ARCH

ARCH D2.4

Standardisation Strategy

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Executive Summary

The aim of this report is to provide an overview of the strategy for standardisation within the EU-funded ARCH project, which follows a specific methodology that includes among others the identification of standardisation potentials, the initiation of new standardisation activities as well as the promotion of these standardisation activities.

The previously conducted analysis of existing standards and ongoing standardisation activities in task 7.1 (ARCH D7.1 Report 6: Existing standards and regulatory frameworks) was used together with an analysis of the external as well as internal project environment, and standardisation workshops to identify five standardisation potentials. Based on the standardisation options available, the ARCH standardisation strategy resulted in one standardisation potential being followed directly; in this case, by developing a new standard on the topic. All the conducted standardisation activities within ARCH are described in more detail in this report.

A major outcome of the project is the development of the CEN Workshop Agreement (CWA) 17727 "*City Resilience Development – Guide to combine Disaster Risk Management (DRM) and Climate Change Adaptation (CCA) – Part 1: Historic Area".* The document describes the combined Disaster Risk Management and Climate Change Adaptation Framework developed in ARCH. A variety of other stakeholders joined this standardisation activity, besides the ARCH project partners, through workshops and other public opportunities for input. Furthermore, to promote all identified standardisation potentials and to foster an uplift of CWA 17727 on European and international level, a liaison with the European standardisation committee CEN/TC 465 has been established. In addition, several promotional activities supported the dissemination and exploitation of the standardisation activities within ARCH, including a public commenting phase and two webinars on the CWA 17727, as well as participation in conferences and the publication of scientific articles on ARCH standardisation activities in general.

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List of Abbreviations

Abbreviation	Meaning
ACC-CG	Coordination Group Adaptation to Climate Change
AFNOR	French National Standard Body
AWI	Approved new Work Item
CCA	Climate Change Adaptation
CD	Committee Draft
CEN/TC	European Technical Committee
CEN/TR	CEN Technical Report
CEN/TS	Technical Specification
CIB	Committee Internal Balloting
DRM	Disaster Risk Management
EC	European Commission
EFTA	European Free Trade Association
HArIS	ARCH Historic Area Information System
ISO/TC	International Technical Committee
NWIP	New Work Item proposal
prEN	draft standard
rev	revision
RAD	ARCH Resilience Assessment Dashboard
RMI	ARCH Resilience Measures Inventory
SIS	Swedish National Standard Body
SC	Sub-Committee
THIS	ARCH Threats and hazard Information System
UNI	Italian National Standard Body

1. Introduction

ARCH is a European-funded research project that aims to enhance the resilience of areas of cultural heritage to climate change-related and other hazards. Within the project, tools and methodologies are developed with the pilot cities of Bratislava, Camerino, Hamburg, and Valencia, in a co-creative approach with local policy makers, practitioners, and community members. The results will be combined into a collaborative disaster risk management platform for local authorities and practitioners, the urban population, and international expert communities. A range of models and methods will be developed to support decision-making at appropriate stages of the management cycle. The results of the co-creation processes with the pilot cities will be disseminated to a broader circle of other European municipalities and practitioners, in particular through the channel of European standardisation.

ARCH developed a standardisation strategy to conduct goal-oriented standardisation activities that ensure ongoing impact of the project and its results. To begin, the current standardisation portfolio and the external as well as internal project environment were analysed. The challenges and needs of the project partners were identified and the standardisation options evaluated. A decision on standardisation activities was made by providing specific reasons for using standardisation options for transferring the identified standardisation potentials. In this strategy document, the standardisation activities are described in detail as well as the related promotional activities.

1.1. Relation to other deliverables

D7.1 Existing standards and regulatory frameworks (DIN) (M6): The state-of-the-art analysis of the standardisation landscape set the basis for the standardisation strategy.

D7.3 ARCH disaster risk management framework (Fraunhofer) (M12): The report displays the connection between all ARCH tools. It is relevant for this report, because the project partners decided to initiate standardisation activities on the Framework.

Other deliverables on the ARCH tools were reviewed to get a more detailed understanding of the tools, e.g. D4.1 Historic Area Information System, D4.2 Threats and Hazard Information System, D4.4 Knowledge and Information Management System for Decision Support.

1.2. Structure of this report

In Section 2 the overall methodology of the standardisation strategy is described and Section 3 lays down the foundation by giving an overview of the thematically related Standardisation Technical Committees as well as the know-how and tools of the ARCH project. This information is key for the later identification of standardisation activities. Section 4 provides a summary of the standardisation tools that are available to the ARCH project and Section 5 describes the standardisation potentials identified in the project as well as the decision regarding which tools from Section 4 were used. All conducted standardisation activities are detailed in Section 6 and the promotion of those activities is presented in Section 7. Section 8 concludes this report.

2. Methodology

The ARCH project implements standardisation using an approach consisting of five steps: (1) analysing the existing standardisation landscape; (2) identifying end-user needs and standardisation gaps; (3) defining a standardisation strategy to implement the identified standardisation potentials; (4) conducting the standardisation activities; and (5) promoting these activities. Figure 1 summarises these activities and displays them in relation to each other.

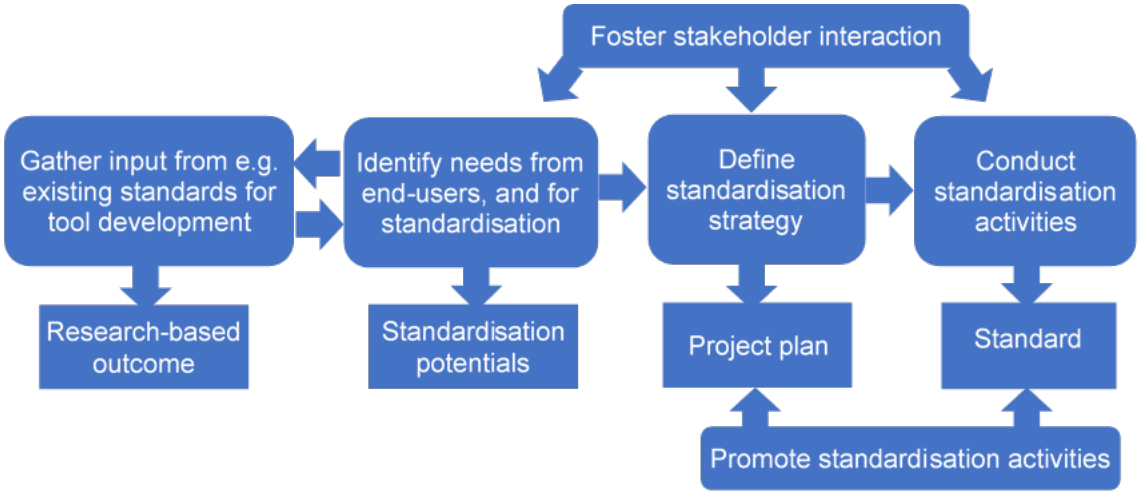

Figure 1: Approach for standardisation in ARCH (see Lindner et al., 2021[1])

With regard to the standardisation strategy, the following goals are envisaged to be achieved:

- transfer of project results into standardisation,
- preparation of materials that ensure that resilience of historic areas can be improved in a systematic way,
- ensure the practical applicability and reproducibility of results, and
- involve relevant stakeholders to achieve broader acceptance of project results.

To identify the standardisation potentials, the review of the existing standardisation landscape relevant for ARCH (see D7.1 Report 6[2]) was compared with the needs of the project partners. Afterwards, the standardisation potentials of the ARCH tools and results were analysed. Then the project partners investigated the different standardisation tools available and agreed on a standardisation strategy to address and move forward on the identified standardisation potentials.

During this process project-external stakeholders, such as other projects and standardisation committees (see Section 3.1) were consulted. As a result, new standardisation activities were identified as next steps. One such activity was the development of a project plan for a CEN

[1] Lindner, R.; Lückerath, D.; Milde, K.; Ullrich, O.; Maresch, S.; Peinhardt, K.; Latinos, V.; Hernantes, J.; Jaca, C. The Standardisation Process as a Chance for Conceptual Refinement of a Disaster Risk Management Framework: The ARCH Project. Sustainability 2021, 13, 12276; see https://www.mdpi.com/2071-1050/13/21/12276

[2] https://savingculturalheritage.eu/fileadmin/user_upload/Deliverables/ARCH_D7.1_SotA_report_6_standards.pdf

Workshop (see Section 4.2 and 6.1). The development of the standard on one of the identified standardisation potentials uses, validates, and enhances an existing project tool with the support of a wider range of stakeholders, thus effectively implementing co-creation in the standardisation process. The process of a CEN Workshop supports this, as it offers with its flexible and open process environment several possibilities to engage with relevant stakeholders concerned. Finally, the promotion of standardisation activities, and especially the development of the envisaged CEN Workshop Agreement, is furthermore crucial to bring the developed standard to its target group and to foster an uplift of the document within the standardisation system.

3. Environmental analysis

This Section presents the Standardisation Technical Committees relevant to the work area of the ARCH project and the technical solutions developed through ARCH. An overview of the ARCH project partners' expertise is also described to display an overview of the technical know-how behind the later identification of the ARCH standardisation activities. The project's external landscape (e.g., existing standards) and internal environment are examined to identify factors that influence its standardisation work.

3.1. Project external – Technical Committees

The heart of the standardisation system are Technical Committees (TC) that develop standards, reports and specifications for humankind to facilitate cooperation and communication. Technical Committees bring together experts to agree on requirements for products, services, or processes. The TCs that standardize technical content which is relevant for the ARCH project are divided into four categories:

- sustainability and resilience,
- conservation of cultural property,
- climate change adaptation/mitigation, and
- disaster risk reduction.

Technical Committees on Sustainability and Resilience

There are two TCs that develop standards on relevant overarching topics like sustainability and resilience: **CEN/TC 465[3] and ISO/TC 268[4] on Sustainable Cities and Communities.** The Technical Committees cover the development of requirements, frameworks, guidance and supporting tools and techniques. CEN/TC 465 was established in 2020 to foster this work on the European level and to develop holistic and integrated approaches in response to the needs of European Cities and Communities in both rural and urban areas. The French National

[3] https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:2691595&cs=1B4B2B4D071921D6418AE8D855A9F8585

[4] https://www.iso.org/committee/656906.html

Standardisation Body (AFNOR) acts as the secretary, and the ARCH project partner ICLEI European Secretariat is the technical chair of the Technical Committee.

CEN/TC 465 is dedicated to supporting the implementation of Europe's sustainability ambitions and policies, and the position of Europe as a global leader in local sustainability solutions which implement the EU Green Deal and the EU Urban Agenda. The international counterpart ISO/TC 268 has a similar focus but works worldwide. Worth noting is that this counterpart has the same secretary, AFNOR.

The published standards from ISO/TC 268 focus on the topics presented in Figure 2. The International Committee is presented due to the novelty of CEN/TC 465.

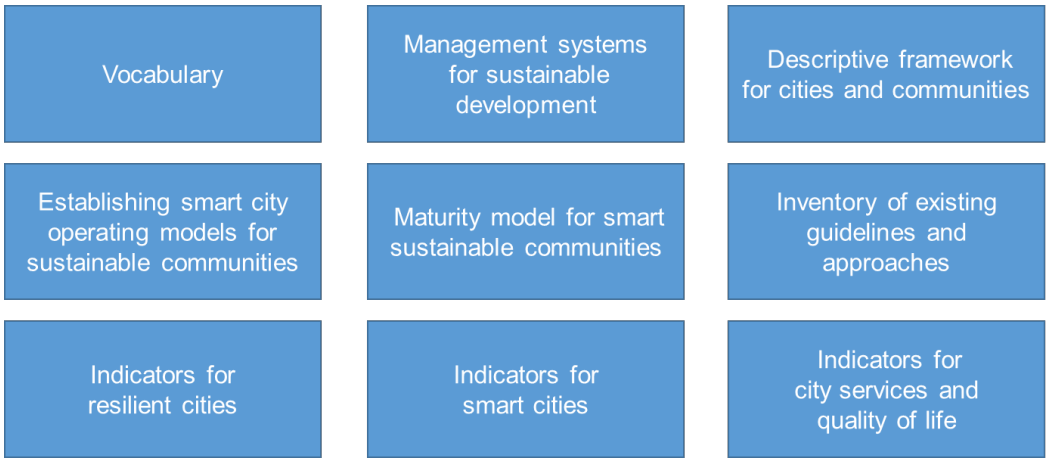

Figure 2: Topic excerpt of the published standards of ISO/TC 268

Technical Committees on Conservation of Cultural Heritage

The ARCH project with its focus on historic areas is also connected to **CEN/TC 346 Conservation of Cultural Heritage**[5], which concentrates on the characterisation of materials, processes, practices, methodologies, and documentation of tangible cultural heritage to support its preservation, protection, and maintenance. Its work area includes the characterisation of deterioration processes and environmental conditions for cultural heritage and the products and technologies used for the planning and implementation of their conservation, restoration, repair, and maintenance. The Italian National Standardisation Body (UNI) is the secretary of the Technical Committee, and no ARCH project partner is participating in it.

The published standards from CEN/TC 346 focus on the topics presented in Figure 3.

[5] https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:411453&cs=1CF54B40A1F71DDBD7991221E377664AE

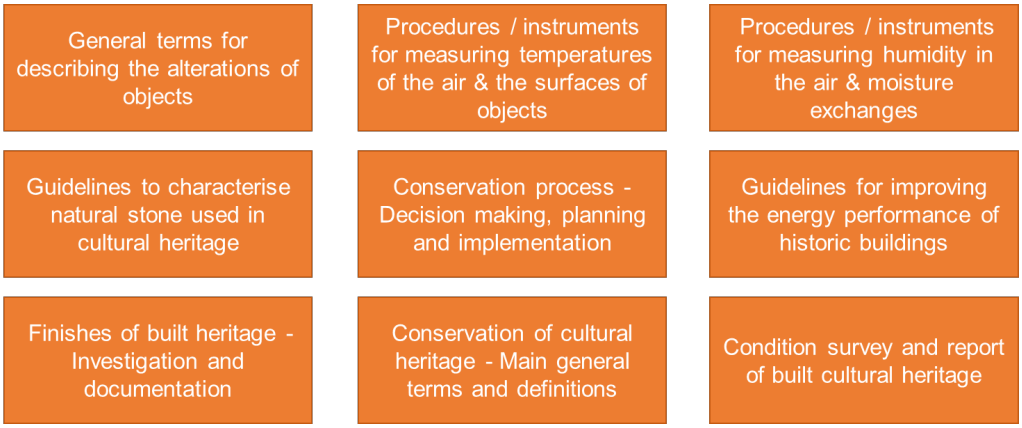

Figure 3: Topic excerpt of the published standards of CEN/TC 346

Technical Committees on Climate Change Adaptation and Mitigation

Standardisation activities concerned with Climate Change Adaptation and Mitigation take place in the following Technical Committees: **CEN/SS S26[6] and ISO/TC 207[7] Environmental management.**

The International Technical Committee 207 is a rather large Committee with seven sub-committees, while CEN/SS S26 mainly transfers the International Standards to the European level into EN ISO documents. Standardisation in the field of environmental management deals with environmental and climate impacts, including related social and economic aspects. The secretary of ISO/TC 207 is the Standards Council of Canada (SCC) and the ARCH project partner Fraunhofer is active in Sub-Committee 7, the focus of which is listed below:

The seven sub-committees focus on:

- ISO/TC 207/SC 1 Environmental management systems,
- ISO/TC 207/SC 2 Environmental auditing and related environmental investigations,
- ISO/TC 207/SC 3 Environmental labelling,
- ISO/TC 207/SC 4 Environmental performance evaluation,
- ISO/TC 207/SC 5 Life cycle assessment,
- ISO/TC 207/SC 7 Greenhouse gas management and related activities.

The published standards from ISO/TC 207/SC 7 focus on the topics presented in Figure 4.

[6] https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:6339&cs=1AD7507557F50522E0C87C90D7994A0CF

[7] https://www.iso.org/committee/54808/x/catalogue/

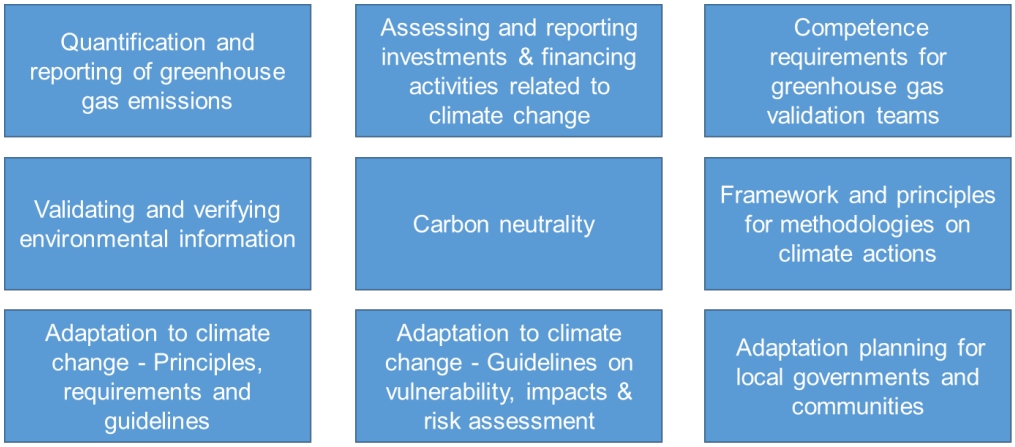

Figure 4: Topic excerpt of the published standards of ISO/TC 207/SC 7

CEN-CENELEC Coordination Group "Adaptation to Climate Change" (ACC-CG)[8]

The European Commission requested (M/526) that European Standardisation organisations contribute to building and maintaining more climate-resilient infrastructure throughout the EU in three key sectors identified in the *EU Strategy on Adaptation to Climate Change*: Transport Infrastructure, Energy Infrastructure and Building/Constructions[9]. The European Standardisation organisations therefore created the *Coordination Group Adaptation to Climate Change (ACC-CG)*. The ACC-CG is currently supporting European Technical Committees in revising several European infrastructure standards. In parallel, guidance tools have been developed which support standard writers in including climate change adaptation (CCA) in standards in a systematic way.

Technical Committees on Disaster Risk Reduction

According to the United Nations, "Disaster Risk Management (DRM) is the application of disaster risk reduction policies and strategies, to prevent new disaster risks, reduce existing disaster risks, and manage residual risks, contributing to the strengthening of resilience and reduction of losses"[10]. The Technical Committees committed to Disaster Risk Reduction are **CEN/TC 391[11] and ISO/TC 292[12] on Security and resilience.**

It must be emphasised that natural hazards have been part of human life since ancient history, however the relative recent evidence of climate change and their probable impacts have naturally interwoven disaster risk reduction and adaptation to climate change communities and work. This has led to the integration of the climate change perspective into Disaster Risk Reduction strategies. At the same time Disaster Risk Management-related actions are often considered in climate change adaptation plans to increase climate resilience[13].

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[8] https://www.cencenelec.eu/areas-of-work/cen-cenelec-topics/environment-and-sustainability/climate-change/

[9] https://ec.europa.eu/growth/tools-databases/mandates/index.cfm?fuseaction=search.detail&id=546

[10] https://www.undrr.org/terminology/disaster-risk-management

[11] https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:680331&cs=1D102578ADD777D09EAC5ED07F4632E32

[12] https://www.iso.org/committee/5259148.html

[13] ARCH D 7.1 Report 2 – Disaster risk management, emergency protocols, and post disaster response

CEN/TC 391[14] and ISO/TC 292[15] Security and resilience deal with aspects of prevention, response, mitigation, continuity, and recovery before, during and after a destabilising or disruptive event. ISO/TC 292 consists of 10 Working Groups (WG), an Advisory Group, and a Communication Group and they developed the majority of the existing standards. The French National Standardisation Body (AFNOR) acts as the secretary of CEN/TC 391 and the Swedish National Standardisation Body (SIS) acts as the secretary of ISO/TC 292. To date no ARCH project partner works in either of the Technical Committees.

The published standards from ISO/TC 292 focus on the topics presented in Figure 5. The white boxes represent sub-categories (e.g. Emergency management – Incident management).

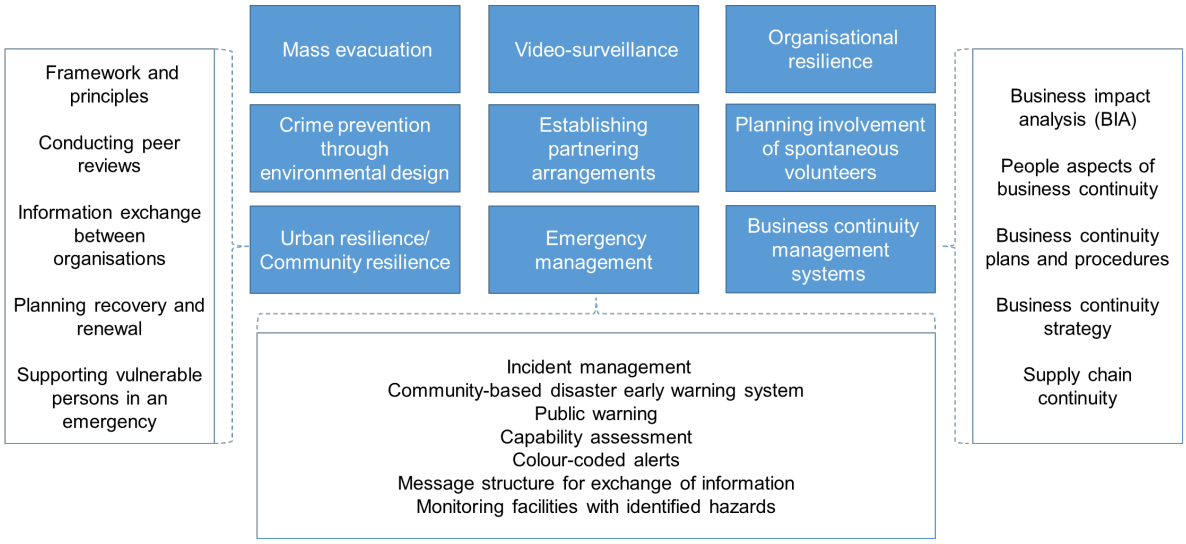

Figure 5: Topic excerpt of the published standards of ISO/TC 292

3.2. Project internal – Expertise and tools

This Sub-Section gives an overview of the ARCH project expertise (see Table 1 to Table 3) as well as a brief summary of the developed ARCH results (see Table 4). The ARCH expertise overview is of relevance when identifying if additional expertise is necessary for the initiation of standardisation activities. The overview of the solutions is important for the determination if the results can be transferred into a standardisation document.

[14] https://standards.cencenelec.eu/dyn/www/f?p=205:7:0::::FSP_ORG_ID:680331&cs=1D102578ADD777D09EAC5ED07F4632E32

[15] https://www.iso.org/committee/5259148.html

ARCH Expertise

Table 1: Research partners and their expertise

Organisation	Expertise
Fraunhofer IAIS	The Fraunhofer Institute for Intelligent Analysis and Information Systems focuses on research and development on innovative systems for data analysis and information extraction, in software and in hardware. The Adaptive Reflective Teams (ART) department of Fraunhofer IAIS focuses on modelling and analysis of systems in the fields of enterprise modelling and analysis, enterprise information integration and preventive security. The models are used in simulation and decision support systems, risk assessment, dependency analysis and visualisation, structural analysis, and resource-oriented planning.
TECNALIA	The “Spatial Development and Urban Sustainability Area” within the “TECNALIA Energy and Environment Division” addresses the challenges faced by industry and society as a result of climate change, from a broad regional sustainability and urban resilience perspective. The team embraces a multidisciplinary team of Biologists, Geographers, Spatial Planners, Engineers, Physics and Environmentalists.
University of Camerino (UNICAM)	UNICAM is active in the field of Geoarchaeology in defining the geomorphological evolution of historical landscapes. Another important activity is the study of natural hazards (earthquakes, landslides, floods) and their relationships with the cultural and landscape heritage.
National Institute of Geophysics and Volcanology (INGV)	The main mission of INGV is the monitoring of geophysical phenomena in both the solid and fluid components of the Earth. Expertise lies within environmental and geotechnical engineering as well as geology.
Research for science, art and technology (RFSAT)	Expert in the telecommunication industry. This includes for example networking and communication systems towards 5G, Virtual/Augmented/Mixed-Reality systems and immersive user interfaces, 3D modelling, ultra-low-power wireless embedded sensing and control, embedded mobile sensing and control, smart infrastructures, hybrid positioning and localisation, Geographical Information Systems (GIS).
Comenius University in Bratislava (UNIBA)	The scientific focus of the Faculty of Natural Sciences is currently mainly aimed at the study of landscape and urban systems, with an emphasis on sustainable development, environmental assessment, and environmental planning.

Organisation	Expertise
Italian National Agency for New Technologies, Energy & Sustainable Economic Development (ENEA)	Public Agency that carries out basic and applied research in the fields of energy, the environment, and new technologies to support competitiveness and sustainable development. Expertise spans from risk analysis to numerical modelling of physical networks, from GIS and geomatics to complexity systems.
SOGESCA	Offers environmental consulting services to public bodies and industrial enterprises.
Municipal Monument Preservation Institute in Bratislava (MÚOP)	MUOP is the municipal monument preservation institution in Slovakia with coordination, advisory and scientific supervision purpose. Expertise lies within architecture and archaeology.
Electronics and Telecommunications Research Institute (ETRI)	ETRI makes contribution to South Korea's economic and social development through research, development, and distribution of industrial core technologies in the field of Information, Communications, Electronics, Broadcasting and Convergence technologies.

Table 2: City partners and their expertise

Organisation	Expertise
Free and Hanseatic City of Hamburg	The Free and Hanseatic City of Hamburg, one of the 16 states of the German federation, is the second largest city in Germany with its 1.8 million inhabitants. In this sense, it is a city as well as a state. The city's main challenge are floods, heavy rain events and changes in the tidal differentials. Expertise lies in architecture, cultural heritage protection and preservation of cultural heritage monuments.
Municipality of Bratislava	The city of Bratislava is the capital of Slovakia and mainly at risk from heat waves, drought, fluvial and pluvial flooding, and extreme weather events. Expertise lies in architecture, cultural heritage protection and preservation of cultural heritage monuments.
Las Naves (LNV)	Las Naves Foundation is an entity promoted by the City Council of Valencia whose aim is to support and promote city's development through innovation in its different aspects. Expertise lies in agri-food systems.
Municipality of Camerino	Camerino is subject to hydrogeological risks and heavy snowfalls, but the main natural threat is the high seismic hazard of the area. Camerino has experience in relation to the repair and seismic improvement of damaged buildings by earthquakes as well as urban planning.

Table 3: Other organisations and their expertise

Organisation	Expertise
ICLEI	The organisation has a strong focus on building capacity, sharing knowledge, and supporting local governments in the implementation of sustainable development at community level. Building on a wide range of experiences in the field of climate protection, sustainable public procurement, integrated management and urban governance, ICLEI Europe often acts as a facilitator between local government, research and the private sector to provide advanced and sustainable technical solutions for the urban challenges of today.
DIN	DIN supports R&D projects with the concept of R&D Phase Standardisation, which covers activities with the aim of early identification of standardisation potential of products and services, establishment of standardisation processes and assistance with public availability of the results of these processes.

ARCH Tools

The main output of the ARCH project will be a coherent, overarching and unified disaster risk management (DRM) framework for historic areas that takes climate change adaptation, heritage management, and social justice into account. Figure 6 visualises the framework and how the ARCH tools described in Table 4 integrate into the framework. More information on the framework can be found in D7.3 *ARCH Disaster Risk Management Framework*[16].

[16] Deliverable 7.3 ARCH Disaster Risk Management Framework

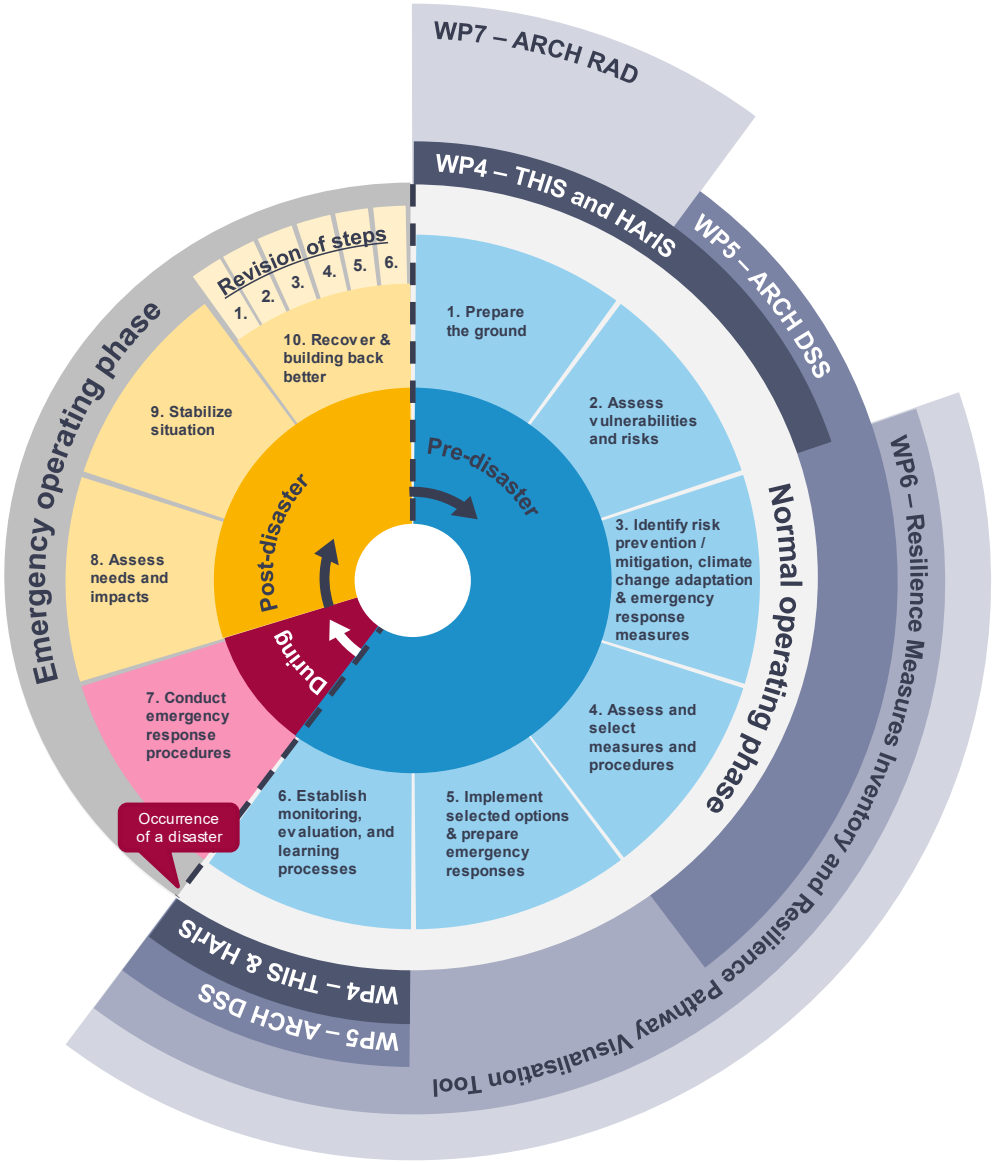

Figure 6: ARCH Disaster Risk Management/Climate Change Adaptation Framework

Table 4: Overview of ARCH tools (incl. recap)

Tool	Recap
Historic Area Information System (HArIS)	HArIS enables end-users to access geo-referenced information about historic and current conditions of historic areas. It links both 3D geometry and material information, where possible, enabling structural resistance and simulated ageing analysis when combined with short- and long-term evolutions of air quality and climate data.
Threats and Hazard Information System (THIS)	THIS enables end-users to access geo-referenced information about historic and real-time environmental threat indicators for historic areas.
ARCH Decision Support System (ARCH DSS)	The ARCH DSS enables end-users to conduct scenario and risk analyses for historic areas with regard to natural hazards. The system combines data gathered from different sources to allow constant monitoring of historic areas. Lastly, the system allows to predict risks and damages/impacts.
Resilience Measures Inventory (RMI)	The Resilience Measures Inventory provides end-users with access to harmonised information about resilience measures. It enables end-users to identify suitable measures to increase resilience for heritage areas.
Resilience Pathway Visualization Tool	The Resilience Pathway Visualization Tool enables end-users to graphically design resilience pathways to build on resilience by identifying, prioritising and sequencing resilience measures for implementation.
ARCH Resilience Assessment Dashboard (ARCH RAD)	The ARCH RAD is a tool for resilience assessment of historic areas. It enables end-users to assess how well the resilience building process, advocated by the ARCH DRM Framework, is implemented in their community and can be used to monitor the resilience improvement process over time. At each step of the process, the ARCH RAD provides users with guidance, additional information, and suitable tools from the ARCH project and beyond.
ARCH HUB	The ARCH HUB is the overall access point and integration platform of all relevant ARCH solutions and information. It is a resilience knowledge base that supports practitioners from municipal administrations, service providers, policy makers, and other local and regional actors with resilience building at the cross section of disaster risk management, climate change adaptation, and heritage management.

4. Strategic standardisation options

This Section provides a brief introduction into the standardisation toolbox available to the ARCH consortium. The choices of the consortium for its standardisation activities were limited to the tools presented in this Section.

4.1. CEN New Work Item Proposal

New documents (European Standard (EN), CEN Technical Specification (CEN/TS), CEN Technical Report (CEN/TR)) that are developed within CEN Technical Committees (CEN/TC) at the European level are usually initiated by a New Work Item Proposal (NWIP), which is commonly proposed by a CEN TC or a corresponding Working Group (WG). The experts within the WG recommend the NWIP to the TC for balloting, and the TC then decides on how to proceed.

The Committee Internal Balloting (CIB) is subsequently started; it constitutes an enquiry with all CEN member states. Each member state has one vote on whether to proceed with the NWIP or not, and they vote according to the outcome of their respective national enquiry. The national experts can leave comments and information about deviating national regulations that should be taken into account and they can volunteer to participate in the work on the European Level if the NWIP is accepted. The TC then determines the outcome of the CIB. Other entities that can propose a NWI are the EC or EFTA Secretariat, international organisations or European trade, professional, technical or scientific organisations or national standardisation bodies of CEN member states. An example could be a NWIP resulting from a standardisation request by the EC. A common misinterpretation is that any person or organisation can propose a NWI at European level. The usual way is to propose the work envisaged at national level to the national standardisation body which then considers whether this work should possibly be carried out at the European level.

When proposing a new work item, it is highly advisable to deliver a first draft of the envisaged document to convince fellow members of a working group to actively collaborate on the topic as well. Once the NWIP is accepted, there is a rather strict time frame to be followed, and the time to the next steps, such as the enquiry, is limited. Besides a comprehensive manuscript, factors to help the adoption of a NWIP are the presentation of the proposed work at an early stage and the personal attendance of TC and/or WG meetings to explain the background of the idea and the plan to implement it. Within European research projects, a NWIP could be a potential deliverable to start new standardisation work that uses the results of the project. Because a first draft is needed, the NWIP is usually scheduled for the end of the project, when deliverables of the partners, which can be used as drafts, exist and can be handed in. Before this, it is advisable to inform the TC that a NWIP is envisaged and to attend a meeting to present the research project and its aims in order to avoid handing in a NWIP to an unknown group of people[17].

[17] CEN/CENELEC Internal Regulations Part 2 – Common rules for standardisation work (2017)

4.2. CEN Workshop Agreement

CEN Workshop Agreements (CWA) can be initiated and developed by consortia that are not members of CEN Technical Committees (CEN/TC). If there are for example precise standardisation potentials and ideas that have been derived from the results and/or deliverables of a research project, the development of a standardisation document is a way to spread the outcomes and to share knowledge with the community.

The development group of a CWA consists of a consortium of partners agreeing to develop a document together. Ideally, all interested and relevant parties are represented. Such a document does not have the same character as a European or International Standard, due to the partly consensus-based process. The draft documents do not have to be published for commenting and thus the consortium does not have to consider the feedback of the general public, but they can, if they want to. Anyhow, publication of the draft document is recommended to increase the acceptance of the document. A CWA has a lifespan of six years and has a "pre-standard" character.

The nature and the procedure of a CWA is described in the CEN-CENELEC Guide 29[18]. A CWA is basically a working platform that is open to the participation of all interested parties to elaborate the CWA. The proposal of a new CWA leads to the creation of a new CEN Workshop. The proposer of a CWA shall prepare a draft project plan and a self-assessment. Furthermore, the proposer has to undertake an analysis of the degree of interest in the subject across different European countries and amongst different stakeholders. In case of a CWA development out of a research project, this is usually done by including the different project partners from all over Europe.

A CWA's project plan contains the CEN Workshop motivation, scope, objectives, the development schedule, and the contact persons. After one month of publication of the Project Plan on the CEN website, a Kick-off Meeting needs to be organised. During the Kick-off Meeting of the CEN Workshop the project plan is confirmed, and the chairperson and the secretariat are elected. The next step is the development phase during which the role of the Workshop participants is to provide input and comments on draft documents. To finalise the CWA, the Workshop participants need to agree on the final document and all organisations that approve the CWA will be listed in the European Foreword[19].

4.3. Liaison

In exchange for an annual fee for a TC and its corresponding Working Groups (WG), a liaison on the European level (CEN) can be established. Organisations then have access to all the committee's documents that have been circulated via a document exchange system, and can attend meetings – however, they cannot vote on work items. Forming a liaison can provide an insight into the TC's work programme and the standardisation landscape of a certain topic. It

[18] CEN-CENELEC Guide 29 – CEN/CENELEC Workshop Agreements – A rapid way to standardisation (2020)

[19] CEN/CENELEC Internal Regulations Part 2 – Common rules for standardisation work (2017)

can also help to identify gaps and be a platform for networking with other experts working in the field. Participation also implies the possibility:

- to propose technical documents for a possible conversion into a CEN deliverable,
- to introduce preparatory work as a support to ongoing standardisation activities,
- to submit technical contributions to the body's meetings and by correspondence, and
- to formulate advice on current and future standards programmes[20].

4.4. Contribution to existing standards

There is also the possibility to contribute to ongoing standardisation activities. A contribution to existing activities and standards should especially be made, if:

- an existing standard or draft standard is inaccurate,
- a standard is hindering innovation, and/or
- standards contradict each other.

The responsible CEN/TC has to be contacted immediately, if a standard hinders innovation or if standards contradict each other. In case of an inaccurate standard, a research project or organisation could improve the standard by taking part in the public commenting phase of the draft document. The CEN[21] and ISO[22] search websites can be used to identify such draft documents in the public commenting phase. An organisation or research project then has to fill out the commenting form and send it to a National Standardisation Body (NSB) that can forward it to the respective CEN/TC before the end of deadline.

4.5. Standardisation forum

Networking platforms, such as STAIR (STAndards, Innovation and Research) [23] or the Smart City Standards Forum[24], aim to bring together standardizers, researchers and innovators in order to discuss and identify standardisation needs and opportunities for a specific area of concern. Usually, platforms are not intended to develop standard-like documents, but rather recommendations for future actions. The starting initiative typically comes from one or more European research project. The functioning of, for example, a STAIR platform follows principles similar to a CEN Workshop:

- a National Standardisation Body (NSB) is committed to take the secretariat,
- direct participation of stakeholders (open to all interested stakeholders),
- duration is limited in time.

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[20] CEN/CENELEC Guide 25 – The concept of Partnership with European Organisations and other stakeholders (2017)

[21] https://standards.cencenelec.eu/dyn/www/f?p=CEN:105::RESET::::

[22] https://www.iso.org/advanced-search/x/

[23] https://www.cencenelec.eu/research/tools/projects/STAIRplatform/Pages/default.aspx

[24] https://www.din.de/de/forschung-und-innovation/themen/smart-cities/smart-city-standards-forum

5. ARCH standardisation potentials

5.1. Identification of standardisation potentials

The needs for standardisation within the project were identified by assessing the project results for their readiness to be transferred into standards and/or for their possible use as input to already existing standards. The challenges and needs, for which standardisation might be a solution, were collected from the project cities and further research partners. In total, 33 representatives of the project partners and the advisory board took part in a standardisation potential workshop during the ARCH General Assembly meeting in December 2020 and identified 18 challenges or needs that were divided into the following topics: 'terminology' (4), 'indicators and measures' (6), 'warning systems' (3) and 'strategy and operations' (5). A follow up workshop in January 2021 summarized the input based on the gaps in the standardisation landscape, the needs identified, and the tools or deliverables developed in the project, which resulted in the identification of in total five standardisation potentials (see Table 5).

Table 5: Overview of standardisation potentials with identified challenges and needs

#	Standardisation Potential	Background	Need addressed
1	Overview of terms and definitions for the resilience of historic areas.	Different international and national standards on terminology.	Overview of terms and definitions in different contexts to have a meaningful conversation.
		There is a variety of terms defining the process of cultural heritage restoration (e.g., renovation, restoration, refurbishment, reconstruction). The use of terms differs per country and profession.	Overview of terms and definitions in different contexts (cultural/scientific) to have a meaningful conversation.
		Different understanding of resilience (bouncing back, bouncing forward, evolutionary).	Overview of terms and definitions in different contexts to have a meaningful conversation. In addition, relating these terms and definitions to each other, to understand when to use which understanding.

#	Standardisation Potential	Background	Need addressed
2	Describing the resilience building of historic areas in cities and communities. This includes characterization of historic areas, indicators for resilience assessment and processes to manage and monitor resilience building.	There are no common and official indicators to measure the resilience of historic areas. There are also no non-quantitative benefits of resilience measures (e.g. improved mental health and wellbeing as a result of place-based attachment to a local site of heritage significance).	Transparent overview of quantitative and non-quantitative outcomes to have a complete picture on the success/failure of the resilience measures that were taken. Suitable proxy quantitative indicators for outcomes that are difficult or impossible to quantify. Guidance on examples of qualitative benefits and their value. Guidance on the limitations of quantitative indicators.
		The definition of resilience depends on the context, it is used in many backgrounds. There are no processes to build resilience and no resilience building management for historic area.	Definition of a common characterization for historic areas. Based on that a harmonised procedure to assess how resilient the historic area is in the context of its socio-ecological system is needed, so that measures can be taken to increase the resilience. Identification of how resilient the historic area is.
		There is no clear process for monitoring climate change adaptation of historic areas. What is monitored? How is the implementation process? Were the adaptation goals achieved?	To guide climate change adaptation efforts, it is necessary to identify ‘what works’, what does not work, why does something work and how does it work. This includes not only direct effects of adaptation measures (e.g., less heat in summer), but also institutional aspects (i.e. learning from the processes of actually implementing adaptation measures). This also includes being able to measure success of adaptation measures in case no hazard materialises (or if the effects of the adaptation measure can only be measured years / decades later).

#	Standardisation Potential	Background	Need addressed
3	Describing the impacts of damages on historic areas caused by climate change related hazards. This includes existing heritage metadata of descriptors for risk assessment.	Missing agreed taxonomies for hazards, characterization of exposed historic areas, metrics and descriptors for vulnerability assessment and climate-change induced damage and impacts.	Unified description of historic areas exposed to hazards. Guideline on how to describe the exposed historic areas, physical damage and functional impact induced by changing climate on historic areas (i.e., definition and/or identification of ontologies, taxonomies, damage metrics for physical damages, KPIs).
		Development of methodologies and tools for the risk assessment and post-event scenario prediction, based on available data, including data from monitoring.	Need of strategies/tools for planning before and after extreme events.
4	Description how to develop, implement and maintain an alert system for historic areas (or input to existing standards on early warning systems).	There are no threat alert systems for historic areas. There are no early warning systems on the effects of climate change on a historic area.	Timely identification of threats to the cultural heritage, so that countermeasures can be taken.
		Preventive measures to minimize risks for historic areas.	Simulation of risk scenarios based on damage data.
5	Approach to involve people and organisations in research projects that are not familiar with such projects. Guideline on how to create a mutual beneficial partnership.	It is difficult to reach farmers and other vulnerable groups and engage them in European research projects. This is a general challenge that we have for almost every aspect of the projects.	Farmers are key stakeholders in ARCH. Farmers and other vulnerable groups to climate change are usually not willing to participate in workshops, and this is even worse in COVID times were all activities taking place online and they might be even more reluctant to take part or be plain impossible to them due to requirements of technology skills and equipment which they might lack.

Evaluation of standardisation potentials

The project partners rated the standardisation potentials using the following criteria: feasibility, transferability, ability to fill a gap, need for the document and desired input from project external partners. The criteria are explained in detail in Table 7. The same evaluation criteria were already successfully used in another project on city resilience (see Lindner et al., 2021)[25]. A "Yes" counted as 1 point and a neutral ranking was counted as 0.5 points. The maximum score was 5, which could be achieved by rating each criterion with a yes. The second standardisation potential (see Table 5) was evaluated best and therefore suggested to be transferred into a new standardisation activity titled "City Resilience Development – Guide to combine Disaster Risk Management (DRM) and Climate Change Adaptation (CCA) – Part 1: Historic Area". Table 6 summarises the assessment conducted. The results of the standardisation potential task have been shared in a small session with projects funded by the same call as ARCH (i.e., SHELTER and HYPERION) to find similarities for the future standardisation activities and to get commitments of support (see Section 7).

Table 6: Overview of assessment of identified standardisation potentials (see Lindner et al., 2021)

Criteria/ Standardisation potential	Feasibility	Transferability	Filling a gap	Need for document	Input from externals desired	Score in points
1	No	Yes	Neutral	No	Yes	2,5
2	Yes	Yes	Yes	Yes	Yes	5
3	Neutral	No	Neutral	Neutral	Yes	2,5
4	No	Yes	No	Yes	Yes	3
5	No	No	No	Neutral	Yes	1,5

[25] Lindner, R.; Jaca, C.; Hernantes, J. A Good Practice for Integrating Stakeholders through Standardisation—The Case of the Smart Mature Resilience Project. Sustainability 2021, 13, 9000; see https://www.mdpi.com/2071-1050/13/16/9000

Table 7: Evaluation criteria description

Criteria	**Description**
Feasibility	The feasibility was checked by requesting the project partners to put down their names for topics that they would volunteer to work on. Factors influencing the decision of the partners were their expertise in the topics proposed (see also Sub-Section 3.2), their capacities regarding time depending on their other obligations within and besides ARCH and the progress on the idea during the ARCH project.
Transferability	The transferability is another key factor in the decision-making process. CEN Workshop Agreements are supposed to consist mainly of requirements and recommendations and should not be company specific. CWAs rather describe general requirements and recommendations of products, processes and services that could potentially benefit the whole community.
Filling a gap	DIN endeavours to accompany the development of documents that fill a gap in order to avoid standardizing the same topic twice and producing conflicts for the users of the document. The analysis of standards was therefore a vital part to ensure that a gap exists (D7.1 *Existing standards and regulatory frameworks*).
Need for document	A key principle of DIN and standardisation is that the need for standards is not only dictated by gaps in the standards repository or DIN itself, but by the stakeholders in the society and the economy. DIN is a privately-run non-profit organisation with the mission of supporting the economy and the society. Therefore, their willingness to participate in developing a standard is an indicator for the need of a new normative document or the revision of existing documents. DIN used the disposition of the project partners to work on a CWA as an indicator for the need of a document within the research community and later further evaluated the needs by contacting the responsible technical committees.
Input from externals desired	The ARCH consortium is aware that for the development of user-oriented solutions it is beneficial to work with a diverse group of people to increase the usability of the solutions. Therefore, the consortium decided that for each standardisation potential it would be beneficial to include project external stakeholders.

5.2. Decision on standardisation activities based on the ARCH standardisation potentials

The potential standardisation options have already been described in Section 4. The identified standardisation potentials (see Table 5) were analysed and reasons for selecting a specific standardisation option discussed (see Table 6). The overview of standardisation options pursued by ARCH is presented in Table 8, the ones not followed in Table 9. Due to its highest ranking, standardisation potential number 2 was chosen to be transferred into a CEN Workshop Agreement (see Section 6.1). However, the other standardisation potentials have not been entirely left out, as these will be further exploited by presenting them to relevant standardisation committees (see Section 6.2).

Table 8: Overview of standardisation tools that were selected and why

Standardisation Tools	#	Reasons for selecting the tool
CEN Workshop Agreement	2	- Sustainability of the results at least for the next 6 years - first step to an EN, CEN Technical Specification or CEN Technical Report - fast and flexible development within the timeframe of the project - direct participation of project internals and externals
Liaison	1 - 5	- feedback from standardisation technical experts on ARCH solutions - input to ongoing activities of the TC based on ARCH standardisation potentials - necessary for ARCH to submit NWIP - invitation of standardisation technical experts to ARCHs dissemination activities
CEN New Work Item Proposal	2	- higher outreach/distribution of the envisaged CWA - uplift to EN standard or similar - higher consensus – European experts voted

Table 9: Overview of standardisation tools that were not selected and why

Standardisation Tools	#	Reasons for not selecting the tool
Contribution to existing standards	1,3,4,5	- probability of acceptance is uncertain - currently no draft standard that fits in the scope of the identified standardisation potentials
Standardisation forum	1 - 5	- already exist on the topic (e.g. CEN-CENELEC-ETSI Sector Forum on Smart and Sustainable Cities and Communities, Smart City Standards Forum)

6. ARCH standardisation activities

This Section details the ARCH standardisation activities that were initiated based on the standardisation tools selected in Table 8.

6.1. CEN Workshop Agreement

The CEN Workshop, the outcome of which will be a CEN Workshop Agreement (CWA) with the number CWA 17727, was constituted during a standardisation kick-off meeting in May 2021. In total, 59 participants took part in this meeting. Finally, 42 persons approved the project plan and are therefore members of a temporary working group called “CEN Workshop ARCH”.

It is notable that only one third of the CEN Workshop members are working within ARCH, five persons are from SHELTER, the sister project of ARCH funded under the same call, and that the other 23 persons are from other cities, ministries, research institutions, consultancies, industries, research projects (RESILOC) and NGOs (such as from the ARCH Mutual Learning Framework[26]). This demonstrates the wide-reaching interest in such activities, and the support for the development of standards through projects like ARCH.

To develop the CWA 17727, the CEN Workshop members as well as ARCH Mutual Learning Framework participants were engaged using mainly online workshops and digital collaboration tools. As the number of participants in the CEN Workshop is relatively high, a core group, consisting of five persons coming from ARCH and one person from the SHELTER project, has been established to guide the standard development and to prepare the interaction with the other CEN Workshop members.

A standard, such as the envisaged CWA, includes different chapters, starting from the introduction, which sets the scene on the topic, and continuing with the scope, a section explaining the aim and target group of the document. The standard also includes relevant terms and definitions, a general description of historic areas as well as the 10 phases included in the DRM/CCA framework. Additionally, a European foreword is provided in which the contributors to the standard are listed. Furthermore, the sections describing the content of the standard are foreseen to be more requirements than recommendations, thus giving the applier of the document a stronger obligation to follow. As the Terms and Definitions section provides relevant terminologies for the resilience of historic areas, another previously identified standardisation potential is also partly answered in the CWA.

The meetings of the CEN Workshop focused on the characterisation of historic areas and the transfer of the steps of the ARCH DRM Framework. The rather research-based output of the ARCH project has been shifted to a more market-oriented output. Thus, the content of the original ARCH DRM Framework has been transferred into the CWA by, at first, providing general information on the steps, requirements for the successful completion of each step, additional recommendations as well as supporting materials and tools. The core group initially

[26] https://savingculturalheritage.eu/mutual-learning

provided proposals for these Sub-Sections, based on the ARCH DRM Framework and have validated, enhanced and complemented them in the CEN Workshop meetings with all members.

The aim of the CWA therefore is to further develop the ARCH DRM Framework, together with a broader community of experts, including municipal staff, and to help practitioners, decision-makers, heritage managers, public administrators, and other actors in the field of DRM, CCA, and historic area management: 1) to acknowledge the need for socially just resilience building activities; 2) to understand which steps are necessary to develop a Resilience Action Plan, which combines both processes (DRM and CCA) and takes needs and opportunities of historic areas into account when building resilience; 3) to provide guidance on how to operationalise the different steps of the Framework; 4) to provide guidance on which stakeholders to involve in each step of the Framework; and 5) to provide a conceptual structure for the use of different supporting tools and materials within the steps of the Framework.

To that end, the input was distributed one week in advance to the CEN Workshop members using the digital brainstorming tool Miro, in which each member had the chance to provide information before the meetings. Within the meetings the contributions were refined, complemented, and directly discussed. Different facilitation methods, such as a world café, were used to ensure constructive interaction among the CEN Workshop members.

Through the different ways of engaging the stakeholders, the steps of the ARCH DRM Framework were significantly advanced, especially with project-external views. Additional feedback was gathered through the publication of the draft CWA 17727 on the CEN Website for public commenting in March 2022. The consortium also organised during this period a Webinar to explain the content of CWA 17727 and a Workshop with the Free and Hanseatic City of Hamburg to get feedback from potential users of the document. The feedback received from these activities was discussed with the CEN/WS members and incorporated into the document. CWA 17727 will be finalized in April 2022 and will be published shortly afterwards.

A CWA has a maximum lifespan of six years, as already mentioned in Sub-Section 4.2. After three years the CEN Workshop members will be contacted and asked if they would like to confirm the document for another three years, revise the document, transfer it into another deliverable or withdraw it from the market. In the case of CWA 17727 the consortium decided to already initiate the transfer of the CEN Workshop Agreement into another standardisation deliverable (e.g., European Standard or Technical Specification). The reasons is that CWAs do not have to be made available in all 34 CEN Member States (optional but not mandatory) and they have a maximum lifetime. The CEN Workshop already presented the prCWA 17727 at the General Assembly of CEN/TC 465 in February 2022 and it was agreed to set up a Liaison to potentially uplift the CWA (see Sub-Section 6.2).

6.2. Liaison with CEN/TC 465

The application for a Liaison with CEN/TC 465 was handed in and accepted in February 2022 after the positive feedback from the technical experts during their General Assembly meeting. The goal of the Liaison is to support the work of CEN/TC 465 with ARCH's city resilience expertise. Thus also providing input to the work programme of the TC, which focuses on this topic. In this frame the ARCH project partners aim to present and discuss with CEN/TC 465

experts the project results and activities (e. g. discussion on the identified ARCH standardisation potentials). After the publication of CWA 17727 a New Work Item Proposal will be handed in to CEN/TC 465 to request the incorporation of the document into another deliverable. Another advantage would be that the maintenance of the document is guaranteed because Technical Committees are permanent committees and not temporary ones like CEN Workshops.

6.3. New Work Item Proposal

Through the liaison with CEN/TC 465 (see Section 6.2), it is possible for a research project such as ARCH to propose a new standard by preparing a new work item proposal. Therefore, it is planned that after the finalization of the CWA 17727, such a proposal will be submitted to CEN/TC 465. Hereby not only the CWA initiated by ARCH, but also the other three existing CWAs on City Resilience Development that were initiated from the SMR project will be taken into account:

- CWA 17300 – City Resilience Development – Operational Guidance
- CWA 17301 – City Resilience Development – Maturity Model
- CWA 17302 – City Resilience Development – Information Portal

CEN/TC 465 has listed in its work plan the need for establishing standards on City Resilience. During the liaison activities with this standardisation committees, city resilience-related activities of the British Institute for Standardisation (BSI) were mentioned. ARCH seeks to analyse, during the remaining time of the project, how these different initiatives can be combined for a joint proposal.

Additionally, it should be noted that a CWA has only a limited duration of six years. To transfer this research-based standardisation document into a standard as part of the standardisation committees, it is necessary to uplift the CWA. Therefore, a new work item proposal is an option to foster this transfer.

7. Promotion of standardisation activities

This Section gives an overview of the promotion activities of the ARCH standardisation activities which include dissemination and exploitation activities.

Table 10: Overview of dissemination and exploitation activities

Promotional activity	Explanation
Workshop with projects funded by the same call (January 2021)	To find similarities for future standardisation activities and to receive input to the identified standardisation potentials of ARCH a dedicated virtual session on standardisation was conducted with the sister projects HYPERION[27] and

[27] https://www.hyperion-project.eu/

Promotional activity	Explanation
	SHELTER[28]. During this exchange, as part of a series of exchanges among the projects, the other projects became aware of the envisaged standardisation activities within ARCH as well as ARCH got information on the other two projects standardisation activities. Due to the COVID-19 situation a physical meeting was not possible at this stage. As HYPERION and SHELTER have not included a standardisation organisation in their project and also had limited resources and activities foreseen for standardisation, partners on these projects were glad that they had the opportunity during this session to get more information on standardisation activities within the topics of climate change, city resilience and historic areas. Furthermore, the ARCH project offered them to participate in the upcoming standardisation activities. Based on these efforts, partners of the SHELTER project joined the development of the CWA within ARCH (see Section 6.1).
prCWA Public Commenting (February – March 2022)	The draft CWA 17727 was published for commenting on the Website of the European Standardisation Committee[29]. When developing a CWA the draft publication is voluntary. The CEN Workshop decided to take the time and effort to discuss the document with an even broader group of people to increase the usability of the document as well as the awareness about the document.
prCWA Webinars (March 2022)	The consortium organised a webinar as well as a workshop. The webinar was organised to explain the CWA 17727 to potentially interested users and it was advertised via LinkedIn, the ARCH and DIN Website as well as through newsletters (ICLEI and ARCH). The workshop was organised to get feedback on the document from potential users by means of a real example. The Free and Hanseatic City of Hamburg volunteered to provide feedback, so a workshop was organised to use CWA 17727 against the background of a storm surge. The feedback gained was incorporated into the CWA 17727.
Scientific Publications (August – November 2021)	Based on the standardisation activities within ARCH, several scientific publications have been prepared and will be

[28] https://shelter-project.com/

[29] https://www.cencenelec.eu/news-and-events/news/2022/workshop/2022-02-11-city-resilience-development/

Promotional activity	Explanation
	developed until the end of the project. So far, two publications can be listed. “Bringing Research on City Resilience to Relevant Stakeholders – Combining Co-creation and Standardisation in the ARCH project”[30] within the CORP 2021 conference proceedings. This paper presents the relation of the standardisation and co-creation activities in the project. “The Standardisation Process as a Chance for Conceptual Refinement of a Disaster Risk Management Framework: The ARCH Project”[31] as part of the special issue ‘Climate Change and the Built Environment: Towards Sustainable Development and Resilience’ in the journal ‘Sustainability’. It presents the overall (envisaged) standardisation activities of ARCH.
Conference Participations (September 2021 – project end)	The standardisation activities of ARCH are presented during different conferences. Within the CORP (Competence Center of Urban and Regional Planning) conference 2021 and European Urban Resilience Forum (EURESFO) 2021, the CEN Workshop for developing the CWA 17727 was promoted to gather further contributors. For 2022 further participation in conferences (e.g. EURAS, ICLEI World Congress) are planned to disseminate the results of ARCH’s standardisation activities.
ARCH Stakeholders Dialogue (June 2022)	The goal of the event is to present the ARCH project solutions to potential users and to empower them to make use for them. Against this background, a standardisation session will be organised that will present CWA 17727 as well as the ARCH Standardisation Strategy. The ARCH Standardisation Strategy is going to be explained to raise the awareness on how to use standardisation tools for the dissemination and exploitation of project outcomes.

[30] Lindner, R.; Lückerath, D.; Hernantes, J.; Jaca, C.; Latinos, V.; Peinhardt, K. Bringing Research on City Resilience to Relevant Stakeholders—Combining Co-creation and Standardisation in the ARCH project. In Proceedings of the 26th International Conference on Urban Planning, Regional Development and Information Society, Vienna, Austria, 7–10 September 2021; see https://archive.corp.at/cdrom2021/papers2021/CORP2021_104.pdf

[31] Lindner, R.; Lückerath, D.; Milde, K.; Ullrich, O.; Maresch, S.; Peinhardt, K.; Latinos, V.; Hernantes, J.; Jaca, C. The Standardisation Process as a Chance for Conceptual Refinement of a Disaster Risk Management Framework: The ARCH Project. Sustainability 2021, 13, 12276; see https://www.mdpi.com/2071-1050/13/21/12276

8. Conclusion

The resilience of cities and their historic areas has become of major importance during the last years due to the different crisis situations that they are facing. In this regard, historic areas may have to face further city challenges such as migration, climate change adaptation as well as the economic and societal impacts of the current war situation in Europe.

Standardisation activities exist on the topic of sustainable cities and communities, such as work conducted in the ISO/TC 268 and the recently founded CEN/TC 465. In the latter, the resilience of cities is one major element of its work programme for the next years. Therefore, it is crucial to feed this standardisation committee with research results that have a high degree on implementation. Thus, the ARCH activities in the four project cities show the direct implementation of resilience-enhancing tools within these pilot cases. All the project tools are jointly described within the ARCH DRM/CCA framework that has been transferred into the CWA 17727. The other further standardisation potentials identified in ARCH will be used within the established liaison with the CEN/TC 465. This ensures the sustainability of the standardisation activities conducted in ARCH and provides a possibility to quickly foster the uptake of ARCH standardisation activities at European or international level.

In conclusion, the ARCH project will significantly contribute to future standardisation work on city resilience with a specific focus on historic areas. These activities complement the already established CWA 17300 series on City Resilience Development. Furthermore, the methodology used for implementing the standardisation work in ARCH can be verified as appropriate as it supports the easy integration of project-external stakeholders in the co-creation process for enhancing the project tools, the development of a standard during the project duration and the promotion of these activities. However, as the project has not ended yet, further insights are to be expected, especially with regard to the liaison with CEN/TC 465 and the envisaged promotion activities. Finally, this report can serve future research activities to provide more success cases of how standardisation can be integrated into research projects, such as on city resilience and/or resilience of historic areas.