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# Co-creation as an approach to bridge the Risk Perception Action Gap and customise crowdsourcing tools to respond effectively to climatic risks[1]

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## 1 INTRODUCTION & SCOPE OF WORK

Natural hazards are considered main challenges for the degradation of the built environment and communities across the globe. The frequency and intensity of extreme climatic events is also expected to substantially increase on the European continent, threatening societies and hampering effort for building resilience to disasters (*Michalis and Vintzileou, 2022*). Technological solutions can play a significant role in all phases of disaster risk management, mostly enhancing prevention, preparedness and response to disasters; however, the provision of accurate, timely and advanced information in case of natural hazards to both citizens and protection authorities remains a challenging issue. Moreover, technological solutions have not yet been sufficiently tested during all the phases of disaster risk management (*Ouzounoglou et al., 2022*).

This work presents the co-creation activities of RiskPACC project, which focuses on enhancing the preparedness actions undertaken by citizens focusing on bridging the Risk Perception Action Gap (RPAG). The RPAG refers to the lack of active engagement of citizens to the preparedness and response phases of crisis situations of evolving risks which are usually focused on one-way and top-down risk communication that is most of the times initiated by Civil Protection Authorities (CPAs).

The co-creation approach aims to facilitate interaction between citizens and CPAs by evolving their collaboration into a two-way communication flow and at the same time drive technical developments to enhance understanding the risk perception in an effort to bridge the RPAG between CPAs and citizens. The scope of this work is to provide an overview of the 1st round of co-creation activities carried out in RiskPACC project, and to outline the methodological approach that was put into practice in order to facilitate the activities of Rapid Prototyping. More specifically, an overview of workshops which were carried out with the main objective to bring together technology providers and end users is presented. This aimed at matching the case studies with specific crowdsourcing tools through a series of iterative sessions, which incorporated the use of storyboard user stories to provide an understanding of potential functionalities of each tool. The main outcomes of internal co-creation workshops were employed to optimise the proposed functionalities of the tools based on the requirements and particularities of each case study. This was followed by a series of external workshops which further presented the updated functionalities of tools and also delivered feedback for further development of the conceptual aspects of the technological tools.

## 2 CO-CREATION METHODOLOGY TO BRIDGE THE RPAG

Co-creation stems from other practical approaches such as design thinking and value proposition design, and is a useful methodology to enable citizen participation. Co-creation means including “transdisciplinary actors”

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(*Dübner, Fanderl, and Heydkamp, 2018, p. 141*) and other key stakeholders, especially people who would be affected by a specific decision, in a decision-making process. In order to do so, co-creation is a methodology that is based on iterations during a creation process.

Common to all co-creation processes is the focus on the establishment of a two-way communication flow, which will substitute former one-way communication that is usually employed as a top-down flow (e.g. from CPAs towards citizens). The newly created two-way communication will also allow bottom-up flows (e.g. from citizens towards CPAs), such as feedback or empowerment in decision-making processes. RiskPACC project believes that the improvement of communication flows will enhance collaboration between CPAs and citizens, in order to bridge their RPAG.

The co-creation approach employed in RiskPACC project serves a two-fold objective: (a) a horizontal approach consisting of iterations and continuous developments of crowdsourcing tools and their methodologies, and (b) a vertical approach for structuring the co-creation workshops following the Introduction, Conceptualisation, Prototyping, and Continuation steps (*Digital.Labor, 2020*) through the organisation of internal and external workshops. The main aims of the activities that took place in the Rapid Prototyping phase are listed as follows:

- Bring together crowdsourcing tools of the project and respective partners with the case study owners to provide a mutual understanding of requirements, but also a matching of functionalities with case studies.
- Foster the discussion between main actors involved in RiskPACC (*i.e.*, CPAs, volunteers, and citizens) and enabling their close collaboration in an attempt to understand risk perception better and to mitigate the RPAG.
- Map the end users' perspectives on the technological tools through storyboard user stories that present the proposed functionalities of the tools. This provides useful feedback for the identification of new functionalities and further development of tools.

## 3 MAIN RESULTS AND NEXT STEPS

The co-creation workshops that were carried out enabled an important interaction between participants, case study owners and technical partners and provided new, compelling ideas. Similarly, the interaction between CPAs and citizens provided useful feedback regarding the RPAG and supported networking and cooperation between CPAs and citizens. Throughout the activities of the workshops it was evident that risk mitigation is a common goal, which require the active collaboration between all main actors involved (e.g. volunteers, citizens and CPAs). The co-creation approach also facilitated the enhancement and adaptation of the technological solutions for bridging the RPAG. Main outcomes of the workshop activities focused on the usage of crowdsourcing information, e.g. assess damage through social media data in the aftermath of a hazardous event. *Vice versa*, the lack of access to social media, internet, and smartphones limits the ability to communicate in local areas. A significant problem related to risk perception is that during crisis situations, citizens are usually informed by media rather than CPAs due to lack of available technical solutions. This indicates that the received information in many occasions is inadequate, or even inaccurate and unreliable. Finally, with regards to the prevention phase, educational/training programs were proposed to be designed and implemented by the operational authorities focusing on providing information on the potential risks for each area and advance the preparedness of citizens.

The first round of external workshops in the RiskPACC case study regions enabled the further conceptual development of the proposed crowdsourcing solutions at TRL 2. The next steps involve additional iterations with end users, towards the further development of the technological tools and their testing and validation in a representative environment (TRL 5).

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