Co-creating Communication Approaches for Resilient Cities in Europe: the Case of the EU Project Smart Mature Resilience

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ABSTRACT

Cities face a wide range of risks. Potential threats range from natural disasters and the (relatively slow) environmental change, to man-made issues like extremism. To overcome such threats, cities ought to be resilient, capable of resisting problems, of adapting to new situations, and overcoming crises. Effective communication is particularly crucial for a resilient city. Rather than trusting that relevant stakeholders, municipal staff and citizens will intuitively communicate in the ideal way, cities should see communication as a strategic aspect of their resilience development. Thus, how resilient cities communicate should be strategically managed. In this paper, we present immediate results from an ongoing European project called Smart Mature Resilience. In this project, we work with seven cities towards the ultimate goal of developing a Resilience Management Guideline for all European cities. Moreover, we intend to set up a resilience backbone in Europe, which will be driven by effective communication between cities.

Keywords

Resilience, cities, co-creation, communication, information

INTRODUCTION

Cities across Europe are facing complex environmental, social and economic challenges as well as an increasing frequency and intensity of hazards and disasters. Studies on risk in cities by the Cambridge Centre for Risk Studies have demonstrated that "we live in a world where crises can, and do, occur from a wide range of potential causes, many of them unexpected." (Coburn et al, 2015). Evidence indicates that exposure of persons and assets in all countries has increased faster than vulnerability has decreased, thus generating new risks and a steady rise in disaster-related losses, with a significant economic, social, health, cultural and environmental impact in the short, medium and long term, especially at the local and community levels (UNISDR, 2015). These challenges are closely linked to climate change and social dynamics, whether as causes or aggravating factors.

Resilience is defined as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions." (UNISDR, 2009). Communication is one of major streams in building resilience (Horne, 1998). A city's coping capacity depends on clear channels of communication between relevant actors, in addition to a responsive and well-structured emergency response system and effective social infrastructures (Johnson and Blackburn, 2014). Ineffective communication has been cited as a factor in the failed response to natural disasters including flood events in the UK and flooding resulting from Hurricane Katrina (O'Sullivan et al., 2012). Reducing vulnerability requires functional

communication infrastructure in cities and effective internal communication within the city administration and between the municipality and its most crucial stakeholders: for example, first responders in the case of crises, and with citizens during daily operations. Communication with citizens is essential to the engagement and empowerment of citizens that provides the foundation for socially resilient communities.

This research-in-progress paper addresses the process of co-creating communication approaches for resilient cities. Co-creation is an effective method to address the above-mentioned communication-related challenges, as it ensures that communication approaches and tools are developed specifically for the needs of cities and are closely tuned to the actual communication practices in place in cities. Further, we describe the development of a communication tool that can facilitate the strategic communication necessary for resilient cities. We propose that this kind of tool or the strategic communication necessary is described is necessary for resilience, as communication exclusively in terms of crisis situations is insufficient. The tool was developed in response to the call by project cities for holistic and integrated communication that accounts for communication during daily work as well as during disasters while the other ongoing research projects and existing tools focus mainly on disaster responses. This tool and the project's investigation and testing of communication methods attempts to address the gap identified by Turoff et al. that "what is truly missing is to look at what could be done to design for this [social media] trend and integrate it and citizen participation into all the phases of disasters" (Turoff et al., 2013).

This paper reports on the European-funded project Smart Mature Resilience. Smart Mature Resilience responds to the need for enhanced resilience in European cities. A Resilience Management Guideline and a set of practical tools are piloted in a core group of cities and shared with a wider group of cities, with the objecting of strengthening the nexus of Europe's resilient cities overall. Researchers and cities cooperate in a cycle of development, pilot trials and evaluation. Researchers work with the project cities of Donostia/San Sebastian, Glasgow, Kristiansand, Vejle, Riga, Bristol and Rome to co-create and pilot tools which help cities assess their resilience maturity, identify and implement resilience building policies and cooperate with stakeholders. The participating cities are active project partners who contribute to creating the Resilience Management Guideline as well as serving as the test-beds where the project tools are tested.

The paper is structured as follows: (1) description of the tools, (2) co-creation process, (3) communication strategy building process, (4) portal development process, (5) portal implementation plan, and (6) conclusions.

PROJECT TOOLS

As of early 2017, three tools have been developed. The first tool is the Resilience Maturity Model, which identifies the ideal path towards resilience. This model defines five stages of resilience maturity, from an initial stage to a highly advanced stage. Each of these maturity stages has four dimensions: leadership and governance; preparedeness; infrastructure and resources; and cooperation, and the model takes into account the practical reality that cities begin their resilience development from a variety of starting-points that often vary across the different dimensions.

The second tool that has been developed is the Resilience Information Portal. This portal serves as a toolbox that can complement and enhance the platforms and software that cities already have in place. It allows cities to display data internally or publicly that is already available to the city as it applies to resilience, vulnerability and crisis situations. The portal allows for different levels of users to allow for city managers, critical infrastructure providers, citizens or other stakeholders to be able to contribute information as applies to a given city context. The portal offers added value not available to cities (as they self-reported), as the cities have multiple (and in Glasgow's case, dozens) of platforms in place in their municipalities for internal communication, but the wealth of information available to them is not integrated, streamlined or fully utilized. Furthermore, the tool includes a number of levels of users, which accounts for the complexity of the network of stakeholders and target groups that are to be considered in building resilience. Lastly, the toolbox format facilitates the practical reality in cities, which is that replacing existing communication systems is impractical and would cause unwarranted disruption. Therefore, providing the platform as a toolbox allows cities to select the elements not already available to them without undoing or disrupting facilities and channels that already function effectively.

A Risk Systemicity Questionnaire has undergone pilot testing and is being finalized at the time of writing. This is an interactive worksheet where users can self-assess risk in their own city as well as their awareness of risk in their own city by considering the relative likelihood of vicious cycle scenarios in terms of health, climate change (air pollution), climate change (flooding), social inequalities, ageing (population), riots, immigration, social cohesion and social alienation. The project is currently developing the final two tools, a portfolio of resilience building policies and a system dynamics model. The five tools will, in combination, comprise the European Resilience Management Guideline.

CITIES AS CO-CREATORS

The project tools have been developed in a process of pilot testing and feedback gathering with the cities in order to ensure that the tools cater closely to the cities' needs. This feedback process also places the project research under constant 'reality check' scrutiny. Collaboration with the cities has made evident that each step of the resilience-building process requires strategic communication, and that a communication strategy is a crucial element of resilience development.

The involvement of cities as project partners has meant that those contributing feedback and data to the development of project tools has been individuals working on the project as part of their daily work in resilience, planning, environmental, crisis management and other departments of their respective city councils and municipalities. Additionally, depending on the nature of the tool or the type of feedback needed, city partners have involved stakeholders from across the municipality and the municipality's network including citizens, reflecting the extremely broad reach of the field of crisis management, and even broader reach of resilience management.

As mentioned already, the three main partner cities, Kristiansand, Glasgow and San Sebastian have been the early adopters and present the operational environment in which the pilot implementation of the Resilience Information Portal took place. During this process, a core circle of city representatives, plus some additional, relevant stakeholders have provided with valuable input that led into the finalization of the tool. The remaining four partner cities, which have not been serving as pilot implementation cases (Vejle, Bristol, Rome, and Riga) were involved in the implementation and review process, assuming the role of peer-reviewers. More particularly, they were assigned with an observer role in the pilot process, monitoring the progress of the core cities and providing feedback and insights, which aimed to ensure that the final portal, with its specific qualities and functionalities would be widely replicable and applicable to other cities in Europe; cities that will form the so-called European Resilience Backbone. The core cities and their local research partner worked closely together on co-creating and testing the portal, with a particular focus each case on building resilience against risks that fall within each chosen security sector.

Citizens are "inherently creative and want to shape their own experiences." Co-creation is a way that cities can tap into that creativity while providing all stakeholders with a feeling of control over something within the process (Fuchs et al 2016). Throughout the project's co-creation process the cities were always encouraged to further engage with the stakeholders in creating and increasing the value of the portal for strengthening the communication flows in bottom-up, top-down and across-silo streams and therefore enhancing each city's resilience.

Turner (1967) makes use of a 1932 definition of disasters, where "a catastrophic change is a change in the functional adequacy of certain cultural artefacts." While our project reaches much more broadly than only dealing with crisis situations, the objective of avoiding, mitigating and recovering from the effects of extreme events nonetheless informs the communication practices we will propose in this paper. Further, the project's city partners contributed numerous examples in terms of critical infrastructure where disasters and accidents were a trigger provoking the implementation of policies or gaining political recognition for the implementation of resilience-related policies. A disaster or cultural collapse takes place because of some inaccuracy or inadequacy in the accepted norms and beliefs (Turner, 1967). Following the data gathered from the Smart Mature Resilience cities, one of the ways in which cities both respond to disasters and assuage unrest among citizens following disasters is by implementing policies related to critical infrastructure protection, risk management, climate change adaptation, preparedness and resilience. The events functioned as triggers to spur institutions to implement resilience-related policies. The following examples were gathered at a project workshop and are detailed in the Smart Mature Resilience report, Critical Infrastructure Dependencies Workshop Report (Gimenez et al., 2016).

For example, Bristol's power and water supply were affected by flooding in 2007, which led to the introduction of new flood and water management legislation in 2010, which empower city councils and local coordinators to make more decisions regarding flooding. In 1999, a heavy storm in Vejle caused a power outage that lasted for four days, causing manufacturing to grind to a halt for several businesses. This event led to companies planning alternative emergency supply generators for crisis situations, and also fostered networking and information sharing among electricity suppliers. Donostia's communication system was affected by flooding in 2007, incapacitating emergency services during the peak of the crisis. This led to the improvement of emergency services and alarm warnings that capitalise on neighbourhood outreach via social media. Companies and industries located in flood-prone areas have also been moved to lower-risk areas.

In 1994, Glasgow was affected by flooding that had an economic impact on the city. This disaster led the

authorities to think collectively at a strategic level and to develop risk plans to mitigate the flood impacts. Moreover, partnerships were created among private consultancies, private companies, and the Scottish water agency. In 2011, engineering works were developed to prevent flooding and these risk plans have been improved over the last years. As a result of heavy snowfall in Riga during November 2013, the roof of a popular shopping mall collapsed under the accumulated snow, causing the deaths of fifty-seven people. Since this event, the societal awareness of the importance of structural building maintenance increased. A new construction department was also created in charge of analyzing buildings and determining which buildings are no longer fit for use.

These examples demonstrate the close relationship between communication and resilience development. Furthermore, they show that strategies and policies that relate to resilience are implemented in response to crisis situations.

COMMUNICATION STRATEGY BUILDING PROCESS

The Smart Mature Resilience project communicates with the project's target audience and stakeholders according to a communication strategy developed at the outset of the project. All project partners participate in communication and dissemination and all were, as such, involved in the development of the strategy.

The first step in the development of the communication strategy was a situation analysis of the project's communication environment. The major communication-related challenges and risks were identified. Challenges were found to include terminology and conflicting usages of the term 'resilience', data availability and heterogeneous data sources, and the issue of standardization. These challenges have since the project outset been successfully addressed, with the development of a project definition of resilience for the former issue, the careful analysis and interpretation of data in addition to sourcing of data directly from cities, and the project's development of a draft CEN Workshop Agreement towards establishing standards. A CEN Workshop Agreement (CWA) is a document published by CEN in at least one of the CEN three official languages. A CWA is an agreement developed and approved in a CEN Workshop. A CWA does not have the status of a European Standard.

The second step in development of the communication strategy was the establishment of the project's key messages, which are as follows: Cities need to become more resilient; Resilience relies on functioning critical infrastructures and dynamic social interactions; A holistic approach can enhance resilience in Europe; The project develops tools to assess and develop cities' resilience; The project results can advise the decision-making process towards enhanced resilience. Project stakeholders were identified as: cities, encompassing population (general public and local communities), critical infrastructures (city staff and technicians, utilities), media, state-owned enterprises and first responders; the research community; and EU policymakers. Private business was identified as a secondary target group.

The project uses a variety of communication channels in order to reach these target groups. Firstly, internal and external events are a primary communication channel, including project meetings, workshops and webinars, a Stakeholder Dialogue, Stakeholder Workshop and final conference. Next, the project website primarily facilitates external communication and serves to represent the project to an external audience with the widest target group. General project information including public reports, announcement of events, project outlines and related news are be updated regularly. A mailing list is a further communication channel, to which the project newsletter is be distributed via email on a quarterly basis. Subscriptions to the mailing list are available via the project website. The social media platforms of LinkedIn and Twitter are used for networking among city policymakers, city administrative staff and researchers and encourage discussion with the research community and the interested public.

Communication channels available through the project partners were also identified as local television, local radio, local newspapers and partner institutions' communication departments. The communication strategy also dictates a visual identity and guidance for of the project logo and colours, in order to ensure coherent representation of the project across project partners.

Communication target groups and channels were established as follows. A project leaflet was produced summarising the main project information with a target group of cities. Print and electronic articles and press stories with results obtained and activities developed in the project also aim to communicate with cities. The project website, including project progress, results, deliverables and dissemination materials aims to communicate with cities and the general public. Social media posts communicating activities carried out, results obtained and project news is aimed at the general public. Print and electronic articles and publications in scientific journals explaining the research methodologies applied and the results obtained, as well as oral

presentations and poster exhibitions at scientific conferences aim to communicate with the scientific community. The project newsletter containing activities carried out, results obtained and project news aims to communicate with a specialised topical audience, cities and multi-level governance. Policy briefs with policy-relevant project results aim to address decision makers and the European policy level. Oral presentations and participation in the standardization workshop to discuss standardization potential within the project as well as a printed CEN Workshop Agreement will reach city representatives and stakeholders involved in the standardization process. The final conference should address all European cities and will also take into account cities from outside Europe.

COMMUNICATION WITH CITIZENS

Smart Mature Resilience has seven cities as active partners; they are responsible for contributing to project communication and are a primary resource for directly communicating with citizens. As part of the project's communication approach, cities were provided with communication support in developing press releases according to a tri-annual timetable to inform citizens of issues relevant to them related to resilience.

The types of press releases to be developed followed three general approaches. Opportunity-based communications relate directly to concrete disasters and emergencies, and contextualize the work the municipality or city council is doing directly to an extreme weather event or other tangible crisis that is current news. This counteracts the challenge of communicating effective disaster response and resilience development, where successful response or high levels of resilience generate less communicable results than poor emergency response or low levels of resilience. The second press approach follows a story-based style, where press releases or articles are related to current affairs or the cultural context of the city. The third approach is commentary on resilience as a topic, which is primarily produced due to deeper topical expertise and access to more specialized communication channels.

COMMUNICATION BETWEEN CITIES

One outcome of the Smart Mature Resilience project is the exchange and communication facilitated between cities. During co-creation and pilot testing of the tools, the cities were in regular contact and provided each other with numerous real examples, strategies, experiences and opinions regarding how resilience management works in their local contexts. The communication strategy of the Smart Mature Resilience project foresees the project cities as multipliers of the tools and outcomes of the project to a wider group of cities, following the successful exchange and collaboration within the project between city partners. The project's objective is to build a group of resilient cities who can support one another and the broader group of cities around the world, as cities must be considered not only to be networks in themselves, but also participants in networks that comprise of and include other cities and their respective sub-networks. Peer exchange and sharing of information is already happening, including in terms of resilience, in many partnerships and groupings between cities globally. One of these active city groupings is ICLEI – Local Governments for Sustainability, which was one of the motivations of involving ICLEI as a partner in the Smart Mature Resilience project.

THE PROJECT WEBSITE AS A COMMUNICATION CHANNEL

The project website is a primary communication channel for the project. It provides information on the project, profiles each project city in terms of resilience, shares news stories and events, hosts all of the project's scientific outputs and tools. The website was designed to feed naturally into the resilience information portal by means of matching website design, so that users can easily access the portal and training material directly from the project website.

PORTAL DEVELOPMENT PROCESS INCLUDING HOW CITIES' INPUT WAS INTEGRATED INTO THE PROCESS

System development is typically described in a sequential, step-wise order. It then roughly follows the waterfall model and distinguishes planning, requirements analysis, system design, implementation (i.e. programming), testing and productive usage (Royce, 1970; Boehm, 1976). The Resilience Information Portal development followed an agile development approach (Sommerville, 2011) as the portal means to reflect the information sharing needs of the cities. It can be built based on the input from the city partners, in particular with feedback from a variety of municipal stakeholders. The portal seeks to be a generalizable solution. Thus, development of the portal needed to be carried out in incremental steps and could lead in some cases to mi-term changes to existing parts. The challenge is that the portal seeks to be a generalizable solution while cities have varying

expectations and communicate in differing ways. A high level of heterogeneity is encountered with regard to communication strategies. Thus, while the production of a technological solution is important for a demonstration of feasibility and in order to provide a tangible system to discuss, the underlying processes, concepts, and ideas are the more valuable contributions of the project. The following figure describes the portal development process. It highlights three activities: interviews with cities to gain their insights, portal development and feedback loop. Development was started based on a set of bootstrap portal requirements. Since we can only rely on the literature and on existing approaches yet need to start with initial requirements for the first platform, this bootstrapping is done.

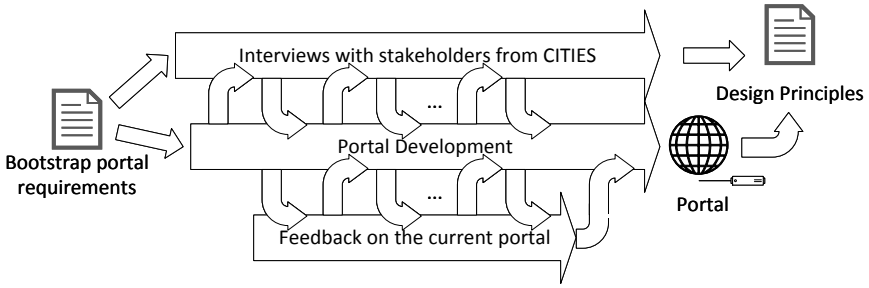

Figure 1. Portal development process

The arrows leading from the development can be read as both providing the next iteration of the portal (or, in the case of the first arrow, of the "naked" platform) and as giving replies about development activities. The latter is necessary as we might realize that some functionality described by the cities is not feasible for implementation or because we come to new ideas in the process of development that we want to discuss. The arrows leading to the development can be read as formal (interview data) or informal (comments, wishes) feedback.

Between January and April 2016, face-to-face interviews were conducted with six cities. Twelve stakeholders took part in the interviews, leading to 20 sets of interviews in which 33 individual interviewees participated. The primary purpose of the interviews was to derive design principles for the Resilience Information Portal. The process of derivation of design principles follows the design theory for dynamic complexity (Hanseth et al. 2010). According to this theory, the identification of design *problems* should come first since it guides us to design *goals* and *principles.* Design principles in this sense refer to the way of achieving design goals. We first set up the pre-questionnaire survey which was provided online to identify communication challenges (design problems) then proceeded to face-to-face interviews. In the pre-questionnaire survey cities were asked the communication activities require using an information system that enhances resilience before identification of the challenges. In this sense, communication challenges identified by each city describe problems towards resilient cities. Based on the results of the pre-questionnaire, the following nineteen communication challenges are identified: lack of integration of communication tools, information fragmentation (including incompatibility of information and systems), logging incident information, presenting information on complex emergencies, lack of updates on what others are doing, lack of direct communication, raising awareness of potential and real threats among the citizens, lack of information variety, unawareness of information reach, contacting relevant people (internal officials) quickly, communicating with "hard to reach" groups (e.g. people who do not speak the local language), human resource updating, lack of interactive communication, long-term involvement, security, information confidentiality, handling of documents marked as protected or confidential, mal-information on social media, and managing social media.

To approach these various challenges, we propose the following six design principles: (1) information sharing, (2) establishing a communication structure with stakeholders, (3) knowledge sharing, (4) citizen engagement and raising awareness, (5) information sovereignty, and (6) usability. The first principle becomes the foundation of the other five principles. It guides HOW the information delivered and WHO should be reached. Communication starts with setting up a physical service centre towards citizens. Platforms (website, social media, internal systems) to share information with stakeholders are implemented. Cities identify target groups to enhance engagement. Target groups are varied like first responders, local communities and social groups and communities of interest. Thereby, the population must be reflected. When the foundation set up, cities establish a communication structure with related stakeholders. They share objectives and issues. Communication at a distance should be supported by the platform as well as face-to-face conversation. The project cities acknowledge (or provide) resource capacity for updating information on certain platforms, responding to inquiries from stakeholders, and on translating information into several languages, The cities expressed the need for a library of best practices to be set up and shared with neighbouring cities, in national networks and in an

international consortium.

Among six design principles, we found that citizen engagement and raising awareness is the most critical goal for cities to achieve resilience since they realize it is no longer sufficient to handle complex issues merely with internal resources. They need to mobilize citizens' and stakeholders' capability and create value together. Cities are curious about social media as means to involve citizens. As suggested by Moorhead et al (2013), social media could provide benefits to engage citizens. For deeper understanding of social media's potential, we conducted additional interviews with the four cities out of six using Skype and WebEx. In regards to citizen engagement and empowerment, the literature proposed several ways of doing this, such as participation promotion (Boehm et al. 2004), producing a sense of unity (Zimmerman 2000), and sharing problems and role ownership (Conger et al. 1988). Cities provided a particular case of using social media to engage citizens and they all have been given these benefits. For instance, as explained by the City of Kristiansand, they use a Facebook page to communicate with children and young people, who are otherwise not in regular communication with the city administration. The City of Vejle utilizes multiple social media like Facebook, Twitter, and Instagram. They combine face-to-face dialogue and try to get citizens involved in the future city development. In Bristol, officers use a professional Facebook page to engage 14 neighborhood partners for decision-making. On their Facebook page, they collect partners' opinions as well as sharing information. This contributes to reducing costs for gathering opinions, as users of social media can be more ready to offer opinions online rather than attending public meetings. Additionally, different target groups can be accessed through social media than would be accessible at public meetings. As reflected in the identification of target groups for communication of the Smart Mature Resilience project, different groups require different channels of communication in order to be effectively reached. Cities realize that strategic two-way communication through a range of channels, including social media, is a prerequisite for resilience-building.

Cities' contributions and examples demonstrated to us the importance of narrative creation. Partners expressed their experience that municipal communication channels enjoy a particularly high-prestige level of trust among citizens. When information is shared online directly by cities, citizens believe for the most part that the information is, even if not complete, accurate and provided for their benefit. City channels also benefit from a high level of attention by the media, have close relationships with local media and information and press releases shared by cities and municipalities are picked up by media as standard. Sharing of trustworthy information also maintains and increases citizens' and stakeholders trust in them. In order to guide citizens or influence their responses to disasters in a strategic way, a coherent narrative is essential both in crisis situations as well as during ordinary daily operations in order to establish a common understanding of risks and roles.

Regular and two-way communication and engagement with citizens during non-crisis times can help to counter the challenge described by Turner (1976) as "Involvement of strangers," whereby crisis management plans fail to account for the reactions and behaviour of individuals from outside of the plan-making institution as "administrators may… run into error in communicating with them because they adopt oversimplified stereotypes when considering their likely behaviour and characteristics." Established relationships and engagement can open the system to include citizens in the communication processes of the city. While not allowing for targeted briefing, as is possible with appointed staff, longer-term communication across a number of media nonetheless allows the city to create a narrative for how citizens should understand their role in the city, how they should ideally react to hazards and prepare them in order to guide their expectations and reactions when crisis situations do occur.

PORTAL PILOT IMPLEMENTATION

The Resilience Information Portal that was created proves that this co-creation process proves is not only useful as an innovation practice, but also as a strategic method to strengthen brand value and positively influence the citizens' perceptions on attempted resilience-building efforts. Furthermore, the Resilience Information Portal was treated and regarded as a collaborative environment to facilitate awareness and engagement among key partners in resilience building activities. The portal particularly serves two purposes:

- Support communication within the city, between the city and its stakeholders, and between the city and its citizens. In addition, the integration of social networking services is supported.

- Enable knowledge sharing as a long-term communication activity. Similarly to short-term communication support, the city, its stakeholder, and citizens are included.

The Resilience Information Portal demonstrates that co-creation is not only useful as an innovation practice, but also as a strategic method to strengthen brand value and positively influence the citizens' perceptions on attempted resilience-building efforts.

After the first weeks of the pilot implementation process, a series of webinars was also conducted aiming to support this effort; during these webinars, the implementing cities, as well as their peer-reviewers had the opportunity to present their climate adaptation and resilience activities to each other, discuss constraints and opportunities that raised during the pilot process so far, strengthen the co-creative development of the portal and facilitate dialogue between the two tiers of cities that will help the developers finalize the tool. In addition, the peer-reviewers asked questions on the basis of a guideline questionnaire prepared in advance by the local research partner. This was to make sure that the most relevant aspects for the tool development would be questioned and analyzed. After each webinar, the peer-reviewers summarized their feedback and gave recommendations for further development and practical action in a short report as well as provide additional feedback based on the webinars during the review workshop.

Following the tool finalization, additional stakeholder training workshops were organized by each city. Critical infrastructure stakeholders, first responders, IT consultants and emergency management municipal employees were invited to attend these workshops, while identical methodology was used aiming to ensure replicability, comparability, and transferability, to put the emphasis on the project's Circle of Sharing and Learning and to provide detailed training, introducing the portal's main qualities and functionalities. Throughout the pilot implementation process, the pilot cities in close cooperation with their respective research partners, will also organize bilateral meetings with identified stakeholders in the security sectors, but also beyond them, to further explore synergies and collaboration potential between institutions, municipal departments and utilities and the project itself.

The same process that was used for the pilot testing of the Resilience Information Portal will be used for the following project tools; that said, the joint pilot implementation process for the Resilience Maturity Model and Risk Systemicity Questionnaire and the joint implementation process for the Resilience Policies and the System Dynamics Model will follow similar management tactics. Tool testing activities will be guided by the tool developers and project consultants who will be facilitating knowledge and information exchange between partners and city officials and representatives. The Resilience Information Portal provides a platform in which the cities can share best practices implemented in the city during the resilience building process. These best practices can then be included in the Resilience Building Policies as an evidence of how these policies have been or can be implemented in the cities. Therefore, the Resilience Information Portal should help to establish links between European cities, leading to facilitating learning from others (best practices transfer) that will lead to policy suggestions for the Maturity Model, which will then feed into the Resilience Policies Repository.

CONCLUSION AND FUTURE WORK

This project has implemented processes of co-creation to enhance resilience in European cities. In terms of co-creation, the project takes both top-down and bottom-up approaches. The agile development process applied in the co-creation process gathers input from city stakeholders and representatives of municipalities. A conclusion of this bottom-up approach has been that each city exhibits various challenges and problems, resulting in heterogeneous needs and priorities, which demand continuous revision and reassessment of the development process. The advantage of this characteristic has been that it pushes results towards a general and broadly applicable solution, which is the objective of the project's outputs (standardization and uptake by cities outside the consortium). Each of the seven cities contributed various opinions, needs and feedback, presenting a challenge but also the opportunity to ensure that the results are widely applicable.

In terms of communication with citizens, we found cities to be a crucial channel for communication. Municipal websites and press releases issued by cities enjoy a high level of visibility and trust among citizens, representing a highly valuable resource for communication activities.

The collective feedback from cities has showed that so far informing thoroughly stakeholders and city representatives is important and necessary in order to secure active participation and involvement in resilience

building activities. Nevertheless, there is need for further focus on stakeholders that are mostly affected by or interested in an issue or challenge. Meaningful and solid stakeholder engagement should be the focus; more particularly on creating and maintaining stakeholder relationships and co-creating the tool having constant input) rather than on innovation. Data input in the portal should be presented in a consistent and solid manner and also filling in gaps or hiccups in city processes and local stakeholder engagement.

City partners identified social media integration as quite crucial in citizen engagement processes; social networking can be rather meaningful in facilitating communication flows and strengthening community involvement but needs to be treated carefully in order to change their effect from outreach to participation and to avoid problems arising from their wrongful use. The project's next steps include the engagement of further cities in testing of the tool and in communicating with project cities. We conclude this paper saying that to ensure high quality pilot implementation processes, there is need for close cooperation and coordination with research and city partners to ensure a clear, well-structured co-creation process. We will continue looking at the effectiveness of the co-creating communication approach of the project and how it enables cities to be more resilient.

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