these communities can be more autonomous and act proactively on the prevention and mitigation, improving communities' resilience to climate change.

- **Is this a unique challenge/problem of your city, why or is this by your knowledge a challenge/problem that many cities have – which kind of other cities?** At this moment, it is a problem for 450 cities (out of 497) in the Rio Grande do Sul state, affected by the same heavy rain and flood. Considering these cities, around half a million needed to leave their homes, and there are 76 thousand people in shelters, while 149 people are deceased and 108 are missing. At the same time, 31 cities in the Brazilian state of Maranhão are facing a flood too, with 31 cities at high risk. In the last ten years, 11 Brazilian states (out of 27) have suffered significant damage from floods. Based on that, the toolkit could be used in several Brazilian states and cities, observing the differences related to the kind of impact, as well as preserving the regional differences such as culture and modus operandi.

2. Innovation.

- How have you solved that issue so far? Why aren't the present solutions good enough? Are there legal obstacles, which ones? The current local solutions are not good enough; they do not focus enough on preventing and mitigating flood as a wicked problem. Moreover, they are even less concerned with involving communities in decision-making through formal listening processes (consultation or participation). Current solutions follow a top-down concept, which hinders communities from discussing and actively proposing solutions, thus reducing their autonomy, and leaving them increasingly dependent on patronizing solutions.
- What should be the main features, characteristics of the future solution to be potentially best for that challenge or problem? Three main sources are going to be used to develop the toolkit: a) deep research within communities frequently affected by food and resultant issues, using non-extractive research methods; b) the best practices listed in the report Innovating Smart Cities Resilience through Research and Best Practices by the European Commission (Migration and Home Affairs); c) the Toolkit on Digital Transformation for People-Oriented Cities and Communities developed by the United Nations, the United Nations Habitat, and partners. The toolkit will be a compound of adaptable resources to be used on the front line by communities, such as skills, good practices, mechanisms, local knowledge, techniques, technologies, artifacts, and a roadmap for implementing these artifacts.

3. Expected impact of your pilot solution.

- What is the expected impact to your city environment you expect to see if the challenge gets solved? Communities better prepare for floods in all civil defense cycle, namely prevention, mitigation, response, and reconstruction.
- What impact on your citizens do you expect to see if the challenge is solved? Reducing the impact of climate change can be done through citizens' engagement and community preparedness.
- What is the expected impact on your city governance you expect to see if the challenge gets solved? **Improving community engagement contributes to city governance** by having a governance actor more prepared for the discussions and voting (if it is the case). Previous research conducted by our research group has identified that, even when community leaders have a position on governance councils, they cannot always make a difference and defend the issues of those they represent. This occurs because either their participation is lower or their speeches are less valued, often because they do not have the communication, oratory, and persuasion skills necessary to be an effective part of a governance committee. Going beyond participation in governance decision-making committees, the comprehensive

public domain activities and services within a smart city logic are strengthened by the presence of smart community representatives, who will have a better condition to be an active actor in the debates related to societal changes.

- **Piloting**

  Why would you be interested to become a piloting partner of a proposed solution to the challenge you are describing here? Describe shortly your capability to participate. We are interested in becoming a piloting partner due to the possibility of contributing to Porto Alegre and other cities to become (more) resilient and with a lower negative impact of flood on citizens. We have been conducting scientific and applied research on smart cities and communities in Porto Alegre and other cities, and the toolkit proposed is a potentially effective way to bridge science to practice, helping communities to be more prepared for flood events and more autonomous to continue improving their own prevention-mitigation process. Our capability to participate in this challenge is threefold: a) the high scientific reputation we have in Brazil and worldwide, including being partners on three Erasmus Capacity Building projects, one of them in smart and sustainable cities and the other two on climate change; b) our consolidated expertise on dealing with wicked regional or local wicked problems, on applied research projects; c) the well-known experience working on vulnerable communities, especially on the six social centers created and maintained by the university in Porto Alegre and the RS State as well.

CHECKLIST AND FAQ

Are you a city, municipality or a campus / private real estate developer?

Yes – you are warmly welcome to propose 1-3 challenges, one challenge per one template

No – do not send us any challenges but wait until we have gathered urban challenges and you are welcome to propose solution ideas by September 16

Are you describing challenge or problem? – Yes, then great.

Does a city need to propose a solution idea as well? – No, these researchers and companies will propose the solution ideas by September 16.

Can only Estonian cities propose challenges? Can only EU cities propose challenges? – No, cities* from whatever country are warmly welcome.
*A **City** is a local administrative unit where the majority of the population lives in an urban centre of at least 50 000 inhabitants and cities from countries with less than 5 cities of more than 100 000 inhabitants if they have more than 10 000 inhabitants. Those countries are: Croatia (HR), Cyprus (CY), Estonia (EE), Ireland (IE), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Slovenia (SI) and Slovakia (SK).

Can our city participate without proposing a challenge? – Yes, that is also possible but then you need to vote for challenges proposed by other cities. This can be done between May 17 and June 18.

How will the challenges be evaluated? – We will not evaluate the proposed challenges but other cities/municipalities/campuses/private real estate developers can vote for the proposed challenges. In Round 4 researchers will start to propose solution ideas only to the challenges that have minimum one Estonian city/county and one city/county from another country.