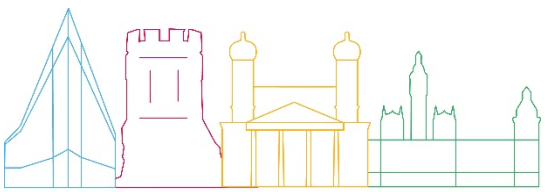
ARCH

ARCH D2.5

Report on clustering activities



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Executive Summary

This deliverable has been prepared for the European Commission-funded research project *ARCH: Advancing Resilience of historic areas against Climate-related and other Hazards.* It is the key output of task 2.5 '*Clustering with other projects'* and describes the activities conducted together with other topically related projects and initiatives over the runtime of ARCH. These activities include both one-off clustering activities, like joint workshop sessions, as well as long-term activities conducted within the 'heritage cluster', i.e., the three projects funded under call *LC-CLA-04-2018: Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events*,

The main outcome of the clustering activities is the founding of the EU R&I Task Force for Climate Neutral and Resilient Historic Districts in 2021, which was supported by the activities of the 'heritage cluster' conducted under the Horizon Results Booster. The first major outcome of the task force is a joint white paper with recommendations to overcome challenges for and make use of opportunities from resilient historic districts. This white paper is included in D2.5 as an annex.

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List of Abbreviations

Abbreviation	Meaning
DSS	Decision Support System
ESAB	External Scientific Advisory Board
EURESFO	European Urban Resilience Forum
E-STAG	European Science and Technology Group
GIZ	Gesellschaft für Internationale Zusammenarbeit (German Association for International Collaboration)
HArIS	Historic Area Information System
MCR2030	Making Cities Resilient 2030
RAD	Resilience Assessment Dashboard
RMI	Resilience Measures Inventory
RPVT	Resilience Pathway Visualisation Tool
THIS	Threats and Hazards Information System
UNDRR	United Nations Office for Disaster Risk Reduction

1. Introduction

This deliverable has been prepared for the European Commission-funded research project *ARCH: Advancing Resilience of historic areas against Climate-related and other Hazards.* ARCH develops decision support tools and methods to improve the resilience of historic areas to climate change-related and other hazards. These tools and methods are developed with the pilot cities of Bratislava (Slovakia), Camerino (Italy), Hamburg (Germany), and València (Spain) in a co-creative approach that includes local policymakers, practitioners, and community members. The resulting solutions are bundled in a resilience knowledge base that supports guided resilience building (the ARCH HUB), and include:

- an information management system for geo-referenced properties of historic areas (HArIS);
- an information management system for geo-referenced data regarding hazards, risks, and impact indicators (THIS);
- a Decision Support System (DSS) for risk and impact analysis of historic areas;
- an inventory of resilience-building measures linked to appropriate financing sources (RMI);
- a visual planning tool for resilience pathways (RPVT) that allows to select, prioritize, and sequence potential resilience measures over time; and
- a resilience assessment dashboard (RAD) to evaluate and monitor the resilience maturity of a historic area, identify resilience weak points, and formulate resilience action plans.

This report (D2.5) is the key output of task 2.5 '*Clustering with other projects'*. It describes the activities conducted together with other topically related projects and initiatives over the runtime of ARCH. These activities include both one-off clustering activities, like joint workshop sessions, as well as long-term activities conducted within the 'heritage cluster', i.e., the three projects funded under call *LC-CLA-04-2018: Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events*, like the establishment of the EU R&I Task Force for Climate Neutral and Resilient Historic Districts as well as joint dissemination and exploitation activities conducted as part of the Horizon Results Booster.

The clustering activities were coordinated by Fraunhofer with support from ICLEI, with all project partners participating, depending on aims and scope of individual activities. In general, the clustering activities had two main goals:

1. Find and act upon synergies with a broad range of projects related to the topics of resilience, climate change adaptation, disaster risk management, and heritage management, both on the national as well as European level

2. Facilitate close cooperation between the three projects of the 'heritage cluster', i.e., ARCH, HYPERION[1], and SHELTER[2], with the goal to identify synergies as well as complementarities to ensure a broader applicability of all project results.

1.1. Gender statement

This document has been developed taking into consideration the guidance on gender in research provided in the Project Handbook (D1.2 [1]) as well as State-of-the-Art report number 5 of deliverable D7.1 on *'Gender aspects in conservation and regulation of historic areas, disaster risk management, emergency protocols, post-disaster response techniques, and techniques for building back better'* [2].

Following these guidelines, the project team tried to ensure – to the best of its capabilities – equal participation of women in all clustering activities and tried to also ensure that the voices of women and minorities received the required attention during the clustering processes.

1.2. Structure of this report

The remainder of this report is structured as follows: Section 2 describes clustering activities conducted on European and national level. Section 3 continues with an introduction to the work conducted under the Horizon Results Booster, before sections 4 and 5 describe the activities under the EU R&I Task Force for Resilient and Climate-neutral Historic Urban Districts as well as the 'heritage cluster'. The annexes of this report then contain results produced as part of the Horizon Results Booster, documentation of task force meetings, as well as the joint Whitepaper, one of the main results of the work under the task force, and an updated mapping of projects with which ARCH engaged over its runtime.

[1] https://www.hyperion-project.eu/
[2] https://shelter-project.com/

2. Clustering with European and national projects and initiatives[3]

2.1. Joint workshops and conferences

On a European level, ARCH engaged with multiple projects and initiatives via participation at and organisation of workshops and conferences. These activities started off in November 2019, when ARCH participated at the ILUCIDARE[4] Playground in Brussels, providing input to a joint policy paper of the RURITAGE[5] and ROCK[6] projects. These activities were followed by joint sessions with related projects during the Mannheim 2020 conference (CLIC[7] and OpenHeritage[8]) and the Adapt Northern Heritage Conference (HYPERION and SHELTER), discussing issues of sustainable urban regeneration in the light of cultural heritage and challenges for resilience of historic areas. ARCH also participated as an online exhibitor at the ROCK Open Knowledge Week 2020, showcasing its approach and results. On top of these activities, ARCH made use of networking opportunities at the European Urban Resilience forum (EURESFO) from 2019 to 2021, sponsoring the event and organising sessions to promote ARCH tools in 2020 and 2021. Project partners also participated at brokerage events organized by the European Commission, like Horizon 2020 Cities of the Future 2019, Horizon 2020 – Science with and for Society 2020, or the Digital Excellence Forum @ ICT Proposers' Day 2019. This provided the chance to exchange with projects such as PLACARD[9], NATURVATION[10], Connecting Nature[11], OASIS[12], and Clever Cities[13].

2.2. Urban Agenda Partnership for Culture and Cultural Heritage

In parallel to these one-off clustering activities, ARCH took an active part in the activities of the Urban Agenda Partnership for Culture and Cultural Heritage[14], via partners ICLEI, Fraunhofer, and Hamburg. These activities focused on Action 8 of the partnership *'Guiding Principles for Resilience and Integrated Approaches in Risk and Heritage Management in European Cities'*, coordinated by the German Ministry of Interior, with ICLEI, the City of Bordeaux, and Cyprus as official action members, while other partners participated on a voluntary basis. The goal of this action was to take stock of manuals, guidance, initiatives, and projects that are related to

[3] Clustering activities solely conducted under the umbrella of the 'heritage cluster' or as part of the Horizon Results Booster, are reported in subsequent sections.
[4] https://ilucidare.eu/
[5] https://www.ruritage.eu/
[6] https://rockproject.eu/
[7] https://www.clicproject.eu/
[8] https://openheritage.eu/
[9] https://www.placard-network.eu/
[10] https://naturvation.eu/
[11] https://connectingnature.eu/
[12] https://oasishub.co/
[13] https://clevercities.eu/
[14] https://futurium.ec.europa.eu/en/urban-agenda/culturecultural-heritage

integrated risk and heritage management to transfer the UNESCO Manual on Disaster Risk Management for World Heritage Sites [3] into actionable guidance for integrated risk management for European historical towns.

The partnership was established in 2020, with activities under Action 8 commencing in 2021. Up through August 2022, ARCH participated in ten meetings of Action 8, showcasing and discussing ARCH results, in particular the ARCH Resilience Framework (see [4]). In addition, Fraunhofer and ICLEI participated in expert interviews for the scoping paper produced as part of Action 8 and provided comments to the guidance paper on integrated risk management. In addition, partners Fraunhofer, ICLEI, and Hamburg participated in a tabletop simulation exercise on integrated risk planning and urban development, which was held in Bad Münstereifel, Germany, in 2022. Most recently, the leader of Action 8 also participated in ARCH's final event, held in Hamburg, Germany, in July 2022.

As a result of these exchanges, Fraunhofer and other German participants of Action 8 are currently exploring the possibilities of setting up a national follow-up project to support World Heritage Sites and historic urban districts with integrating management approaches for cultural heritage, disaster risks, climate change adaptation, and urban planning.

2.3. Clustering with the United Nations Office for Disaster Risk Reduction

In addition to the activities conducted within the Urban Agenda Partnership on Culture and Cultural Heritage, ARCH also made connections with the disaster risk management community, specifically the Office for Disaster Risk Reduction of the United Nations (UNDRR).

These exchanges started via a member of ARCH's External Scientific Advisory Board (ESAB), who is a member of UNDRR's European Science and Technology Group (E-STAG). This group provides technical advice and support in the formulation and implementation of activities carried out by the disaster risk reduction community. Via ARCH's advisory board member, project results were transferred into the work of the E-STAG. In addition, this work provided one avenue for exchanges with the Making Cities Resilient 2030 (MCR2030) initiative about the Resilience Assessment Dashboard (RAD) developed by ARCH: As part of the MCR2030 initiative an addendum to the Disaster Resilience Scorecard for Cities [5][15] with specific focus in Cultural Heritage was developed. This development was supported by UNDRR's E-STAG and via ARCH's ESAB member an exchange between the developers of the addendum and the RAD was organized.[16]

In addition to these activities, further clustering with the MCR2030 initiative took place via partner ICLEI. As a core partner and co-chair of the Regional Coordinating Committee (RCC) in Europe and Central Asia for the MCR2030 initiative, ICLEI Europe works closely with the RCC partners on developing and implementing the MCR2030 Europe Regional Roadmap and in implementing the following activities:

[15] The original UNDRR Scorecard was one of the foundations on which the RAD was developed.

[16] Unfortunately, until the time of writing this report, ARCH was not able to procure access to this addendum, which seems to be available only for members of the MCR2030 campaign.

- Understanding the needs and demands of cities: the MCR2030 initiative offers in Europe and Central Asia an open space to support cities starting to understand risk and leverage the lessons learnt from cities championing resilience, promoting and communicating stories around city experiences, and supporting their pursuit for funding for implementation.
- Engaging cities in the network, through:
    - City recruitment
    - Driving peer learning and twinning
    - Communicating city experiences and advocating resilience by collecting and connecting partners and contributions
    - Connecting with innovative tools and instruments at the national level, linking to the MCR2030 dashboard of tools and resources as a platform to offer these elements to cities
    - Specific attention to key regional legislative processes: efforts to align with EU priorities (EU Adaptation Strategy) and investment or financing structures and opportunities.
    - Production of joint knowledge products, guidance documents and targeted communication activities

Via these activities of ICLEI, ARCH is exploring how to integrate outputs of the project in the MCR2030 dashboard, extending the reach of the project by making resources available to cities participating in the initiative.[17]

2.4. Clustering with national projects and initiatives

Additional clustering activities took place on national level, via partners Fraunhofer, Hamburg, and Las Naves. First, Fraunhofer and Hamburg exchanged multiple times with the German national research project KERES[18], which examines how to protect cultural heritage against extreme weather events via detailed climate projections. Hamburg and its ARCH pilot site Speicherstadt are engaged in KERES as a use case. As part of this collaboration German partners of ARCH and KERES met multiple times to discuss approaches and experience when integrating heritage management, disaster risk management, and climate change adaptation, including a workshop on the ARCH Resilience Framework and its local applicability in Hamburg.

In addition, Fraunhofer participated in multiple meetings of the Community of Practice Climate Risk[19] of the German Association for International Collaboration (GIZ). This group was established by the GIZ in 2019 and brings together European and international experts in climate vulnerability and risk analysis to exchange about best practices and new

[17] As the MCR2030 dashboard is still being actively developed and extended, these activities are still ongoing and will continue even after the end of ARCH.

[18] https://www.imw.fraunhofer.de/en/research/technology-transfer/innovation-acceptance/projects/keres.html

[19] https://www.adaptationcommunity.net/climate-risk-assessment-management/community-of-practice-on-climate-risk/

developments. Fraunhofer presented its experiences with conducting risk analysis for historic areas during these meetings.

Furthermore, Las Naves participated in informal exchanges with INTERREG-SUDOE VALSIPAM[20], discussing project experiences and approaches. Las Naves also clustered with the CRISI-ADAPT-II project[21], co-funded by EIT Climate-KIC, which was working in the Huerta, one of ARCH's test sites in Valencia. The goal of these exchanges was to align local level activities and make use of synergies. This culminated in Las Naves participating in an online workshop in December 2021 to present the work done in ARCH.

2.5. Other clustering activities

In addition to the above-mentioned activities, ARCH also engaged other projects and initiatives via other means:

- Via its development of a CEN Workshop Agreement based on the ARCH Resilience Framework (see [6]), ARCH engaged 23 participants from outside the project to extend and adapt the ARCH Resilience Framework into a pre-standardization document. This included members from the SHELTER project as well as the RESILOC[22] project. As a result of these activities, ARCH also established a liaison with the CEN Technical Committee 465 Sustainable Cities and Communities, where the CEN Workshop Agreement is now considered to be taken up in the work of the technical committee.
- During its final event, ARCH made connections to other European projects, including RESCult[23], RESILOC, SHELTER, KERES, and STRENCH[24].
- Via connections of individual partners ARCH also established connections to other European and national projects, including FORESEE[25], UNCHAIN[26], AKWORKS[27], and GrowGreen[28]. For a full list of projects engaged by ARCH, see Annex D.

[20] https://valsipam.eu/en/Default
[21] https://www.crisi-adapt2.eu/
[22] https://www.resilocproject.eu/
[23] https://www.rescult-project.eu/
[24] https://www.interreg-central.eu/Content.Node/STRENCH.html
[25] https://cordis.europa.eu/project/id/769373
[26] https://unchain.no/
[27] https://www.arkwork.eu/
[28] https://growgreenproject.eu/

3. Activities conducted under the Horizon Results Booster

Participation in the Horizon Results Booster was initiated by ARCH's sister project, SHELTER, which invited ARCH and HYPERION communications work package leaders to participate. This participation involved **five meetings across the three projects**, additional to the existing cross-project cooperation on the EU R&I Task Force on Resilient and Climate-neutral Historic Urban Districts (see section 4). During these meetings, partners shared opportunities for communication, and worked with the Horizon Results Booster team on the production of a task force logo, video, flyer, and poster for use at events (e.g., EURESFO 2021 in Malmö, see also Annex B.

These meetings also resulted in collaboration on a **Peer Learning Event in April 2022**, which engaged city representatives from each of the three projects and was used as an opportunity to discuss shared themes, challenges, and mutually useful project results on the theme of resilience and cultural heritage. During planning meetings, participants from each of the projects explored ways to exploit the discussions during the Peer Learning Event to create dissemination materials. With the support from the Horizon Results Booster, graphic/visual elements were created to outline shared challenges, key takeaways, and anecdotes from city pilots (see Figure 1 and also Annex B). These were disseminated across the projects' channels.

The Horizon Results Booster provided an impetus for enhanced cross-project collaboration within the 'heritage cluster'. It also supported this joint work with communications materials that were used widely to promote the activities of the projects, as well as the R&I task force, of which all three projects are driving members.

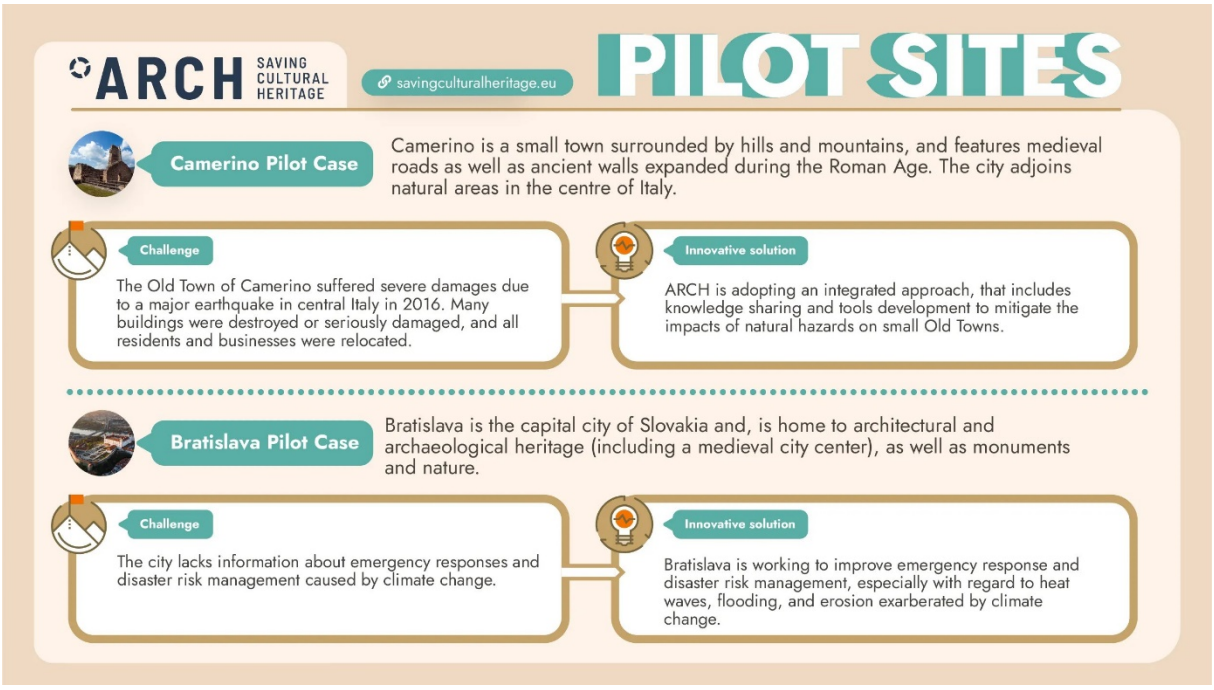

Figure 1: Snapshot of the peer learning infographic produces by the Horizon Result booster. See Annex C for the full infographic

4. The EU R&I Task Force on Resilient and Climate-neutral Historic Urban Districts

The main clustering effort pursued by ARCH was the EU Research and Innovation Task Force on Resilient and Climate-neutral Historic Urban Districts.

This task force was established jointly by ARCH and its sister projects SHELTER and HYPERION in 2021 and has the goal to coordinate European R&I efforts related to climate resilience of historic districts and bridge the gap between urban development, resilience planning, and heritage management to boost collaboration among all involved stakeholders. Its vision is to stimulate and promote development and wider adoption of solutions for climate change mitigation and adaptation in historic urban districts by promoting constructive dialogue, development, and exchange of best practices for achieving better integration between resilient urban planning and heritage management, and increasing awareness of the role of historic areas – with their unique value and importance – play in stimulating the general public to actively contribute to coordinated efforts on climate resilience in accordance with protection and preservation of heritage both within local environments as well as nationally and internationally.

In the long term, the task force should not only co-ordinate EU R&I efforts to make historic urban districts and their communities climate-neutral and resilient, but also branch out to intersect with issues of interest to contemporary urban districts, in order to find synergies.

The task force coordination is shared among ARCH, SHELTER, and HYPERION and rotates regularly. The technical core of the task force is made up of partners from European research projects and other interested organisations in the fields of heritage management, climate change mitigation/adaptation, disaster risk management/resilience as well as urban planning and regeneration. In addition, practitioners, decision makers and policy actors at the European, national, and local level in those fields participate in the task force to discuss solutions offered by the technical partners and ensure their applicability.

The task force aims to meet at least bi-annually, usually in conjunction with conferences or events (e.g., as part of the European Urban Resilience Forum). Between meetings, additional work is conducted on an as-needed basis via electronic means.

As of August 2022, the task force held three dedicated workshops over the course of 2021 and 2022:[29]

- The Task Force Kick-off Meeting (June 23, 2021), where the policy perspective for resilient historic urban districts, scientific gaps in achieving resilience for historic urban districts, and on-the-ground challenges for resilient historic urban districts were analysed.

[29] Annex C provides an overview of the results produced from the workshops in form of meeting notes and/or excerpts of online whiteboards produced during the meetings

- The second workshop (December 14-15, 2021), in which problems, opportunities, and best practices from daily practice, as well as methods and tools to address problems and support opportunities were analysed across different thematic areas.
- The third workshop (June 3, 2022), in which challenges for resilient historic districts were refined and initial recommendations to address these challenges were formulated.

In addition, task force members participated in events of other initiatives, such as the Urban Agenda Partnership for Culture and Cultural Heritage, the Heritage for the Future conference of the Joint Programming Initiative Cultural heritage, and the General Assembly of the European Geoscience Union 2022, to discuss, refine, and align the findings of the task force.

The first major outcome of the task force is a joint White paper of task force participants that summarises the challenges and opportunities gathered during the first two task force workshops. In addition, the paper includes recommendations to actors from research, policy, and practice on how to overcome the identified challenges and make use of the opportunities. The input to the white paper was compiled by nine co-authors from six different European organisations and peer-reviewed by eleven experts from the task force and beyond. During its development process, all members of the task force were regularly updated on the progress and able to provide input. The white paper, which is included in this report as Annex A, therefore presents the gathered expertise of more than 50 different European and international organisations and experts.

The results of the task force work, and specifically the white paper, are planned to be presented during an online workshop at EU Regions Week in October 2022, organised jointly by ARCH, SHELTER, HYPERION, and the Research Executive Agency.

5. Other activities conducted under the ‘heritage cluster’

Besides the activities under the task force, the ‘heritage cluster’ of ARCH, SHELTER, and HYPERION also engaged in other joint activities. These activities were planned and coordinated by Tecnalia, ICCS, and Fraunhofer via regular coordinator calls, which at the outset of the projects took place every two months, with semi-regular participation of the project advisers from the Research Executive Agency.

Activities conducted under the heritage cluster included

- joint participation at SHELTER’s stakeholder requirements workshop in Venice, Italy in 2019;
- participation in General Assembly meetings of the different projects (e.g. third, fourth, and seventh SHELTER general Assembly meetings, fourth HYPERION General Assembly meeting, and seventh ARCH General Assembly meeting);
- organisation of dedicated project exchange events, including a dedicated city case exchange organised by ARCH prior to its fourth General Assembly meeting on November 30, 2020;
- organisation of a peer-to-peer exchange event (“Peer Learning Event”) between case study cities across the projects (see section 3);
- participation of SHELTER and HYPERION cities in ARCH’s Mutual Learning Framework; and
- a joint virtual booth at ECCA 2021.

In addition, the coordinators of ARCH, SHELTER, and HYPERION regularly discussed organisational and scientific issues of the projects, exchanged various deliverables and established contacts between technical partners to facilitate exchanges. The most promising link between the projects is a link between ARCH’s Resilience Measures Inventory and SHELTER’s Portfolio of Solutions, both of which are inventories of resilience-building measures. At the time of writing this report, this exchange about possibilities to link the tools is ongoing and will likely continue after the end of ARCH.[30]

Another result of these exchanges is the conceptual compatibility of the resilience frameworks developed by ARCH and SHELTER. This is also evidenced by the fact that SHELTER partners were involved in the development of the CEN Workshop Agreement initiated by ARCH.

[30] As Tecnalia is involved in the development of both results, the efforts to make both inventories compatible can continue after the end of the project, while SHELTER is still running.

6. References

[1] D. Lückerath, "ARCH D1.2 Project handbook," H2020 ARCH, GA no. 820999, 2019.

[2] V. Rebollo, T. Rangil-Escribano and E. Chapman, “ARCH D7.1 State-of-the-Art report no. 5: Gender aspects in conservation and regulation of historic areas, disaster risk management, emergency protocols, post-disaster response techniques, and techniques for building back better,” H2020 ARCH, GA no. 820999, 2019.

[3] R. Jigyasu, J. King and G. Wijesuriya, Managing disaster risk for world heritage, United Nations Educational, Scientific and Cultural Organisation, 2010.

[4] K. Milde, D. Lückerath and O. Ullrich, “ARCH D7.3 ARCH Disaster Risk Management Framework,” H2020 ARCH, GA no. 820999, 2020.

[5] United Nations Office for Disaster Risk Reduction, *Disaster Resilience Scorecards for Cities,* 2017.

[6] R. L. Saskia Maresch, “ARCH D2.4 Standardisation Strategy,” H2020 ARCH, GA no. 820999, 2022.

7. Annex A: White paper “Paving the Way for Climate Neutral and Resilient Historic Districts”

Paving the Way for Climate Neutral and Resilient Historic Districts

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Introduction

Climate change is one of the biggest challenges facing our planet today. More frequent and intense natural hazards like droughts, heatwaves, floods, and storms are increasingly threatening species and habitats on a global and unprecedented scale. Cities are heavily affected by consequences of climate change, with most of Europe's population living in cities and urban areas and projections for 2050 predicting even larger shares [1]. At the same time, cities generate up to 80% of a country's GDP [2] but also consume 75% of the natural resources and account for 60-80% of greenhouse gas emissions. That is, urbanisation and economic growth happening in cities are the biggest contributors to climate change. Adapting to urbanisation, climate change, digitalisation, and other social, economic and security trends is a challenging endeavour for cities and prone to potential conflicts of interest. It requires managing tasks like accommodating a growing and more diverse population, providing the required services, fostering social, environmental, and economic sustainability, and keeping the city liveable and attractive. But a liveable, sustainable and, above all, resilient city is not just a product of organised and well-functioning services: other crucial elements are the places that make up the city and the communities and their specific traditions that belong to those places. Historic districts of significant cultural value and the communities connected to these places have an important role to play in fostering location-based identity, social cohesion, creativity, innovation, urban regeneration, and climate change adaptation / mitigation. With the increased recognition of the threats from climate change these historic districts and their communities face, and the role they can play in driving climate action, everybody connected to historic districts faces both a major opportunity and a challenging responsibility [3].

To address these challenges and leverage the opportunities, the Horizon 2020 projects ARCH, HYPERION, and SHELTER have established the **EU R&I Task Force for Climate Neutral and Resilient Historic Urban Districts.**

The task force aims to bring together diverse groups of practitioners, researchers, and policy makers at the cross section of heritage management, climate change adaptation / mitigation, disaster risk management, and sustainable urban development. This with the objective to identify and discuss current developments in research and practice; bridge knowledge gaps between these fields; boost collaboration among the cross-sectoral actors involved; and ultimately make our cities more climate neutral and resilient.

In doing so, the task force aims to provide practical support to European authorities and decision makers for developing harmonised, evidence-based policies, strategies, and procedures. The technical core of the task force is made up of partners from European research projects and other interested organisations with relevance for resilient historic districts. In addition, practitioners and policy makers on European, national, and local level in fields related to resilience participate in the task force to discuss solutions offered by the technical partners and ensure their applicability.

This paper constitutes the **first major result** of the task force. It provides an **overview of the challenges faced by practitioners and researchers** when jointly addressing the needs of resilient historic districts and provides an initial set of **recommendations** produced by the task force to address these challenges. These recommendations are **targeted at practitioners and policy makers on European, national, regional, and local levels** involved in heritage management, climate change adaptation / mitigation, disaster risk management, and sustainable urban development, as well as **researchers and funding bodies** active in these fields.

To identify the challenges and produce the recommendations, the task force held three dedicated workshops over the course of 2021 and 2022:

- The *Task Force Kick-off Meeting* (June 23, 2021) analysed the policy perspective for resilient historic districts, scientific gaps in achieving resilience for historic districts, and on-the-ground challenges for resilient historic districts.
- The s*econd workshop* (December 14-15, 2021) examined cross-thematic problems, opportunities, and best practices from daily experience, as well as methods and tools to address problems and support opportunities.
- The *third workshop* (June 3, 2022) refined the identified challenges and formulated initial recommendations to address these challenges.

Additionally, task force members participated in events of other initiatives, such as the Urban Agenda Partnership for Culture and Cultural Heritage, to discuss, refine, and align the findings from the workshops.

The remainder of this paper is structured as follows:

- We first **provide the framework** for the further discussions by introducing the concept of **historic districts as social-ecological-technical systems**, delimiting different **definitions of resilience** and how these definitions might be adapted to historic districts, and explain the **connection between resilience climate change adaptation / mitigation and disaster risk management**.

- Secondly, we **locate the work of the task force in the policy landscape** at the cross section of heritage management, climate change adaptation / mitigation, disaster risk management, and sustainable urban development,
- We then introduce the **challenges for resilient historic districts** identified by the task force before closing the paper with our **recommendations to overcome these challenges and make the most out of the opportunities** for resilience brought to the table by historic districts and their communities.

Historic Districts as Social-Ecological-Technical Systems, Resilience Concepts & their Relationship with Disaster Risk Management and Climate Change Adaptation

Following UNESCO's Recommendation on the Historic Urban Landscape [4], **historic districts** cannot simply be understood as a collection of buildings and structures, but rather as an amalgam of social-cultural-economic-governance systems – the social-economic domain – interacting with climate-biophysical-ecological and technological-engineered-infrastructural systems – the ecological-biophysical and technological-infrastructural domains (see Figure 1) [5]. These domains have historic context and shape each other, not only in the past but also now and in the future. New developments in the different domains (be it urban development, climate change, or societal changes) reinforce and shape the roles and meanings they have for each other. Subsequently, historic districts cannot be seen as isolated systems, but as a **holistic social-ecological-technical system** (SETS) where heritage management, social and economic development, as well as disaster risk management and climate change adaptation / mitigation need to be integrated.

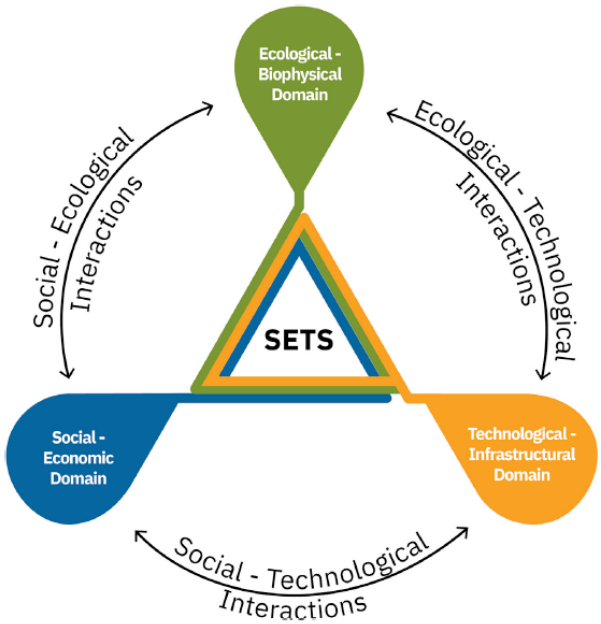

Figure 1: The social-ecological-technological systems conceptual framework. Source: [5]

With climate change, natural and human-made hazards, development pressures, and other forces acting on the SETS, the resilience of these systems and their domains becomes of paramount importance. However, the term 'resilience' can mean many different things to many different actors depending on the context in which it is applied (see e.g. [6], [7], [8], [9], [10], [11]). Broadly speaking, three different understandings of 'resilience' can be distinguished: engineering (or 'narrow') resilience, ecological / ecosystem and social resilience, and social-ecological resilience. While **engineering resilience** aims to withstand shocks and to return to a stable pre-disaster state as fast as possible ('bouncing back', see e.g. [11]), **ecological / ecosystem and social resilience** aims at adapting the system to better cope with the disaster ('bouncing forward'). **Social-ecological resilience** in contrast treats resilience as a process and acknowledges the need to account for uncertainty and include flexibility, learning, and the advancement of capacities and abilities of a system to withstand future shocks. This is also the view taken by the United Nations Office for Disaster Risk Reduction (UNDRR)[1] and the Intergovernmental Panel on Climate Change (IPCC), who in their 6th Assessment Report (AR6) [12] define resilience as

[1] https://www.undrr.org/terminology/resilience

"[t]he capacity of social, economic and ecosystems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure as well as biodiversity in case of ecosystems while also maintaining the capacity for adaptation, learning and transformation." (p.9)

However, while IPCC AR6 explicitly acknowledges the need of adaptation solutions to conform to the principle of justice and the value in diverse forms of knowledge, the propagated resilience definition still fails to explicitly link resilience and justice (as discussed in ARCH State-of-the-Art report no. 5 for AR5 (see [13])), obscuring the fact that impacts are experienced by communities. Therefore, a definition of resilience for historic districts as SETS needs to embrace the concept of **social justice** and acknowledge that communities can be heterogeneous, exhibiting diverse needs, capacities, and levels of power.

Lastly, any resilience concept for historic districts needs to consider the specific characteristics of these SETS as well as the need to **balance socially just response and adaptation with the need to maintain the historic district's identity, integrity, and authenticity.**

The complexity of resilience as a trans-disciplinary bridge between the fields of disaster risk management, climate change adaptation / mitigation and sustainable development (see also Morchain and Robrecht in [14]), means that there has not emerged a consolidated definition yet, although these fields grow ever closer together – a topic the task force might tackle in future. However, ARCH and SHELTER have both suggested resilience definition more targeted towards historic districts as SETS:

ARCH, Resilience of a historic area

"The sustained ability of a historic area as a social-ecological system (including its social, cultural, political, economic, natural, and environmental dimensions) to cope with hazardous events by responding and adapting in socially just ways that maintain the historic area's functions and heritage significance (including identity, integrity, and authenticity)."

SHELTER, Resilience of a historic area

"Resilience of historic area refers to the ability of an historic urban or territorial system- and all its social, cultural, economic, environmental dimensions across temporal and spatial scales to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and use it for a systemic transformation to still retain essentially the same function, structure and feedbacks, and therefore the capacity to adapt in order to maintain the same identity"

Addressing disaster risk reduces vulnerability, as do sustainable measures to deliver climate change adaptation (and mitigation, at least in the long term). These efforts enhance the resilience of SETS, including historic districts, and contribute to the sustainability of the system and to the long-term prevalence of culture, communities, economies, cities, and biodiversity, if

they are shaped with sustainability criteria in mind (cf. [14]). **Resilient historic districts therefore require practitioners and decision makers to address both the long-term, slow onset future risks posed by climate change as well as the short-term sudden onset existing risks posed by disasters**, whose intensity and frequency have already been increased by climate change. And in both cases, these risks must be addressed by **reducing vulnerabilities and pursuing sustainable urban development as well as poverty reduction using ecosystem-based, engineered, social, economic, and institutional solutions that acknowledge how *"[c]ultural factors shape the [e]nabling conditions for adaptation and mitigation, including whether and how people respond to appeals for action."*** [3] In the context of historic districts, this needs to be understood to not just cover culture and arts but also sites of cultural heritage significance for the local community that play an important role in fostering place-based identity and social cohesion. Therefore, to make historic districts resilient, climate change adaptation / mitigation, disaster risk management, heritage management, and sustainable urban development need to be considered jointly.

Policy landscape for resilience and historic districts

From the Sustainable Development Goals [15], the Paris Agreement [16] to the New Urban Agenda [17], resilience building in urban environments is a cross-cutting priority embedded in several international initiatives. However, **most of these initiatives make no specific reference to historic districts or areas.** Some efforts are made within the United Nations organisation through its Office for Disaster Risk Reduction, which promotes resilience building processes at multiple scales, including work at local level that also targets specific issues like cultural heritage. Current international efforts with city governments in relation to local disaster risk reduction and resilience are being developed through the Making Cities Resilient 2030 (MCR2030) multi-stakeholder initiative [18], running until 2030. MCR2030 aims at improving city resilience through easy access to tools and knowledge, some of which are applicable to historic districts or target cultural heritage.

At the European level, the European Union (EU) Civil Protection Mechanism was established by the European Commission in 2001 [19], involving not only EU countries but also additional participating states. Any country, in Europe and beyond, can request assistance through the Mechanism when a natural or human-made disaster exceeds its response capabilities. The EU Civil Protection Mechanism was upgraded in 2019 by the European Commission [20], when the rescEU additional capacities were established to provide faster and wider response to disasters and emerging risks. The **important role of local authorities in disaster risk management** is explicitly acknowledged in the Mechanism creation, as well as in its upgrade. The European Adaptation Strategy to Climate Change, approved in 2013, also recognised the **need to translate its overall objective (to contribute to a Europe more resilient to climate change and variability) to the local level.** After an evaluation in 2018, a new EU Adaptation Strategy was announced in 2019 by the European Commission in the European Green Deal. The strategy was adopted in 2021 [21], with the overall aim of adapting the European Union to the impacts of climate change by 2050, and the specific objectives of achieving such adaptation in smarter, faster, and more systemic ways, as well as increasing support for international climate resilience. **Local adaptation action is one of the cross-cutting priorities identified within the systemic approach of the EU Adaptation Strategy.** To achieve it, the need for increased EU support is recognised, i.e., via the strengthening of the EU and the Global Covenant of Mayors, or through the establishment of a policy support facility under the EU Covenant of Mayors.

Besides the EU Adaptation Strategy, other recent urban policies of the EU also highlight the need for more resilient and sustainable urban districts:

- The 2030 European Territorial Agenda [22] is a strategic policy document for spatial planning in Europe, its regions and communities. It provides a framework for action for territorial cohesion and calls on policy makers at all levels of governance to contribute to an inclusive and sustainable future for all places and to help achieve the Sustainable Development Goals in Europe.
- The New Leipzig Charter 2020 [23] provides a key policy framework document for sustainable urban development in Europe. The Charter emphasises that cities must establish integrated and sustainable urban development strategies and guarantee their implementation for the city, from its functional areas to its neighbourhoods.
- Declaration of Toledo 2020 on Urban Development[2] focuses on how to face the present and future urban challenges of European cities and on how to apply the Europe 2020

[2] https://www.socialeconomy.eu.org/wp-content/uploads/2020/12/Toledo-Declaration_Social-Economy-Final.pdf

strategy by achieving smarter, more sustainable and socially inclusive urban development. This new declaration strongly supports social innovation and its dissemination in the territory together with resilient economic systems.

- The EU Taxonomy for Sustainable Activities [24] is an EU-wide classification system for sustainable activities to scale up sustainable investment and to implement the European Green Deal.

The duration and magnitude of the COVID-19 crisis has reinforced the need to embed resilience into EU policy making. Temporary instruments such as the Recovery and Resilience Facility [25] have been established as part of the NextGenerationEU recovery plan, and resilience has begun to be monitored nationally through specific dashboards [26] that consider a broad set of indicators structured around four dimensions: socio-economic, green, digital and geopolitical.

While the need to consider resilience, climate change adaptation / mitigation, and disaster risk management as well as the role the local level needs to play in these fields, has clearly been recognised in international, European, and national policies and strategies, **there is still a need for better addressing the specificities and potentialities of historic districts and cultural heritage.**

Challenges for Climate Neutral and Resilient Historic Districts

During its one-year work across interdisciplinary workshops, participation in conferences and aligned initiatives, as well as via the experiences gathered throughout the work within its member projects, the task force identified five major challenge fields that need to be addressed for historic districts to become resilient.

CHALLENGE 1: Data and methods – access, harmonisation, usability

To make historic districts resilient, practitioners, researchers, and policy makers need reliable information that can inform decision making. This **information currently needs to be collected from different sources**, e.g., historical archives, earth observation data and products, census data, interviews with contemporary witnesses, climate model outputs, environmental monitoring, or other sources [27, 28]. These **sources might not be accessible** to all relevant actors, might provide **data in incompatible formats**, **data that spans different time intervals**, or **data with incompatible spatial resolutions**. On top of this, required data might be **incomplete or missing** all together. This information from different sources and hugely diverse data sets of varying quality then needs to be harmonised, analysed, processed, verified, and understood to allow its use, e.g., in vulnerability, risk, and resilience assessments. Even if sufficient information is available, the **knowledge derived from its analysis can often not be integrated in decision making processes**, either because practitioners and decision makers **lack the necessary background knowledge or support** to make use of the knowledge, or the results of processing the **gathered information are presented and communicated in ways not digestible and usable for decision makers**. These challenges are made even harder by the inherent complexity of the trans-disciplinary concept of resilience (see section on SETS and resilience), which requires even more information from a wider selection of sources and targets a larger number of researchers, practitioners, and policy makers.

It is therefore not surprising that there is still a **lack of standardised data formats and data gathering processes** (which data is collected, at which time, and in which spatial resolution), although initiatives like the INSPIRE Directive[3] and the common European Data Space for Cultural Heritage[4] are a step in the right direction. However, not only are standardised data sets missing, but the **methods that make use of this data are also not harmonised sufficiently** across different fields of expertise and differ depending on their aims and scope - a quantitative risk assessment at building-level might require different methods and data than an indicator-based risk assessment with lower-resolution at district-level. This lack of harmonisation makes it complicated to consistently combine methods across different scales – a necessity if a complete picture of the resilience of a historic district should be established [29] – and limits trans-disciplinary collaboration, as well as benchmarking and monitoring of resilience.

For historic districts, these issues made even more complex, because it is necessary to also **integrate heritage values** (socio-economic, intangible, or otherwise) with the fundamental data

[3] https://inspire.ec.europa.eu/inspire-directive/2
[4] https://digital-strategy.ec.europa.eu/en/funding/deployment-common-european-data-space-cultural-heritage-cnectlux2021op0070

and analyse potential losses to these values in vulnerability, risk, and resilience assessments, which is a complex and often normative process.

As a result, researchers and practitioners need to make use of data, models and, tools with **limited usability and reliability**, need to either spend considerable effort to acquire large amounts of data for detailed assessments or employ less data demanding assessments that might not cover all necessary aspects, might need to conduct multiple assessments on different scales, and might need to translate results for different target audiences to provide actionable knowledge for decision making.

CHALLENGE 2: Fragmentation of responsibilities in policy and governance

Recent societies compartmentalise knowledge in the quest for expertise, resulting in **siloed working approaches and a lack of common understanding of concepts**, which does not help to build common strategies that could jointly address heritage management, disaster risk management, climate change adaptation / mitigation, and sustainable urban development. In other words, it **impedes the cross-fertilization of solutions** to create a holistic resilience strategy that can address the challenges associated with climate change and in the worst case can lead to **detrimental overlapping of competences** among decision makers on European, national, regional, and local level. Furthermore, apart from the knowledge fragmentation there is also a **fragmentation of policy**, which is often related to sectorial silos. However, although there is nowadays an effort to better account, coordinate, and integrate policies among different fields of knowledge, transversality is far from being a reality. For example, the integration of heritage management, disaster risk management, and climate change adaptation in mainstream policy is still incipient and rare are the examples in the EU landscape (i.e., National Plans of Adaptation to Climate Change in Italy and France [30]). This fragmentation in policy has been observed at local, regional, and even national level. The **different scale** of the heritage management, disaster risk management and climate change adaptation policies results in additional challenges to define operative actions and specific protocols at local level.

CHALLENGE 3: Integrating local knowledge and traditions

Local knowledge and tradition are widely seen as important for resilience building in historic districts, influencing social behaviour, awareness, social capital, as well as supporting climate action and strengthening the local economy, among others. This includes not only the **use of traditional techniques**, e.g., in monument preservation, building construction, or sustainable agriculture and landscape protection, but also the **acknowledgement of the role local traditions**, like festivities or markets, as well as indigenous communities can play both in pre- and post-disaster contexts ('Build Back Better' phase). While there is some debate over the contemporary scientific validity of some traditional local knowledge, it is certain that the 'intangible' knowledge of a place's past and current narratives is essential to societal resilience building. Using local knowledge from community stakeholders on climate change adaptation and mitigation is particularly valuable, and it builds inclusivity and ownership of people over their surroundings.

Although the value of local knowledge and traditions for resilience building are acknowledged, they are **not yet consistently included by policy makers** in climate change adaptation, disaster risk management, and sustainable urban development. Subsequently, the communities of

historic districts are often **not consistently engaged in resilience building actions** which could hugely benefit from their participation, e.g., training activities for recovery of build materials, reconstruction activities using traditional building techniques, or traditional landscape maintenance, cultivation, and use [31].

Another open question remains, as to **how include local knowledge and traditions, which often takes the form of narratives or storytelling, with quantitative approaches** in disaster risk management, climate change adaptation, heritage management, and sustainable urban development. This issue is strongly linked with the question of **how to better approach and engage local communities in knowledge co-production** (e.g., for risk analyses), also considering requirements of and challenges for diverse social groups (e.g., limited accessibility to information, events, tools, etc. due to language barriers, limited comprehension of digital technologies, social constructs, disabilities, and more).

CHALLENGE 4: Co-ownership and co-production in governance

There are several challenges embedded in the governance of resilient historic districts. Involvement of diverse local communities and stakeholders in governance processes faces **competition for attention** between different initiatives, **accessibility barriers** due to complexity of approaches, **lack of resources, suitable expertise, and a common language**, as well as **scepticism regarding the usefulness and availability of initial results**, and **scepticism about if and how input from local stakeholders will be used in decision making processes**. Notably, it is an ongoing challenge to **find individuals who will take specific responsibility** over research results. This implies a governance gap between research and practice.

Despite these complexities, input from local communities and stakeholders should not be excluded from decision making processes that should be based on a user-driven approach and addressed to provide solutions to the territorial challenges. A good governance process considers local values, risk perceptions, and priorities around climate change impacts and responses, **valuing long-term increases in resilience over short-term profit**. Co-creation and awareness strategies are still **not empowering people and communities enough** to be a part of the solution. Perhaps more importantly, decision makers and authorities often are not prepared to **accept increased empowerment of people and communities**. In the governance framework **lacking financing and investment possibilities** (i.e., nature conservation, ecosystem restoration, water management, climate change adaptation, infrastructure maintenance) influence the opportunities for heritage resilience.

CHALLENGE 5: Mainstreaming heritage management and resilience

Heritage could be a powerful contributor to resilience building, not only as an asset to protect, but as a dynamic part of the solution. Heritage can, for example, **generate awareness** of tangible climate change impacts particularly when monuments and archaeological sites are irreversibly damaged by extreme hazards, like flash flood, storm surges, and fire, or submerged by sea level rise. As large parts of society are often passionate about heritage (especially tangible assets) and willing to give time or money to help protect it, heritage issues can galvanise communities into action more than many other matters.

Heritage sites can also **offer important insights for climate change adaptation**, e.g., by providing examples for more sustainable adaptation measures based on local materials and skills or by

adapting traditional building techniques from one climatic zone to adapt buildings in another geographic regions that might in future exhibit a similar climate. Unfortunately, these potentials offered by the heritage sector are **often not acknowledged or prioritised** by those involved in climate change adaptation, disaster risk management, and sustainable urban development.

On the other hand, heritage can only support transformational changes if theoretical ideas quickly become actionable strategies. Yet, the **heritage sector does not have a reputation for flexibility and openness to change**. Contributing factors for this issue can also be land use, landscape configuration, geomorphology, and urban morphology, which can limit the capacity for action and flexibility for defining adaptive solutions. Particular difficulties can be observed when **trade-offs exist between adaptation and preservation requirements**.

The Way Forward: Recommendations for Climate Neutral and Resilient Historic Districts

CHALLENGE 1: Data and methods – access, harmonisation, usability

To address the challenges associated with access, harmonization, and usability of data and methods, three fields of actions should be pursued:

(1) **Improve access to reliable data with harmonised formats, gathered in a consistent way across multiple scales.** To increase the availability and consistency of data at different spatial scales, a **multi-level initiative to harmonize data formats and acquisition processes** on European, national, regional, and local levels should be initiated. This initiative should start from the INSPIRE Directive – which the European Commission plans to revise soon - and the common European Data Space for Cultural Heritage, which should start to be deployed over the next two years and should make high-value datasets on cultural content available. This initiative should also address issues like **integrating data from different sources** (e.g., local-level sensor data on air pollution with European level data from the European Environment Agency). While this initiative should be initiated in a top-down fashion (on European and national level), it is paramount to include the operational level and local population at appropriate stages of the definition, design, and data acquisition process in a bottom-up fashion. This could take the form of **crowd sourced data, participatory sensing, and civic science**, which would have the co-benefit of increasing the involvement and empowerment of the local population, helping to also address challenges 3 and 4. In addition, this initiative needs to also include different disciplines, from social sciences and history to urban development, climate science, computer science, engineering, and material science to increase data quality.

Based on this initiative, the urban data platforms that are often already available on municipal level need to be extended towards **public resilience observatories**, making data for climate change adaptation / mitigation, disaster risk management, heritage management, and sustainable urban development available and (dis)aggregating the data available on European, national, and regional levels for use on the local level. Such data would, for example, enable the creation of multi-layered digital twin models / tools for historic districts, including structural details, infrastructure networks (e.g., transport, power, water networks) together with economic activity models.

(2) **Advance the harmonization of methods, the integration of heritage values and subsequently enhance the usability and reliability of information.** To advance the harmonization of methods and the integration of heritage values, **more research is needed on multi-level assessment approaches** that combine quantitative and qualitative data as well as assessments on heritage values, losses impacts and deterioration processes. The **Impact Chain approach** for climate risk and vulnerabilities assessments [32] could be a good starting point. Impact Chains, which are based on the SETS framework, are usually developed in a multi-stakeholder process, and can model complex, cascading cause-effect relationships between climate impacts and risks, provide an easy to use and understand communication tool, and can be used as the backbone of an operational risk assessment. They can help address the need for easier to understand risk assessment methods for heritage practitioners as well as combining

quantitative and qualitative approaches – both using indicator-based as well as more sophisticated quantitative approaches. Another starting point could be the **"Risk Mapping Tool for Cultural Heritage Protection"** developed in the framework of the Interreg Central Europe STRENCH project, which provides a methodology for hazard-oriented vulnerability ranking for diverse categories of cultural heritage. Both approaches offer a way to further harmonize methods for vulnerability, risk, and resilience assessment across the fields of heritage management, climate change adaptation, and disaster risk management.

Regardless of the entry point for harmonization, additional research is also needed on how to **co-identify and co-evaluate heritage values in multiple dimensions** (social, cultural, artistic, economic, etc.), and how to **integrate these heritage values** - and the potential loss of these - into approaches for vulnerability, risk, and resilience assessment.

(3) **Provide more and better training, education, and capacity building** opportunities on how to make use of data and results, in decision making and how to provide information in formats suitable for decision makers. For the practitioner side, it is necessary to provide specific **training opportunities as a permanent option**. This includes the use, implementation, and combination of different assessment methods, research results in general, as well as the use of available public data, e.g., from Copernicus (see e.g. [27]), the future European Data Space for Cultural Heritage, as well as potential national, regional, or local resilience observatories. In conjunction with increased training opportunities for practitioners, researchers need to be able to provide their findings in a language and format appropriate for the relevant audience. **Funding bodies as well as academic / research institutions should incentivise societal impact of research even more.** The Horizon Result Booster of the European Commission is a step in this direction, but currently usually focused on communication, dissemination, and exploitation of research outputs. It would be beneficial to **extend the Horizon Result Booster with an additional service that specifically supports highly interdisciplinary research projects** in how to translate complex research outputs, i.e., supporting experts from different fields in translating their knowledge into digestible and usable formats for experts from other fields.

CHALLENGE 2: Fragmentation of responsibilities in policy and governance

To reverse the adverse effects of knowledge and policy fragmentation three main strategies have been suggested to raise awareness:

(1) **Harmonisation and standardisation of terminology and practices**. More effort must be made to develop a common vocabulary that shares concepts concerning climate change, the environmental field, cultural heritage, and governance processes, since *"disciplines are themselves societies, each with its own unique cultural content and linguistic code of signs, symbols, and syntax"* [33]. This approach could be tackled, among other activities, by formal and informal standardisation activities as concepts, terminology, and management frameworks could be consolidated through guidelines and standards.

(2) **Co-ownership of the resilience goals and management strategies.** All parties involved in heritage management, climate change adaptation, disaster risk management, and sustainable urban development, among others, must be conscious of, and collectively

work towards a common resilience goal, however loosely defined that goal might be. A starting point could be to tackle one common strategy such as an adaptation strategy which could help in creating awareness at the wider political level. A legislative framework could be established to further promote cross-sectoral communication and cooperation on a regular basis among all interested parties. And one step forward for silo breakdown can be the development of resilience teams with shared responsibility and budget management to carry out cross-sectoral projects to achieve the previously identified resilience goal.

(3) **Raise awareness at policy level** of the importance to protect culture and cultural heritage and decrease its vulnerability towards natural and human-made disasters by putting forward dedicated measures and actions to be included in the existing national plans for adaptation to climate change and disaster risk reduction and management.

CHALLENGE 3: Integrating local knowledge and traditions

A two-pronged strategy should be taken to address better inclusion of diverse forms of local knowledge and traditions in resilience planning:

(1) **Engagement techniques for participative methods, e.g., in risk assessment or adaptation planning, should be better tailored** to the relevant community groups and their diverse members to better capture and include local knowledge. This can mean **making use of social networking tools** that can attract people to the topics of heritage management, climate change adaptation / mitigation, disaster risk management, and sustainable urban development and which can also encourage people to provide different types of input to relevant processes – from using participatory sensing for gathering quantitative data to ways for people to provide photos, videos, oral testimonies, and other more qualitative data. However, engagement techniques need to be **specifically tailored to the members of the local communities**, which can also mean that more traditional ways of engaging people need to be explored, e.g., interviews, surveys, workshops, and more. In addition, it can help to **engage local communities within their existing structures** (e.g., churches, associations, community groups).

(2) The inclusion of local knowledge requires **more research into mixed-method approaches** (see also recommendations for challenge 1), e.g., for risk analyses, to design better and more consistent methods for combining qualitative and quantitative data as well as fusing knowledge from multiple perspectives. Not only can this increase the validity of results from assessments by linking them to experiences “on the ground”, but it can also open potential new avenues for resilience planning and increase the acceptance of required measures.

An approach that can support both recommendations above, is the **incorporation of narratives and storytelling both as a means for better engagement and a way to include diverse knowledge in assessments approaches**, e.g., via gaming or other means. Use of narratives and storytelling in different forms allow to easily capture qualitative information from local community members, increase the engagement of local communities, and can also make it easier to communicate complex topics such as resilience. These approaches also can have the co-benefit of allowing to include the culture and art sector, which is exceptionally experienced in capturing and crafting stories (see also recommendations to challenge 5).

On top of the two-pronged approach above, **policy and decision makers need to be better incentivised to include the use of traditional techniques** in climate change adaptation, disaster risk management, and sustainable urban development. For example, this could take the form of **specific requirements for planning processes** (e.g., for climate change adaptation) to evaluate the use of local, traditional techniques as alternatives to other resilience building measures. Other approaches could be **specific funding schemes** for the inclusion of traditional, local knowledge, or **requirements to involve local communities** in planning and training activities for post-disaster recovery.

CHALLENGE 4: Co-ownership and co-production in governance

The governance challenge is closely connected to the local knowledge challenge. As such, the recommendations on **better and more tailored engagement techniques** are also valid here. As part of the contemporary technological environment that is now constantly present in our everyday activities and our culture, these community engagement tools should act as a vessel for pre-disaster, post-disaster, and during-disaster engagement, enhancing the idea that heritage is not a thing of the past, but more of a foundation for actively responding to unforeseen challenges of the future.

In addition to these recommendations - and regardless of engagement technique - experts in charge of resilience planning need to engage local communities as closely as possible. This goes beyond inviting citizens and local communities to 'public consultations' organised by the district or municipality within their own facilities, as these meetings will mostly attract the "usual suspects". Instead, those in charge of resilience planning must make the effort to **engage local communities on their terms**, e.g., during community gatherings, local festivities, and other events where the diverse group of community members can participate jointly. This will require those in charge to be equipped with **sufficient personnel and funding and the clear mission to engage local communities**.

To further facilitate stronger involvement of local communities, the areas of heritage management, climate change adaptation / mitigation, disaster risk management, and sustainable urban development need to be **re-designed to allow increased involvement of local communities and facilitate co-creation of processes and measures wherever possible**. Thus, policy makers as well as the researchers and practitioners consulting them in strategy development need to **shift the focus of policy and research-policy strategies from the often strong and narrow economic-technological aspect to a focus on the whole social-ecological-technical system**. Subsequently, funding bodies need to require research projects to *"incorporate more heterogeneous actors to foster inter- and transdisciplinary knowledge co-creation. These actors may need to be different in age, gender, social and educational background in order to allow for different solution options and overcome paradigmatic "lock-in" in unsustainable value systems as well as the issue of bounded morality of systemic actors"* [34] (p. 9). More specifically, **research projects need to be designed to be more inclusive** and make stronger efforts to include representatives of those communities they are supposed to serve. This could also lower the barriers to take ownership of research results.

At the same time, **project coordinators and partners in charge of knowledge co-production need to be mindful that some communities might not have the capacity** to concern themselves with the issues at the heart of a research project, as their main issues might be more existential (e.g., in deprived areas the priorities of residents might be survival of their families rather than

their neighbourhood heritage). However, in some of these cases heritage might also offer a solution to better engagement while simultaneously connecting past and future. An example for such an approach can be using urban agriculture to empower citizens to practice organic and regenerative horticulture using traditional crops/local varieties

While such participative processes take time, they are especially important when resilience measures target historic districts. Only if communities are included in all phases of the resilience planning process (before, during, and after disaster) will potential resilience enhancing measures - and potential changes to the historic district incurred by these measures - be accepted by the communities. This also includes the need to broadly **co-identify what is protection worthy, which risk levels might be acceptable, and how to cope with the dynamic nature of development in municipal districts** together with local communities.

However the increased need for more knowledge co-production with diverse community groups also comes with a price when it comes to research projects: With research programmes on European level covering broader topics and requiring more transdisciplinary consortia, including social science, climate science, engineering, computer science, material science, as well as representatives from civil society and industry, while simultaneously limiting the number of funded projects further compared to previous research programmes, successful research projects often have to promise more and increasingly complex results under limited budgetary capacities of individual partners. This can in turn limit how intense partners are able to interact, how agile the knowledge co-production process can be designed, and how far-reaching engagement processes outside of projects can be, subsequently influencing the quality of outputs. Here, **funding bodies should make sure that the required highly transdisciplinary research projects that require large consortia and diverse community groups receive sufficient funding (for all partners)**, reducing the temptation for project consortia to over-promise due to high competitiveness and an unrealistic amount of expected project outcomes.

Beyond stronger community involvement and sufficient funding for research projects, the **processes for heritage management, climate change adaptation, disaster risk management, and sustainable urban development need to be better integrated.** Mayor et al 2021 in [35] argue that **integrated spatial and urban planning and adaptive management approaches have the potential for transformational changes**, facilitating the deployment of measures for climate change adaptation and disaster risk management, including for instance nature-based solutions, as well as enabling the mobilisation of the resources that support their effective implementation. They base their argumentation on the following points:

- Integrated spatial and urban planning are transversal disciplines that address socio-economic and environmental issues in balance with sustainable development [36, 37].
- Planning departments and technical teams do have the knowledge and understanding of the territorial and urban reality, usually working at the interface between the environment, the social needs, and the market, thus they could also boost new ways of green investment [35]).
- Formal and institutional planning do also have the potential to anchor planning guidelines, criteria, and standards for local climate adaptation [37].
- Local governments have a key role in the design of projects to help in the transformation of urban areas towards more sustainable solutions. Depending on the administrative structure and the distribution of powers and responsibilities, many local authorities may

have resources and capacity for climate action, especially relevant from the perspective of adaptation, through local policies such as urban planning, drinking water supply, sanitation networks and wastewater treatment, the management of roads and public spaces, green public areas, environmental protection, or public health [36]).

Acknowledging the different planning approaches and systems in place would allow us to (i) anticipate the potential barriers for the implementation of certain business, governance, and financial models, and (ii) identify the opportunities and specific mechanisms that would facilitate the articulation of those models. [35].

This re-design of planning processes and community engagement needs to be flanked by **more comprehensive communication and awareness raising campaigns** specifically tailored to different community groups and their members. An example for such measures could be outreach activities at schools to inform about the work involved with disaster risk management.

CHALLENGE 5: Mainstreaming heritage management and resilience

To increase the role heritage can play in resilience planning, several recommendations can be made. First, those involved in climate change adaptation / mitigation, disaster risk management, and sustainable urban development - from policy and decision makers to researchers - need to **make better use of the heritage sector**, including culture and creative industries, in creating momentum for climate and disaster action. On the one hand, this can take the form of **using the unique values of heritage - and the potential loss of these - as a communication tool for creating urgency, but also hope, in messaging**, as these heritage assets have often withstood multiple disasters over their lifespan. On the other hand, the culture and creative industry is uniquely positioned to **support the need for more storytelling and narratives** for better community engagement and communication in resilience planning and assessment processes. This is especially powerful in cases of heavy disasters in the past, which often become common memory of a region and subsequently intangible heritage as well (e.g., a museum on the storm surge in 1962 in Hamburg is in preparation to document that night with almost 350 deaths and its outcome after 60 years of an ongoing disaster risk management on high water events in Hamburg).

However, the inclusion of the heritage sector should not just stop at message crafting. Instead, **the culture and heritage sectors should routinely be involved in climate resilience planning and actions at all levels to ensure related actions are in line with the – community-agreed – protection goals as well as local traditions**. At the same time, the heritage sector might need to move away from its strict focus on preservation and - especially in the face of the accelerating climate crisis - make engagement with disaster risk management, climate change adaptation, and urban planning colleagues an integral part of its practices.

To facilitate a joint better understanding, it is necessary to **provide training and knowledge exchange**, both to heritage managers on topics like climate change adaptation and disaster risk management, but also to climate change adaptation and disaster risk management professionals on relevant heritage management topics. Such training would also foster better mutual understanding as well as harmonisation between approaches and terminology (see also recommendations for challenge 2).

Ultimately, the mutual engagement and training provision should result in the **establishment of a joint resilience team or office at local level** with an official mandate to coordinate the resilience planning process across all involved departments.

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More information on the Task Force

For more information on the task force, please visit its website.

Interested experts and project representatives are welcome to join the task force, by filling out this form.

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8. Annex B: Results from the Horizon Results Booster

8.1. Task Force Logo

8.2. Task Force Flyer

Saving the past to preserve the future

PROTECTING CULTURAL HERITAGE

Models to protect cultural heritage from climate change and natural hazards

As communities adapt to the impacts of climate change, it is increasingly clear that cultural heritage protection must be a part of the picture. Much like other parts of affected communities, historic areas are at risk, along with all of their landmarks, historic buildings, and other cultural assets. These areas are often left aside in conversations about resilience, but they are in need of protection from climate-related and other hazards.

The development of data-driven and multi-hazard models and disaster risk management methods are the place to start. From there, these tools can support decision making and knowledge sharing — all for a more resilient future for cultural heritage and historic areas.

European Cultural Protection projects - Task Force

Three complementary projects funded by Europe's Horizon 2020 Research and Innovation programme support the resilience of cultural heritage by leveraging tools, services and new technologies.

Results

Preserve cultural heritage and historic areas from the effects of climate change and natural hazards.

Leverage existing tools and technologies to deliver an integrated resilience assessment platform.

Bridge the gap between climate adaptation, disaster risk management, and cultural heritage management. This includes addressing new solutions for the maintenance and conservation of historic areas.

The **HRB - Horizon Result Booster** is an initiative funded European Commission, Directorate General for Research and Innovation, Unit J5, Common Service for Horizon 2020 Information and Data.

Capture QRcode or follow this URL

www.horizonresultsbooster.eu

Saving the past to preserve the future

PROTECTING CULTURAL HERITAGE

Challenges

- **Scientific:** Develop models, methods and datasets to support decision-making towards green, safe and inclusive systems that incorporate the protection of cultural heritage.
- **Technological:** Create new technologies and risk assessment tools to understand the impacts of climatic, environmental and natural hazards on historical areas.
- **Industrial:** Establish rules and regulations to define a better future for historic areas and cultural heritage, and the communities around them.

Who benefits?

- Policy Makers & Cultural Heritage Managers
- Consultants, Service Providers of Innovation Platforms
- Research & Academia in the Field of Cultural Heritage
- Civil Society, NGOs and Citizens

Meet the Projects

SHELTER - Establishment of cross-scale, multidimensional, data-driven and community based operational knowledge framework for heritage-led and conservation-friendly resilience enhancement. **shelter-project.com**

Grant Agreement No. 821282

HYPERION - Development of a Decision Support System for Improved Resilience & Sustainable Reconstruction of historic areas to cope with Climate Change & Extreme Events. **hyperion-project.eu**

Grant Agreement No. 821054

ARCH - Preservation of cultural heritage from hazards and risks through the co-creation of tools that help cities save cultural heritage from the effects of climate change. **savingculturalheritage.eu**

Grant Agreement No. 820999

The **HRB - Horizon Result Booster** is an initiative funded European Commission, Directorate General for Research and Innovation, Unit J5, Common Service for Horizon 2020 Information and Data.

Capture QRcode or follow this URL

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8.3. Task Force Peer Learning Infographic

Protecting cultural heritage

Saving the past to preserve the future

Peer Learning Workshop 06 APRIL '22

to strengthen the cooperation between Shelter, Arch and Hyperion with the aim of easing the exchange of knowledge and best practice to build Cultural Heritage resilience

PILOT SITES

Shelter

shelter-project.com

Ravenna Pilot Case

The Church of Santa Croce, built in the 5th century, and the surrounding archaeological site are situated in the city centre of Ravenna, inscribed as UNESCO cultural property in 1996.

Challenge

The mosaics of the floor are exposed to outdoor climatic threats and the whole area suffers from the subsidence phenomena (level 1 to 1.5 m. below the original one), characteristic of the entire subsoil of the city.

Innovative solution

SHELTER is testing an innovative system of water pumps, powered by solar energy and complemented by a preventive alarm system led by sensors, that mitigate flooding and subsidence events.

Seferihisar Pilot Case

Seferihisar Sığacık is a living region, located in the province of Izmir. Its municipality is characterised by rural areas and a coastal town.

Challenge

The port town of Sığacık is characterised by fortress walls which are in deteriorating condition, vulnerable to earthquakes along with the protected historical building stock, putting the local community in a risky condition.

Innovative solution

SHELTER is targeting a roadmap for increasing structural safety and reconstruction techniques for the fortress and for the historic building stock, increasing community measures for disaster.

Hyperion

hyperion-project.eu

Tønsberg Pilot Case

Tønsberg, founded in the Viking-period, is one of Norway's oldest towns dominated by a cliff with steep sides. Although almost destroyed in 1503, its structures and remains from buildings are still preserved.

Challenge

The city needs to be preserved with long term plans for restauration and reconstruction of buildings and monuments.

Innovative solution

Hyperion is developing a high-resolution digital terrain model, based on images and data, for comparison purposes and analysis.

Venice Pilot Case

The City of Venice was inscribed in the UNESCO World Heritage List in 1987, in recognition of its unique historical, archaeological, urban and artistic heritage and exceptional cultural traditions.

Challenge

The main building materials (stone and marble, brick, wood, metal, plaster) of the city are subjected to chemical variations and exogenous physicists.

Innovative solution

Hyperion is developing and testing control systems to monitor the deterioration of the city and of its lagoon area.

ARCH SAVING CULTURAL HERITAGE

savingculturalheritage.eu

Camerino Pilot Case

Camerino is a small town surrounded by hills and mountains, and features medieval roads as well as ancient walls expanded during the Roman Age. The city adjoins natural areas in the centre of Italy.

Challenge

The Old Town of Camerino suffered severe damages due to a major earthquake in central Italy in 2016. Many buildings were destroyed or seriously damaged, and all residents and businesses were relocated.

Innovative solution

ARCH is adopting an integrated approach, that includes knowledge sharing and tools development to mitigate the impacts of natural hazards on small Old Towns.

Bratislava Pilot Case

Bratislava is the capital city of Slovakia and, is home to architectural and archaeological heritage (including a medieval city center), as well as monuments and nature.

Challenge

The city lacks information about emergency responses and disaster risk management caused by climate change.

Innovative solution

Bratislava is working to improve emergency response and disaster risk management, especially with regard to heat waves, flooding, and erosion exarberated by climate change.

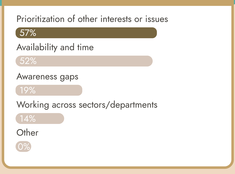
MAIN OUTCOMES

from the interactive session

One word, other than RESILIENCE or CULTURAL HERITAGE, to describe how your project has impacted your city/community?

What challenges (if any) have you faced in community engagement?

What challenges (if any) have you faced in engaging with public administration, practitioners, etc.?



PAINS

- Data Standardisation
- Monitoring real-time systems development
- Activities rebalancing to solve the "resilience paradox"
- Insufficient number of funding opportunities

GAINS

- Citizens engagement
- Development of models and tools for the assessment for climate change impact scenarios
- Guidelines linked to cultural heritage to help decision makers
- Open cultural events for different age groups
- Documents digitalisation

SAVE THE DATE:

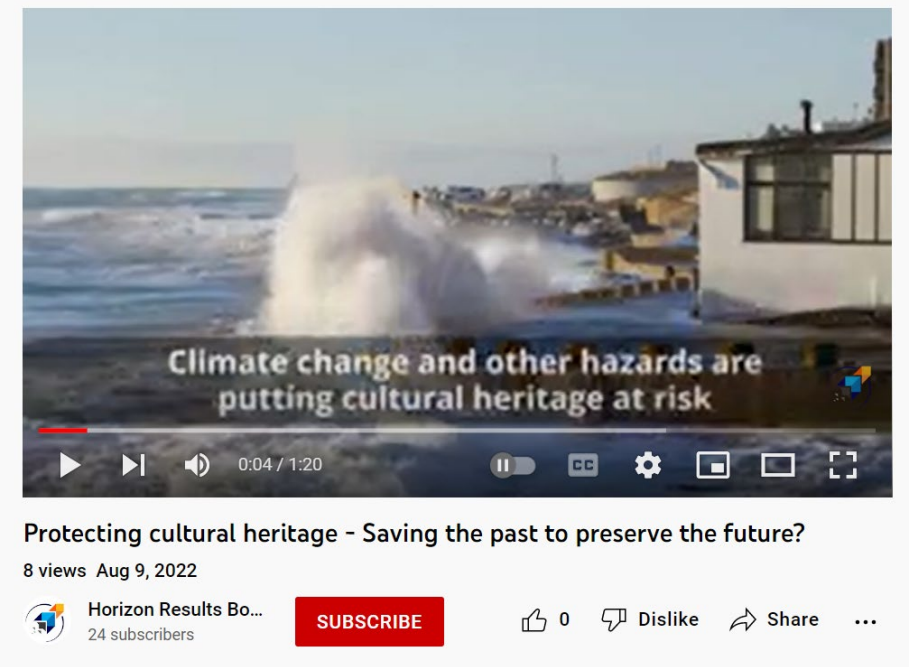
3rd EU Task Force for Climate Neutral and Resilient Historic Urban Districts

3rd of June 2022 | 09:00-14:00 CEST

during ARCH Stakeholder Dialogues in a hybrid form (Thessaloniki, Greece and online)

8.4. Video Pill

The Horizon Results Booster also created a Video "Pill" for the partners, called *Protecting cultural heritage – Saving the past to preserve the future?* The content was shared on social media and played on a loop at events like EURESFO 2021.



8.5. Designed Version of the White Paper from the EU R&I Task Force

The Horizon Results Booster is set to create a co-branded version of the joint white paper, *Paving the Way for Climate Neutral and Resilient Historic Districts*. This will follow the shared visual identity displayed in the previous sections. The co-branded version of the white paper will be published separately after submission of this deliverable, but will be identical regarding context to the version of the white paper included in Annex A.

8.6. Summary of Horizon Results Booster Module B Activities

The final document from the joint Horizon Results Booster, "*Service 1 - Portfolio Dissemination Plan - Project Group: HRB 821282 – SHELTER*" outlines the activities of the Horizon Results Booster undertaken jointly by ARCH along with the other parts of the project group, including project group lead SHELTER as well as HYPERION. The document was produced by the Horizon Results Booster team. As the document is classified as confidential, it is not included in this public deliverable, but was shared with the Commission services, after submission of D2.5

9. Annex C: Results of Task Force Workshops

9.1. Minutes of first task force kick-off meeting

EU Task Force for Climate Neutral and Resilient Historic Urban Districts

KoM Minutes

EU Task Force for Climate Neutral and Resilient Historic Urban Districts

23 June 2021, 13:00 - 16:30

77 participants

Follow-up survey to join Task Force

1. Agenda

13:00	Welcome by Angelos Amditis, HYPERION, Research Director ICCS
13:05	Welcome by Arnoldas Milukas, Head of Unit REA B3.1 – TBC
13:10	Introduction to the purpose of the task force
13:20	Panel discussion – Policy perspective for resilient historic urban districts
14:05	Break
14:20	Introduction to Action 9 of the Partnership for Culture and Cultural Heritage – Urban Agenda for the EU
14:30	Panel discussion – Scientific gaps in achieving resilience for historic urban districts
15:15	On-the-ground challenges for resilient historic urban districts
16:00	Next steps for the task force

2. Minutes

Daniel Lückerath (ARCH, Fraunhofer) welcomes participants to the meeting and presents the agenda

Welcome by HYPERION (Angelos Amditis, Research Director ICCS)

- Underlines the significance of the event and the large amount of participants
- Presentation of the 3 funded project under H2020 programme and joint efforts done by them to have and align common objectives and bring together stakeholders

Welcome by Arnoldas Milukas (Head of Unit REA B3.1)

- Resilience, adaptation, and climate neutrality being combined
- Topics of climate neutral cities and adaptation are at the core of the EU R&I policy
- This task force is timely to contribute to DG R&I
- This task force is not only limited to R&I
    - Need to fill knowledge gaps and provide solutions
    - Include authorities and practitioners
- Goes in line with breaking siloes and creating synergies across science and practice to improve uptake of solutions
- Resilience has tremendous potential as a societal impact, but needs to be addressed in an integrated and sustained way
- Assures readiness for maximum collaboration with this task force

- Following up on existing collaborations

Introduction to the purpose of the task force (Aitziber Egusquiza, SHELTER, Tecnalia)

- Presentation of the motivation which stands behind the task force, based on the idea that resilience in historic areas is a challenge but also an opportunity. The main aim is to bridge the gap between urban development, resilience planning and heritage management. Objectives of the task force are to accelerate dissemination and the uptake of harmonised strategies developed, especially focused on local communities.
- Three thematic area are presented: TA1: develop resilience strategies for historic urban districts; TA: assessing, monitoring and evaluating risk and resilience; TA3: developing equitable solutions for and with communities
- Biannual meetings foreseen
- Governance:
  - First shared by ARCH, HYPERION, SHELTER
  - Add a Technical Core that includes other partners and projects
- Brief overview of the projects and their case studies

FIRST PANEL: Policy perspective for resilient historic urban districts

Speakers: Antonis Kalis (HYPERION, ICCS, Moderator); Maria Yeroyanni (DG RTD); Evangelia Tsartsou (DG ECHO); Maria Chiara Esposito (DG EAC); Erminia Sciacchitano (Italian Ministry of Culture, Minister's Cabinet and G20 for Culture); Andrew Potts (ICOMOS, Coordinator of ICOMOS' Climate Change and Heritage Working Group)

- **Maria Yeroyanni** presents the Horizon Europe Mission on the Climate Neutral and Smart cities, which the objective of reaching 100 climate neutral and smart cities by 2030, as presented in the Report "Proposed mission is 100 climate-neutral cities by 2030".
  The Mission has been also preceded by the H2020 Green Deal topic "Towards Climate-Neutral and Socially Innovative Cities.
  Invitation to participate and follow-up on the results of the EU Research & Innovation Days and the forthcoming Information Days in for Horizon Europe Cluster 5 and Cluster 6.
  Maria presents also the City Science Initiative (CSI) promoted by DG JRC to bridge the science –policy gap. The initiative support a network of City Science Officers (CSO). H2020 projects and cities can register to the network

and suggests organising next task force meeting together with this initiative. Connections with initiatives like New European Bauhaus

- **Evangelia Tsartsou** Mentions besides climate change other type of natural hazards. Copernicus emergency services as a support tool for disaster risk management. Presentation of the PEARL project on application of NBS in cultural heritage. Recommendations for National Risk Assessment for Disaster Risk Management in EU
  She stress the need to develop methodologies and models, identify, and evaluate resilience scenarios and projections etc. where CH is included.
  She highlights it is very difficult to identify and measure cascade risks and effects. It is difficult to develop a common methodology for CH. Indeed there is a lack both at policy and methodology level; for example, how to have economic evaluation for CH loss (economic, social losses)? We have it now for eco-system services but not for CH
  https://ec.europa.eu/echo/sites/default/files/overview_of_natural_and_man-made_disaster_risks_the_european_union_may_face.pdf
  https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC1220(01)&from=EN
  https://publications.jrc.ec.europa.eu/repository/handle/JRC114650

- **Maria Chiara Esposito.** Presents the OMC Open Method of Coordination (promoted by DG EAC with experts from EU Member States) and specifically two groups working on i) resilience of cultural heritage towards climate change and ii) cultural dimension of sustainable development.
  She also mentions two calls launched yesterday on climate change and cultural heritage on materials and technologies and Various Horizon Europe calls under the Cultural Heritage cluster of Horizon Europe (CLUSTER 2). She highlights the importance of exchanging this kind of information and make sure this field of research and its future finding can get increasing attention.
  She finally mentions the importance of the networks and partnerships that are fostering collaborations between academia, cultural operators and cultural heritage professionals and particularly in the field of research and training for improving the understanding of skills' changes, future needs and applications in cultural practices. In this context she informs about the ongoing Blueprint project for sectoral skills alliance in the field of cultural heritage, promoted by DG EAC and funded under Erasmus +, named CHARTER, including among its wide Consortium of 27 parners important Universities and networks, such as ENCATC, the European network on cultural management and policy.

- **Erminia Sciacchitano.** Italy has the chairmanship of the G20. The fight of climate change though culture has been added as a topic. Three thematic webinars have been organized and are available online. G20 Culture Webinars. She highlights some key conclusions from the webinars, such as: The urgency for change; Culture as solution to many contemporary challenges; CH as a driver to change, not only as an object affected by CC, but as a driver to support transformational changes; the primary role of cultural institutions; the need to change within the CH sector; the importance of fostering creativity as a tool for problem solving.

  She stress not lose the opportunity of COP 26 and PRECOP 26. The latter will be in Milan to better represent cultural discourse. Stressed the importance of traditional knowledge and community knowledge (including Indigenous communities)

- **Andrew Potts.** Emphasises 2 main points:
  - the first is the lack of attention to the cultural dimension in CC, and this is part of the problem

  In this frame, it is valuable to keep together climate resilience and climate neutrality (see UNESCO Recommendations). Indeed, cultural heritage is an enabler of decarbonisation.
  - The second point is on disattention culture for policy relevance

  For example, the European Green Deal is not considering cultural heritage; reference to culture is indeed missing. This means that all the efforts done are not reaching the high policy level. Part of the problem is the inattention to the cultural dimensions of climate change and climate action, and the failure to pursue culture-based strategies.
  This task force can play a part of filling that gap. It is critical to be policy relevant. European Cultural Heritage Green Paper and ICOMOS Future of our Past Report.
  Here is a link to the new draft World Heritage Committee Policy on Climate Change (it is in Annex I of the linked document): https://whc.unesco.org/archive/2021/whc21-44com-7C-en.pdf

  ICOMOS has been supporting new methodologies for assessing the vulnerability of cultural heritage to climate change. The focus has been on supporting strategies that are based on climate science, incl downscaled climate models for different GHG emissions scenarios; values -based, meaning looking at impacts not only on fabric and attributes but also at the values they carry; and community-led (meaning, allowing diverse stakeholders to indicate what they value about their place and how they would prioritise

impacts and responses). Another key aspect of the methodology is to assess consequences not only for designated heritage but for associated communities https://cvi-africa.org

UNESCO recommendation on the Historic Urban Landscape https://whc.unesco.org/en/hul/ Info on the Celebration of the 10th Anniversary of the 2011 UNESCO Recommendation on the Historic Urban Landscape https://whc.unesco.org/en/events/1596/ Join the Call of Action https://survey.unesco.org/3/index.php?r=survey/index&sid=966989&lang=en

Giuliana De Francesco, European multilateral relations, Italian Ministry of Culture

- Observatory on culture / cultural heritage and climate change in the urban framework. In 2019 published the orientation paper and in 2020 the action plan was launched. The action arise as the cultural sector cannot be duly taken into account in global policies. Currently finalising the database that will be open for consultation/suggestions.

Dr. Jyoti Hosagrahar, Deputy Director, World Heritage Center, Culture Sector, UNESCO

The video of this presentation can be found at this link: https://youtu.be/9QZjQpxyreA .

- Recommendation on the Historic Urban Landscape adopted in 2011. Presentation of the work done by UNESCO and available publication on climate change and World Heritage Properties. There is a new platform of innovative practices and the thematic indicators for culture in the 2030 agenda.
- Culture Urban Future – Global Report (2016) – UNESCO
  - Identifies pressures: urbanization, climate change, natural hazards and events, conflict
  - About a third of World Heritage Cities are coastal or along rivers
  - Coastal heritage sites in particular under threat (e.g. prominent case of Venice)
- Relevant programs and initiatives:
  - World Heritage Cities Programme
  - Urban Notebooks (e-newsletter)
  - World Heritage City Lab

    - World Heritage City Dialogues (virtual platform for site managers, local authorities to meet and exchange)
    - World Heritage Canopy (platform curating local initiatives and actions, practical strategies and solutions addressing sustainable development along with cultural heritage)
    - Thematic Indicators for Culture in the 2030 Agenda
- Fukuoka outcomes 2021
    - 2007 policy document on the impacts of climate change on world heritage properties (currently being updated)
    - UNESCO-ICOMOS-IPCC expert meeting planned for later this year
    - Urban Heritage Climate Observatory

SECOND PANEL: Scientific gaps in achieving resilience for historic urban districts

Speakers: Aitziber Egusquiza (SHELTER, Tecnalia, Moderator); Simona Tondelli (RURITAGE, University of Bologna), Carsten Herman (Adapt Northern Heritage, Historic Environment Scotland), Giuseppina Padeletti (HERACLES, National Research Council of Italy), Alessandra Bonazza (STRENCH, National Research Council of Italy), Johanna Leissner (Chair EU OMC Group Strengthening Cultural Heritage Resilience for Climate Change, German Research Alliance Cultural Heritage, Fraunhofer EU Office)

- **RURITAGE** (https://www.ruritage.eu/) rural regeneration through heritage addressing resilience also from the social and economic perspective (triple dimension of resilience). Through this project, among other aspects we have learned about how to turn challenges into opportunities and manage the large amount of data that is necessary for resilience. A problem is the silos approach: CH, CC, urban planning, have all disconnected data. Another aspect is how to integrate CC and groups of buildings and open spaces in the approach (historic centres as core). They worked with also the use of insurances and incentives according to the specific context. Overall, we suggest exploring the use of screening technologies that help mapping vulnerability in a fast way to later define action points at local ways.
  Build Back Better and traditional techniques are used in SHELTER; but we need also adaptive reuse and Integrate traditional knowledge of people

  Storytelling is also a useful way to gather local knowledge.
  https://adriseismic.adrioninterreg.eu/

- **Adapt Notherm Heritage** shared three tips (https://adaptnorthernheritage.interreg-npa.eu/) from the just ended project.

The first one starting from the knowledge of stakeholders regarding the way that adaptation is happening to climate change. The second is that we focus on adaptation instead of mitigation to reduce uncertainties and to do that we structure at categories accepting that there will be damage/losses and uncertainties. The third is about storytelling which helps interdisciplinary groups to work together as it is not technical expertise what is lacking, it's people taking responsibilities

- **HERACLES** listed the several methodologies for risk assessment developed in Italy and Greece and the challenge on following a holistic approach. Specific monitoring was installed around monuments, developed protocols for damage assessment, propose adaptation measures along with methodology to evaluate the measures. HERACLES approach helps to make informed choices (through the organised availability of multi-risks and multi-sources data) and to prioritize responses and actions for conservation and development
  https://cordis.europa.eu/project/id/700395

- **STRENCH**, focusing on extreme climatic events to support actors involved by producing a GIS tool for web-mapping to improve hazard mapping.
  Knowledge gaps mentioned: downscaling of data and creation of maps to be used at a local level; the vulnerability assessment and multi-risk assessment; to have a view of cultural heritage on its most comprehensive meaning (tangible and intangible) with a focus on preparedness actions looking at the requirements of the users.
  https://www.interreg-central.eu/Content.Node/STRENCH.html

- **Johanna Leissner**, Chair of the OMC Working Group on Climate Change and Cultural Heritage promoted by DG EAC that started in January. One of the first tasks is to understand how CH is included in national strategies for sustainability. To this aim they develop a questionnaire to identify the level in which cultural heritage is considered. There is a lot of fragmentation at the regional level but also at national level. First results are aligned with the aspects mentioned on this meeting. A second task was also related to a survey on good practices examples. Many best practices come from cities on urban regeneration; less examples were received on floods, archaeological sites and research examples. The results are in general in line with the themes discussed in this TF.
  An issue is to keep together both extreme climate events and slow CC effects (gradual deterioration) that are affecting all cultural heritage. We still need

research and relevant quantitative data in regard to the contribution of for example, cultural heritage to fight climate change.

- Other important points are: importance to promote training opportunities; cooperation with decision makers; ensure that CH is integrted in mainstream poloices such as adaptation strategies etc; create a forum for the exchange (suggestion to create a platform to share knowledge and experience) but also an observatory is needed; awareness raising (example no single word is devoted to CH in the new European Green Deal).

  An important point is also related to give more attention to the small cultural heritage at the rural and small towns which are also threaten without much attention given.

Discussions:

- Question from Aitziber, what should we start with? Simonea, may be looking at how to manage the large amount of data available to make it accessible and easy to share. Alessandra suggests focussing on creating awareness at the wider political level.
- Efren from TECNALIA, the downscaling of data is a challenge. However, increasing resolution is not always in advantage because it increases the uncertainty of the assessments. The historical data is not informing us enough about future trends, so adaptation is a priority. Flexible adaptation pathways are also interesting to apply in cultural heritage. Carsten adds that the type of data that we are getting in downscaling is not really useful. Variables that are coming from the climate data are not suitable enough for a more detailed scale.
- Emanuela is good to have a follow up meeting or permanent exchange

THIRD PANEL: On-the-ground challenges for resilient historic urban districts

Speakers: Daniel Lückerath (ARCH, Fraunhofer, Moderator); Eleonora Milandri (SHELTER, Ravenna), Uta K. Mense (ARCH, Hamburg), Matthias Ripp (Regensburg), Emilio Servera (ARCH, Valencia), Paraskevi Moraitou (HYPERION, Rhodes), Rebecca Piovesan (HYPERION, Venice)

- **Ravenna.** In SHELTER, focusing on area of Santa Croce (Church and mausoleum). Risks
    - Subsidence brings aquifer levels close to monuments meaning risk of flooding is high
    - Earthquakes
  - Gaps

        - Lack of cooperation between stakeholders (manager)
        - Lack of disaster risk management in UNESCO management plan for city sites
        - No early warning system
        - Outdated pumping system
        - No recent surveys for the area
    - Project work
        - Filled data gaps
        - Structure materials and soil surveys
        - Interdisciplinary monitoring strategy
        - Stakeholder engagement through cultural events
        - Collected historical data from archives
    - Expected outcomes
        - Definition of emergency plans, management plans, preventive conservation plans
        - Urban planning tools
        - Replicable lessons learned
        - Enhanced cooperation

- **Regensburg**
    - Green spaces and riverbanks are considered valuable assets, spaces for recreation
    - Main risks:
        - Extreme heat days (especially in light of widespread hardscaping in the city)
        - Flooding
    - Project work
        - Action plan in the making on energy and climate change
        - Finished Action plan on rain hazards “Heavy Current”
        - Climate Resilience Management
        - Management Plan (2011)
            - 8 working fields
            - Integrative approach
    - What to do with this Task Force
        - Shared definition of resilience
            - Likes SHELTER model but too difficult to use for politicians
        - One-stop place to collect information across projects, thinking long-term after project end dates
        - Development of capacity-building efforts

        - How to integrate resilience with other concepts like sustainability -- combined action because in cities, combining them is going to inherently be the approach
        - Heritage as a powerful contributor in the resilience narrative, not merely an asset to protect, but a part of the solution.
        - Would be happy to develop this as part of this Task Force's narrative

- **Rhodes**
    - Hazards
        - Earthquakes
        - Storm surges, flooding
        - Civil fire
        - Strong wind and storms
        - Heat
    - Context
        - Sandy limestone: porous and not homogeneous
        - Primary building materials: stone, wood, iron
        - Waterfront location
    - Project work
        - HYPERION
        - Life-IP AdaptinGR

- **Hamburg**
    - Context
        - Largest harbor city in Germany
        - World Heritage Site is in city center
            - Lack of green space
        - Area of focus: Speicherstadt and Kontorhaus District
        - Gap: Impacts on heritage areas not mentioned in Hamburg Climate Plan
    - Hazards and Impacts
        - Temperature rise (avg of +1.4 degrees C)
            - Heavy precipitation
            - Flooding
        - Extreme temperatures
            - Drought
        - Sea level rise
            - Coastal flooding
    - Aims

        - Focus on integration of adaptation into management plan for the heritage sites (needs to be revised)
        - Improve monitoring of impacts on built urban fabric (wooden piles)
        - Increase community awareness

- **Venice**
    - City lies on 118+ small islands resting on clay “caranto” layer
    - Hazards
        - Tidal effects - high water “aqua alta”
        - Drawing of groundwater
        - Wave motion - subsidence
        - Air pollution (heavy metals)
        - Mass tourism
        - Erosion of lagoon bed
    - Actions
        - High water
            - Changes of building materials
            - MOSE structure
        - Wave motion
            - Maintenance of masonry
            - Cruise ships banned
            - Monitoring of tidal levels, water traffic
            - Monitoring of air quality

- **Valencia**
    - Challenges:
        - Gaps in scientific knowledge
        - Complex governance
        - Lack of adequate funding for actions
        - Not prioritised
        - Avoiding maladaptation
        - Very long-term planning
        - Greenwashing
        - Additional stressors like construction and infrastructure expansion
    - Further resources:
        - Deliverable 3.3 (City baseline report)
        - Deliverable 3.2 (Local partnership and work plans)

Next steps

- Minutes and materials will be available for download here.
- Formal joining of the task force will be opened after the kick-off, vie this form
- A more operational meeting will take place in early fall, including
    - detailed presentations on approaches to improve the resilience of historic urban districts by the different participants
    - more detailed discussions on potential task force results (e.g. a joint whitepaper)

    ➔ The form of this meeting (face-to-face, hybrid, online) will be made in the coming months depending on the COVID-19 situation

Further reading

https://publications.jrc.ec.europa.eu/repository/handle/JRC114650

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC1220(01)&from=EN

https://publications.jrc.ec.europa.eu/repository/handle/JRC114650

Culture urban future: global report (2016):
https://unesdoc.unesco.org/ark:/48223/pf0000245999

New draft World Heritage Committee Policy on Climate Change:
https://whc.unesco.org/archive/2021/whc21-44com-7C-en.pdf

Other links

https://adriseismic.adrioninterreg.eu/

http://www.heracles-project.eu/

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Christophe	Coudun	European Research Executive Agency (REA)
paolo	vitti	Europa Nostra
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Agnieszka	Smigiel	Fondazione Scuola Beni Attività Culturali
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Efrén	Feliu	Tecnalia Research & Innovation
Intza	Balenciaga	ICLEI
Rose	Ortolani	SOGESCA
Sonia	Giovinazzi	ENEA
Michele	Morici	UNICAM
ludovica	giordano	ENEA
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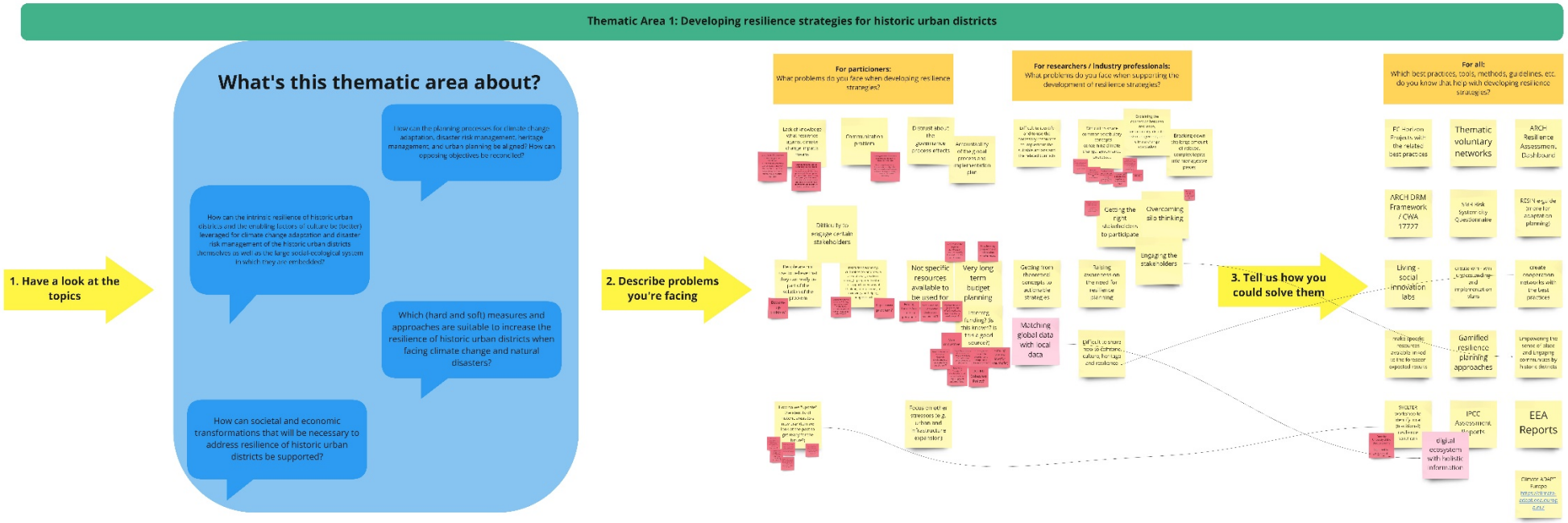
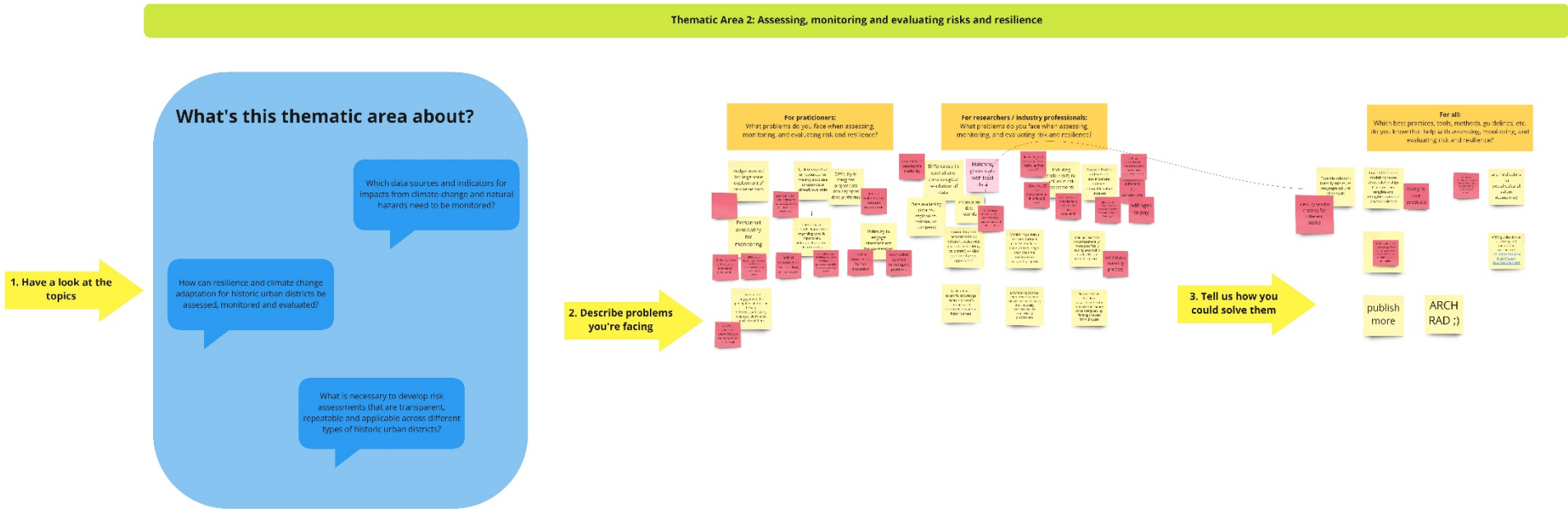
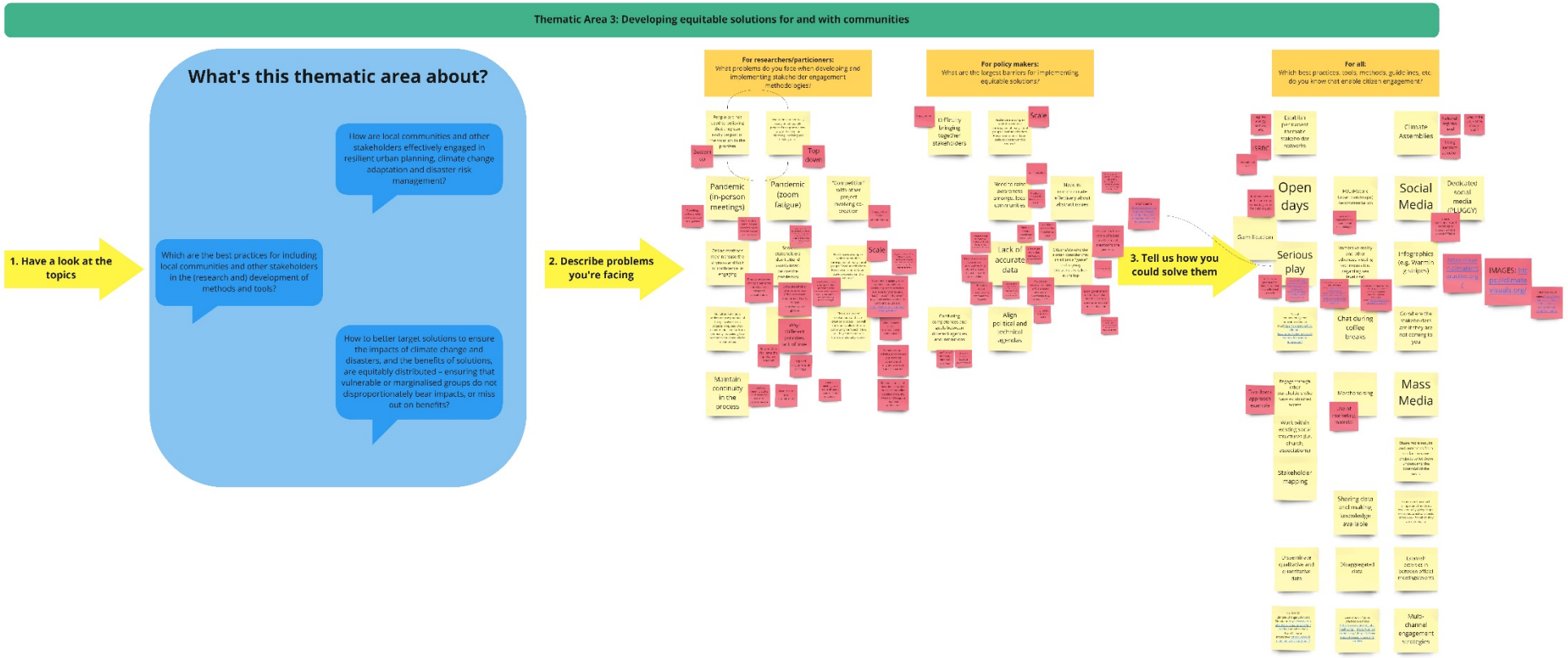
Thomas	Brogren	Realdania
francesca	pajno	Fondazione Scuola del Patrimonio

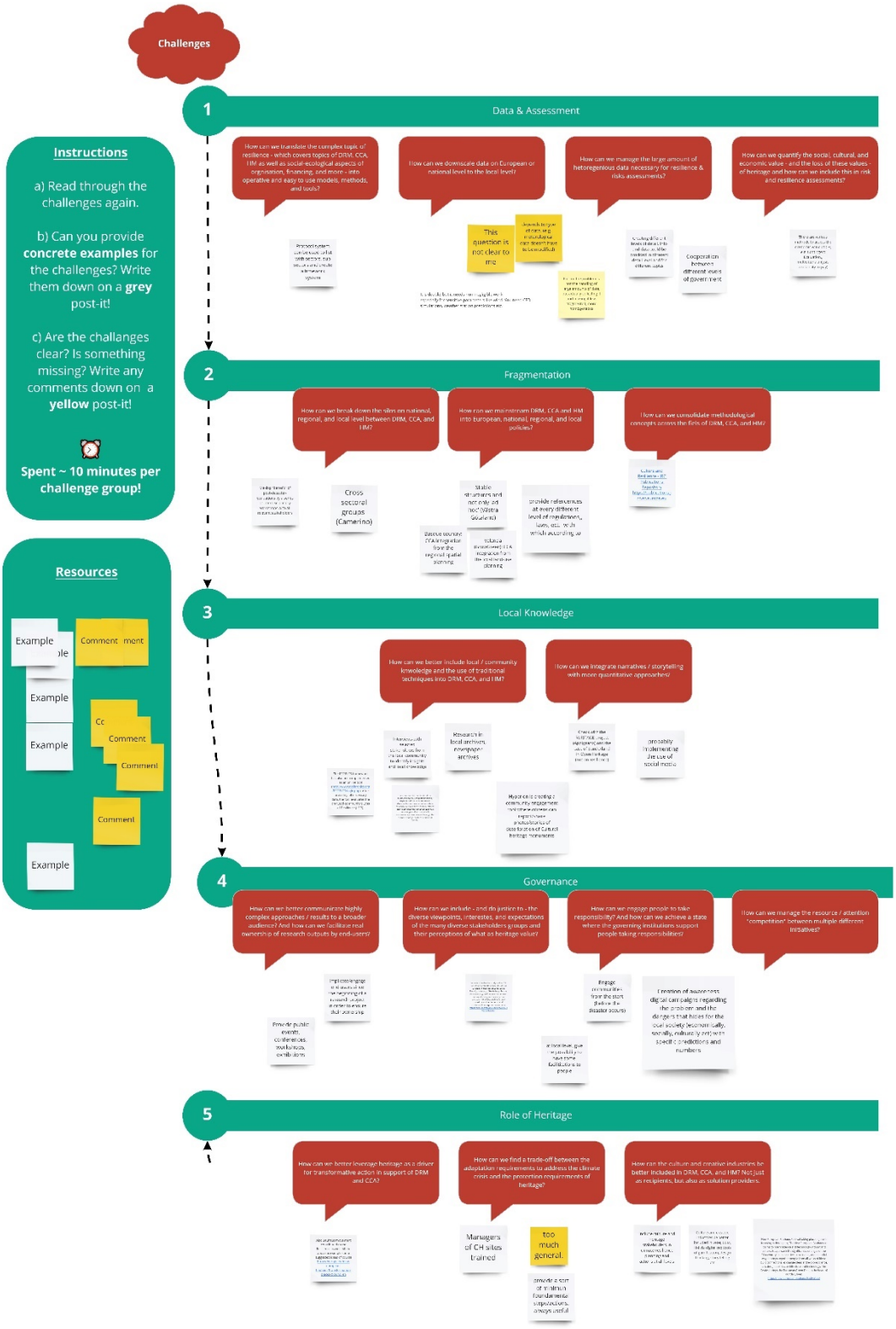
9.2. Miro board from second task force workshop

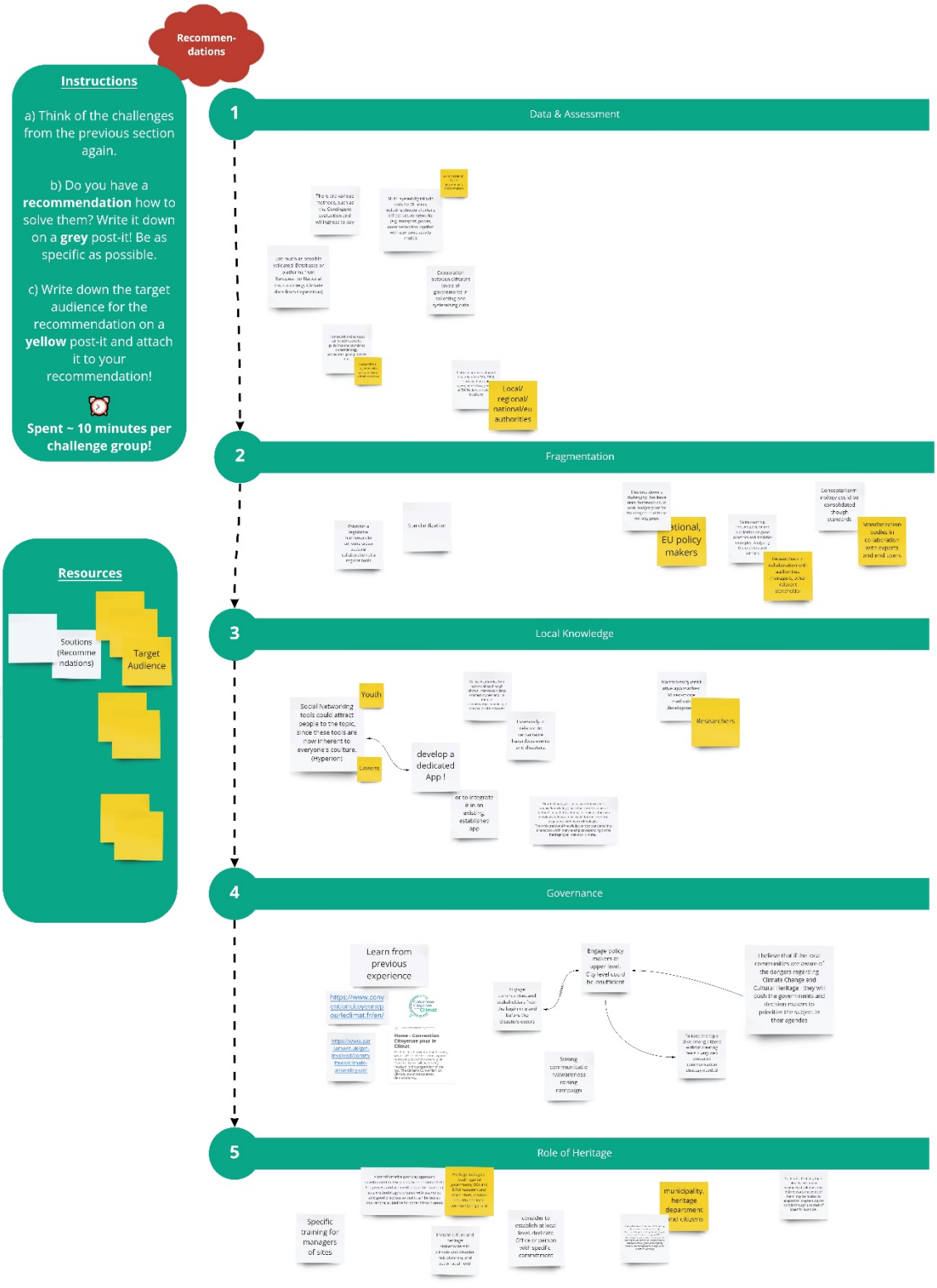



Thematic Area 2: Assessing, monitoring and evaluating risks and resilience
What's this thematic area about?
Which data sources and indicators for impacts from climate change and natural hazards need to be monitored?
How can resilience and climate change adaptation for historic urban districts be assessed, monitored and evaluated?
What is necessary to develop risk assessments that are transparent, repeatable and applicable across different types of historic urban districts?
1. Have a look at the topics
2. Describe problems you're facing
For praticioners:
What problems do you face when assessing, monitoring, and evaluating risk and resilience?
For researchers / industry professionals:
What problems do you face when assessing, monitoring, and evaluating risk and resilience?
For all:
3. Tell us how you could solve them
publish more
ARCH RAD ;)


Thematic Area 3: Developing equitable solutions for and with communities
What's this thematic area about?
How are local communities and other stakeholders effectively engaged in resilient urban planning, climate change adaptation and disaster risk management?
Which are the best practices for including local communities and other stakeholders in the (research and) development of methods and tools?
How to better target solutions to ensure the impacts of climate change and disasters, and the benefits of solutions, are equitably distributed – ensuring that vulnerable or marginalised groups do not disproportionately bear impacts, or miss out on benefits?
1. Have a look at the topics
2. Describe problems you're facing
For researchers/particioners:
What problems do you face when developing and implementing stakeholder engagement methodologies?
For policy makers:
What are the largest barriers for implementing equitable solutions?
3. Tell us how you could solve them
For all:
Which best practices, tools, methods, guidelines, etc. do you know that enable citizen engagement?
Pandemic (in-person meetings)
Pandemic (zoom fatigue)
Top-down
Scale
Lack of accurate data
Align political and technical agendas
Open days
Serious play
Gamification
Chat during coffee breaks
Social Media
Climate Assemblies
Mass Media
Infographics (e.g. Warming stripes)
Stakeholder mapping

9.3. Miro board from third task force workshop




Recommen-dations
Instructions
a) Think of the challenges from the previous section again.
b) Do you have a recommendation how to solve them? Write it down on a grey post-it! Be as specific as possible.
c) Write down the target audience for the recommendation on a yellow post-it and attach it to your recommendation!
Spent ~ 10 minutes per challenge group!
Resources
Soutions (Recommendations)
Target Audience
1
Data & Assessment
Local/ regional/ national/eu authorities
2
Fragmentation
tional, EU policy makers
3
Local Knowledge
Youth
Social Networking tools could attract people to the topic, since these tools are now inherent to everyone's couture. (Hyperion)
Citizens
develop a dedicated App !
Researchers
4
Governance
Learn from previous experience
5
Role of Heritage
Specific training for managers of sites
municipality, heritage department and citizens

10. Annex D: Project mapping

Acronym	Name	Website	Comment
Adapt Northern Heritage	Adapt Northern Heritage	https://adaptnorthernheritage.interreg-npa.eu/	Joint session with SHELTER and HYPERION at Adapt Northern Heritage conference in 2020
ARKWORK	ARKWORK	https://www.arkwork.eu/	Participation by partner RFSAT
Clever Cities	Clever Cities	https://clevercities.eu/	Participation by partners Hamburg, Tecnalia, and ICLEI
CLIC	Circular models leveraging investments in cultural heritage adaptive reuse	https://www.clicproject.eu/	Joint workshop at Mannheim 2020
COST Action 19139 PROCLIAS	Process-based models for climate impact attribution across sectors	https://www.cost.eu/actions/CA19139	Participation by partners RFSAT
FORESEE	Future Proofing Strategies for Resilient Transport Networks Against Extreme Events	https://foreseeproject.eu/	Participation by partner Fraunhofer
GrowGreen	Green Cities for Climate and Water Resilience, Sustainable Economic Growth, Healthy Citizens and Environments	https://growgreenproject.eu/	Participation by partners Tecnalia and LNV

HYPERION	Development of a Decision Support System for Improved Resilience & Sustainable Reconstruction of historic areas to cope with Climate Change & Extreme Events based on Novel Sensors and Modelling Tools	https://www.hyperion-project.eu/	ARCH sister project
ILUCIDARE	International network for Leveraging sUccessful Cultural heritage Innovations and Diplomacy, cApacity building and awaREness raising		Participation at ILUCIDARE Playground 2019
KERES	Protecting Cultural Heritage from Extreme Climate Events and Increasing Resilience	https://www.imw.fraunhofer.de/en/research/technology-transfer/innovation-acceptance/projects/keres.html	Participation of partners Hamburg, exchanges between Fraunhofer, Hamburg and KERES project, participation of KERES at ARCH Final Event
OpenHeritage	Organizing, Promoting and ENabling HEritage Re-use through Inclusion, Technology, Access, Governance and Empowerment	https://openheritage.eu/	Joint workshop at Mannheim 2020
ProCultHer	Protecting Cultural Heritage from the Consequences of Disasters	https://www.procultther.eu/	Exchange via partners ENEA, UNICAM, and Camerino
RESCult	Increasing Resilience of Cultural heritage: a supporting decision tool for the safeguarding of cultural assets.	https://www.rescult-project.eu/	Exchange via ARCH ESAB member
RESILOC	Resilient Europe and Societies by Innovating Local Communities	https://www.resilocproject.eu/	Exchanges via joint participation in CEN Workshop Agreement,

			participation of RESILOC at ARCH Final Event
ROCK	Regeneration and Optimisation of Cultural heritage in creative and Knowledge cities	https://www.rockproject.eu/	Participation in ROCK session at ILUCIDARE Playground and as online exhibitor at ROCK Open Knowledge Week 2020
RURITAGE	Rural regeneration through systemic heritage-led strategies	https://www.ruritage.eu/	Participation in RURITAGE session at ILUCIDARE
SHELTER	Sustainable Historic Environments Holistic Reconstruction through Technological Enhancement and Community-based Resilience	https://cordis.europa.eu/project/rcn/223273/factsheet/en	ARCH sister project
STRENCH	Strengthening Resilience of Cultural Heritage at Risk in a Changing Environment through Proactive Transnational Cooperation	https://www.interreg-central.eu/Content.Node/STRENCH.html	Exchanges via EU R&I Task Force, participation of STRENCH hat ARCH Final Event
UNCHAIN	Unpacking climate impact Chains. A new generation of action – and user-oriented climate change risk assessments	https://www.unchain.no/	Participation by partner Fraunhofer