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## A State-of-the-Art Approach to Modeling Future Multi-Hazard Risk, supporting People-Centred Decision Making

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Numerous approaches to multi-hazard risk modelling and quantification have already been proposed in the literature and/or are well established in practice. However, most of these procedures are designed to focus on risk in the context of current static exposure and vulnerability and are therefore limited in their ability to support decisions related to the future, as yet partially unbuilt, urban landscape. This work outlines an end-to-end risk modelling framework that explicitly addresses this specific challenge, forming the computational engine of the innovative Tomorrow's Cities decision support environment. The framework is designed to consider the multi-hazard risks of tomorrow's urban environment, using a simulation-based approach to rigorously capture the uncertainties inherent in future projections of exposure as well as physical and social vulnerability. The framework also advances the state-of-practice in future disaster risk modelling by additionally: (1) providing a harmonised methodology for integrating physical and social impacts of disasters that facilitates flexible characterisation of risk metrics beyond physical damage/asset losses; and (2) incorporating a participatory, people-centred approach to risk-informed decision making. It can be used to support decision making on policies related to future urban planning and design, accounting for various stakeholder perspectives on risk. The framework is showcased using the physical and social environment of Tomorrowville, an expanding synthetic city that has been specifically designed to capture distinct dynamic features of developing cities as part of the Tomorrow's Cities project.

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