Vortrag/Presentation:

EU-Horizon 2020 funded R&D project:

SHELTER: Sustainable Historic Environments hoListic reconstruction through Technological Enhancement and community based Resilience

Vienna, 29.09.2019, 14:40-15:00

Zentrum für
Risiko- & Krisenmanagement

Wiener Workshop: Wiederaufbau

Im Rahmen des Tags des Denkmals 2019 und anlässlich des Jubiläums Zwanzig Jahre Zweites Protokoll zur Haager Konvention

Termin/Date: 29. September 2019, 13 bis 17 Uhr
Ort/Location: Universität für angewandte Kunst Wien, Universitätsgalerie, Heiligenkreuzer Hof, 1010 Wien

Prof. DI Johannes GÖLLNER, MSc (Vorstandsvorsitzender, ZRK) & **Prof. Dr. Friedrich SCHIPPER (Leiter Fachbereich: Kulturgüter, ZRK)**

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Shelter

SHELTER
Ambition & objetives

https://cordis.europa.eu/project/rcn/223273/factsheet/en

Source: based on Kick off meeting slides, 13th & 14th June 2019, Bilbao-Derio, Spain, by

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SHELTER: Sustainable Historic Environments hoListic reconstruction through Technological Enhancement and community based Resilience

Objective: *Over the last decadOver the last decades, as a consequence of the effects of climate change, cultural heritage has been impacted by an increasing number of climate related hazards, posing new challenges to conservators and heritage managers.*

SHELTER aims at developing a data driven and community based knowledge framework that will bring together the scientific community and heritage managers with the objective of increasing resilience, reducing vulnerability and promoting better and safer reconstruction in historic areas.

- **The first step to enhance resilience is associated to the improvement in understanding the direct and indirect impacts of climatic and environmental changes and natural hazards on historic sites and buildings,** by linking concepts commonly used in disaster risk management and climate change adaptation with cultural heritage management, in order to provide inclusive and informed decision-making.
- **Comprehensive disaster risk management plans need to be drawn up,** based on the specific characteristics of cultural heritage and the nature of the hazards within a regional context, taking into account the diverse heritage typologies as well as the specific socioeconomic conditions, since this directly affect the vulnerability of such systems.
- By a deep understanding of the hazard, the exposure and the vulnerability of the historic area, the local dynamics and the provision of innovative governance and community based models, it is possible **to provide useful methodologies, tools and strategies to enhance resilience and secure sustainable reconstruction.**
- Due to the information complexity and the diverse data sources, **SHELTER framework will be implemented in multiscale and multisource data driven platform,** able to provide the necessary information for planning and adaptive governance.
- All the developments of the project will be validated in 5 open-labs, representative of main climatic and environmental challenges in Europe and different heritage's typologies.

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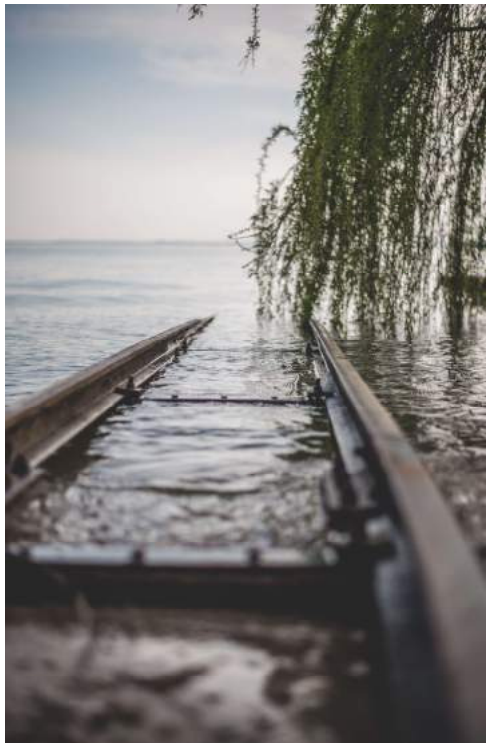

Topic: LC-CLA-04-2018: *Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events*

enhanced resilience of historic areas and improved sustainable reconstruction (building back better)

- **Review, map and systematically characterize** existing experiences and good practices
- **Knowledge-and evidence-based approaches** to increase cost-effectiveness of activities from a life cycle perspective.
- Develop, deploy and validate **tools, information models, strategies and plans**
- **Test and pilot novel cost-effective solutions** while respecting historic value.
- Provide science and evidence-based **guidelines and models to local authorities** within a **participatory and community-based approach.**

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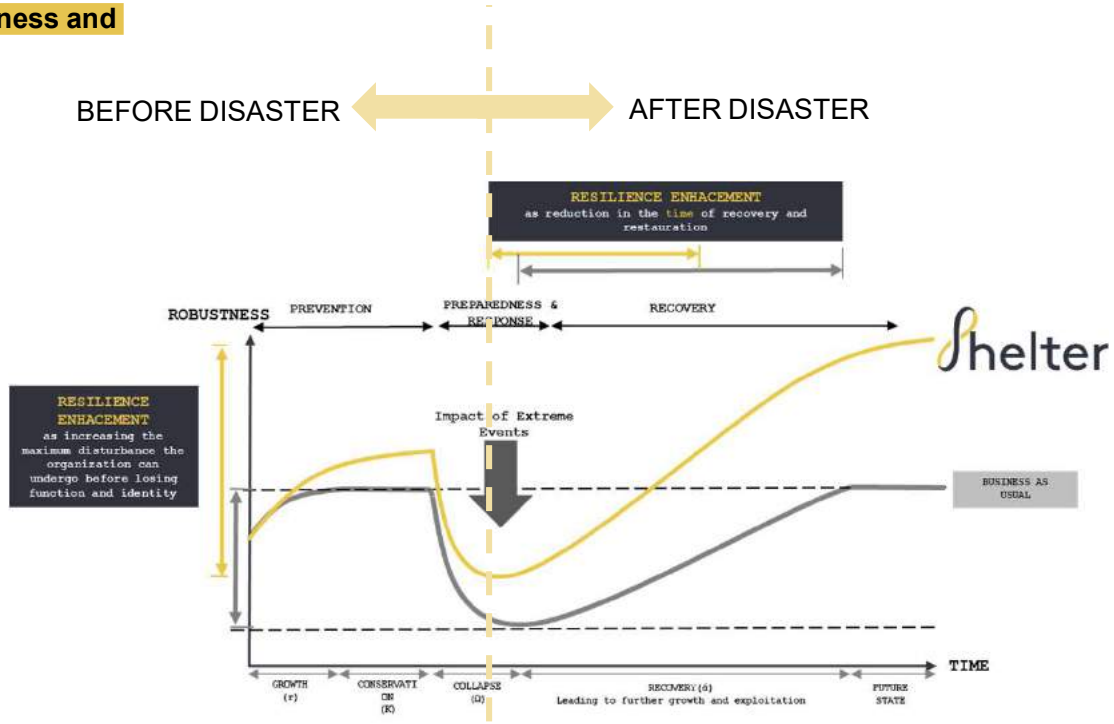
Resilience as robustness and rapidity



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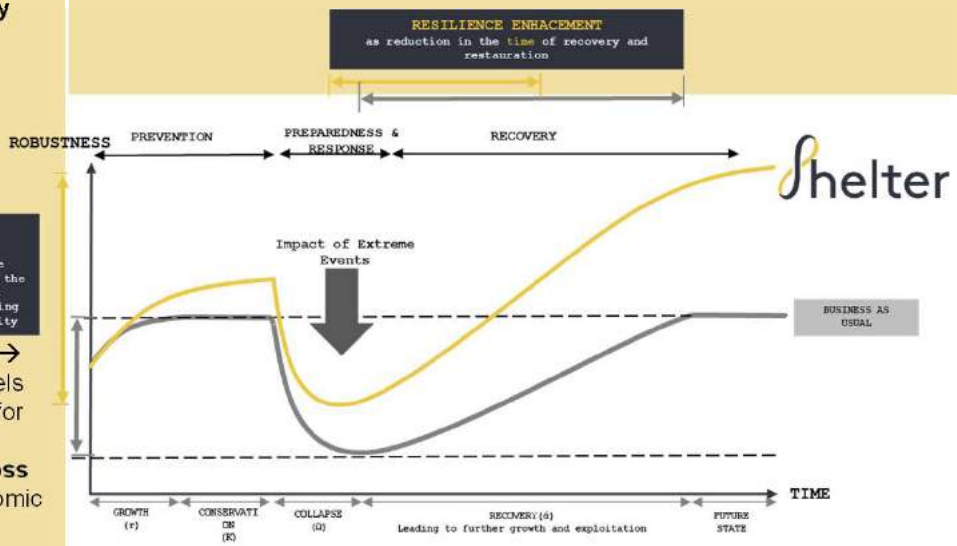
Resilience as robustness and rapidity

- By the identification and integration of multiple data sources & **existing knowledge**
- By systemic **resilience/vulnerability assessment**→ direct and indirect impacts of events in CH assets
- By **spatially explicit strategic decision-making tools**→ design of adaptation roadmaps

RESILIENCE ENHACEMENT as increasing the maximum disturbance the organization can undergo before losing function and identity

- By **community-based approaches**→ new governance and business models
- By **tested tools and technologies** for resilience and reconstruction
- By **methods to evaluate the real loss and damage costs** assigning economic value to CH assets

- By the **Resilience dashboard** (early warning systems + early damage assessment + crowdsourcing tools)
- By a **Resilience ID** documentation strategy
- By supporting stakeholders
- By conservation friendly measures for **rapid stabilization** and recovery
- By the **codification of social memory and local knowledge**



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resilience thinking represents a dynamic view of the future where risk, uncertainty and surprises are the norm and are used to build a more sustainable system and a system-wide transformation

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a **change of paradigm**, where the disturbance is not an unexpected event anymore, instead it is foreseen, accepted and addressed for transformation

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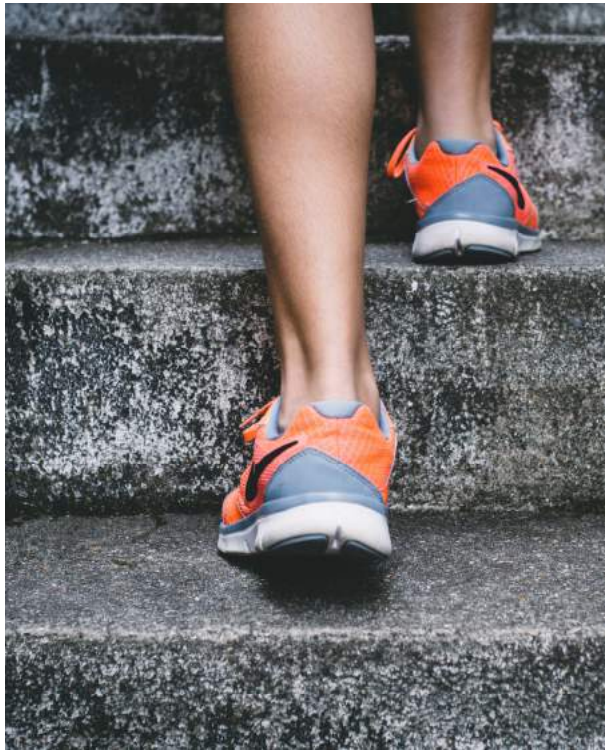

trigger the **necessary systemic transformation** linking sustainability, energy efficiency for affordable comfort, circular economy approaches and vernacular architecture with innovation in local economies, self-organisation and the activation of the territory

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The objective of SHELTER is to establish
cross-scale, multidimensional,
data driven and community based
operational knowledge framework
for heritage -led and conservation-friendly
resilience enhancement &
sustainable reconstruction
of historic areas
to cope with climate change and natural hazards

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Conservation-friendly resilience

→ combines elastic resilience (conservation of identity) with ductile resilience (transformation of the system) to ensure the balance between cultural identity preservation and adaptation to new requirements

→ taking into account the higher vulnerability of materials and structures, accessibility difficulties, density of the urban fabric, material and cultural values compatibility requirements and traditional lifestyles

Heritage-led resilience

→ that exploits the inherent resilience characteristics of HA: self-learning capacities, circular economy approaches, intrinsic sustainability, multi-stakeholder integration, redundancy, resourcefulness and flexibility

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Multidimensional resilience → CH centered vision

DIMENSIONS OF HA RESILIENCE		SHELTER APPROACH
Historic building environment resilience	How the historic building environment addresses disruption, affordable comfort, structural security through traditional techniques, vernacular architecture and built/unbuilt environment relationships and its relevance as container and management unit for other CH scales (as movable CH)	SHELTER addresses specifically historic buildings physical vulnerability as a nested concept for a more general resilience and vernacular architecture as catalyser of a heritage-led resilience where its intrinsic characteristics are capitalised (redundancy of parts, reparability and reuse of components, traditional adaptation strategies) and its singularities contemplated for conservation-friendly planning. **Singularity of HA: Very High**
Cultural resilience	How HA addresses social inclusion and supports social and technical innovation through cultural identity, local knowledge, intangible CH and openness to exploring novel pathways.	SHELTER will consider CH (tangible and intangible) as key driver in HA Resilience. Cultural diversity has the capacity to increase the resilience of social systems, since it is the result of centuries of slow adaptation to the hazards that affect local environments. **Singularity of HA: Very High**
Social resilience	How individual's physical and psychological well-being are addressed within the HA and strong and healthy personal relationships, connection to culture and nature and learning and sharing new skills are enabled.	SHELTER will consider social memory as key part of HA resilience. Vulnerable groups (elderly, migrants, children, disabled) will be specifically considered and gender perspective will be transversal. Issues especially important to HA as depopulation and gentrification will be tackled in reconstruction phase. **Singularity of HA: High**
Governance and institutional resilience	How links and partnerships are created and managed with support networks and across sectors (including public sector/government, research and business)	SHELTER will adopt an adaptive governance perspective and a GLOCAL approach (linking 'local' and 'global" tendencies and interpretations pragmatically). Open Labs will function to integrate all stakeholders in the decision making and knowledge generation. **Singularity of HA: High**
Economic resilience	How the creation of a different sort of local economy can positively stewards the local environment and resources to enhance biodiversity, cut carbon dependence and creates meaningful locally based livelihoods.	SHELTER will foster local economy boosting and territory activation through innovation (including insurance perspective). Economic impact of disasters will consider intangible values. **Singularity of HA: Medium**
Environmental resilience		SHELTER will propose circular approaches and sustainable reconstruction. **Singularity of HA: Medium**

Singularity of HA

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Multi-hazard resilience that takes into account different types of hazards and their combined direct and indirect impacts in the diverse types of CH (tangible, intangible and cultural/natural)

Type of event	Percentage distribution for relevant natural events in Europe and associated losses (1990 – 2017)								SHELTER Case study	Regional representativeness
	No. events	%	Overall losses ($)	%	Insured losses ($)	%	Fatalities	%		
Geophysical *Earthquakes*	97	4,30	57,39	11,50	3,36	2,10	1.023	0,70	Ravenna Seferihizar	Mainly Southern countries
Meteorological *Storms*	**1.055**	**46,90**	170,66	34,20	**99,04**	**61,90**	2.924	2,00	Dordrecht	Atlantic and boreal areas
Hydrological *Floods*	715	31,80	**174,15**	**34,90**	45,60	28,50	3.947	2,70	Dordrecht Sava river Basin	Central-Eastern Europe
Climatological *Heat wave, Wildfire, Subsidence*	383	17,00	37,43	7,50	12,00	7,50	**138.289**	**94,6**	Ravenna Seferihizar Baixa	Mediterranean areas
TOTAL	**2.250**		**499,00**		**160,00**		**146.183**			

Events in Europe and associated losses (1990-2017) (Data source: NatCatSERVICE database)

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Cross-scale and Life Cycle resilience

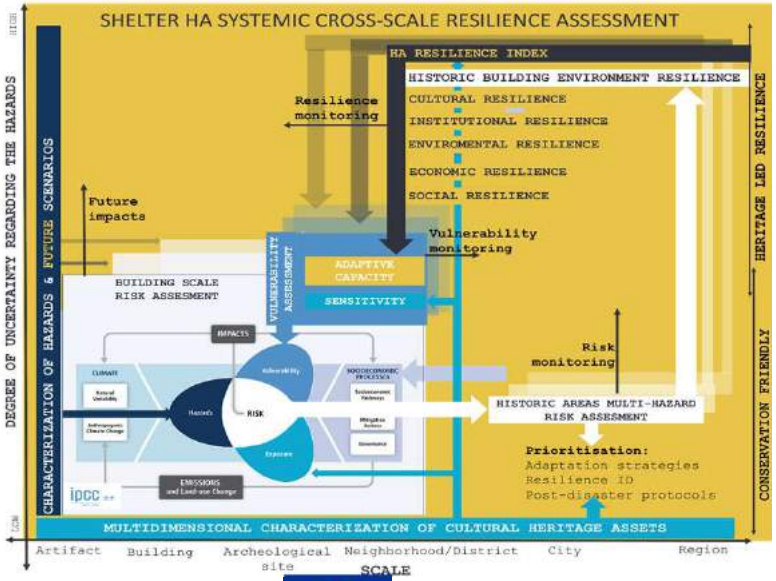
→different temporal scales

→the dynamic interplay between the different phases of DRM (prevention, preparedness, response, recovery, and adaptation)

→their cross-scale configuration (from artefacts to transregional cultural landscapes)

→the whole life cycle of the strategies and materials

…From building scale risk assessment to HA RESILIENCE INDEX



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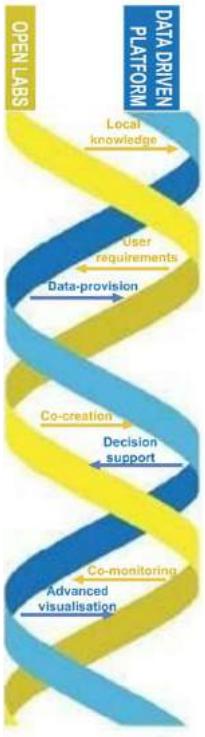

data driven and community based resilience enhancement

as result of the interplay of two processes collaborating→ individual solutions for each HA:

- **data driven approach**→ supports diagnosis, decision making, implementation and monitoring based on existing knowledge and heterogenous data
- **Open Labs approach**→ continuous framework for local knowledge extraction, citizen´s engagement, co-creation, capacity building and innovation

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Open Labs→ GLOCAL stakeholder-centred approach

- knowledge generator case studies
- evaluation frameworks and demonstration sites
- long-term thinking living- and transition labs
- learning environments

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five case studies

			Area of Santa Croce. Ravenna	Seferihisar	Dordrecht	Baixa Limia-Serra Do Xurés	Sava River Basin
Affected population by the case-study			5.000	31.400	118.000	1.614.535	9.000.000
Geographical zone (EU)			South	South-East	North	South-West	Central-East
Demo scales	Building						
	District						
	City						
	Region						
	Cross-regional						
Hazards	Geophysical	Earthquakes					
	Meteorological	Storms					
	Hydrological	Floods					
	Climatological	Heat waves					
		Wildfire					
		Subsidence					
Governance & planning	Level of experience in DRM instruments		High experience in Emergency Operative Plans	Medium. Heat wave warning system and earthquake recovery	High. Protection plans local and national protocols for evacuation	Medium-High. Civil Protection Plan for forest fires	High experience in transboundary protocols
	Experience in co-creation		Medium.	Medium.	High		High
CH	Type of CH		Immaterial, archaeological and urban	Immaterial, urban, earthen architecture	Immaterial, urban and industrial	Immaterial, natural and cultural	Immaterial, natural and cultural
	Level of protection		Very High	Medium	High	Medium	Medium
Existing data/ tools	Level of information		Medium	Medium	High	High-medium	High-medium
	Type		GIS, Cultural Heritage Catalogue and documentation, 3D model of the site, subsidence monitoring (level, GNSS, interferometric)	GIS, Cultural Heritage Catalogue, 3D model, data on protected area boundaries, mobile App. on Google Play	GIS, Cultural Heritage Catalogue, flood risk database and monitoring, climate change impact analysis, 3D models	GIS geoportal and databases, Cultural and Natural Heritage catalogue and geoportal	GIS geoportal, Flood risk maps & analysis, material studies, Digital Elevation Model based on LIDAR, hydraulic model

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five Open Labs→ committed to co-create

OPEN LAB	CODE	CO- CREATION STRATEGY TYPE	CASE STUDY	TOOLS	HAZARD	METHODS
URBAN	U-TEC	Technological co-adaptation strategy	Ravenna	Stabilization and consolidation techniques	Earthquakes	Co-creation of specifications for the solution through the involvement of citizens and master students. International open call for suppliers
				Pumps	Subsidence	
	U-ICT	ICT solution co-creation strategy	Dordrecht	Tailored IMMERSITE solution	Floods/Storms	Co-creation and co-development of tailored citizen engagement tool (SHELTER)
	U-VER	Vernacular co-adaptation	Seferihizar	Innovation in vernacular architecture	Earthquakes	Co-creation of solutions based on traditional skills through the involvement of local research, academia and local business.
				Vernacular eco-rehabilitation	Heatwaves	
CROSS-REGIONAL	CR-NBS	NBS co-creation strategy	Baisa-lima	Co-creation of NBS	Wildfires	Co-creation of NBS through the involvement of local research, academia and local business.
	CR-GOV	Multilevel governance	Sava river	Co-creation of multilevel governance schemes for transnational HA.	Floods	Co-creation of collaborative governance schemes.

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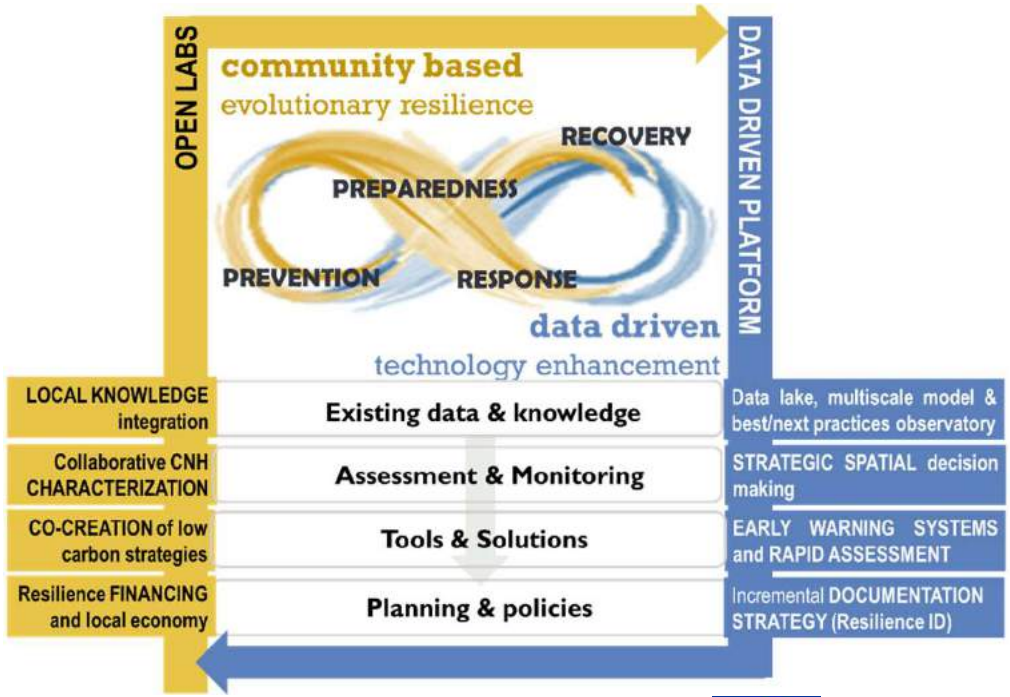
SHELTER operational knowledge framework



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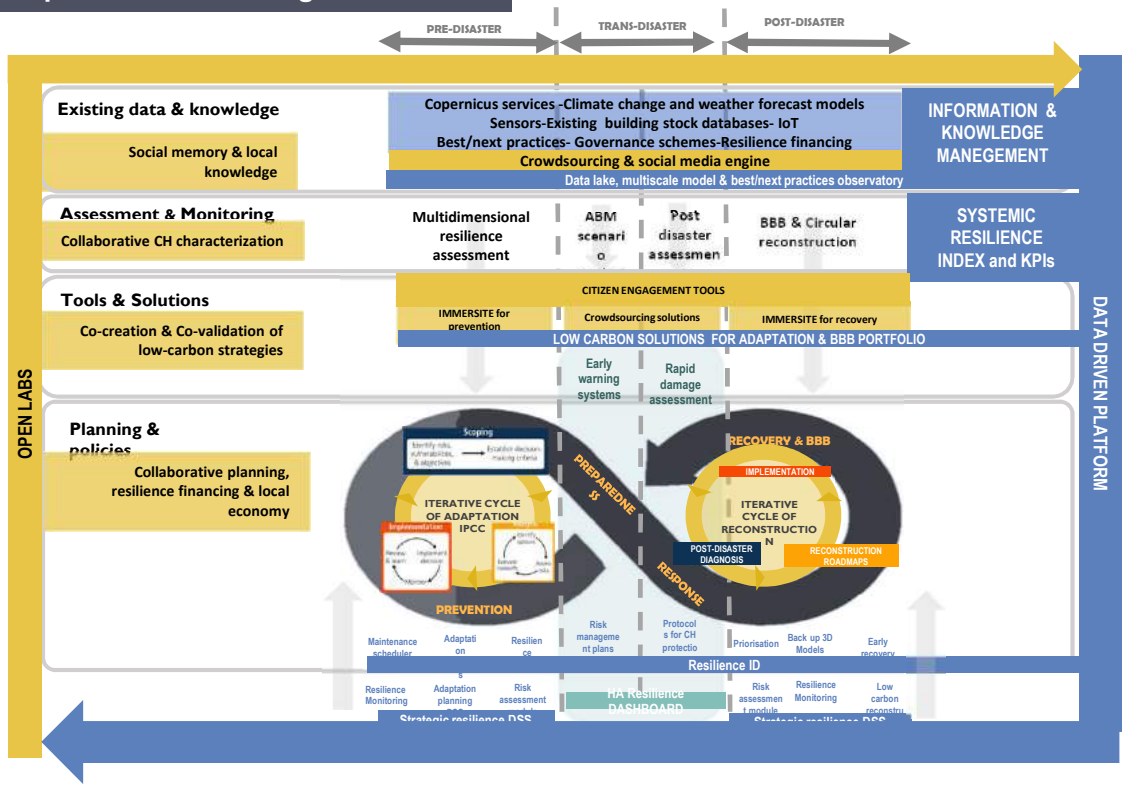
SHELTER operational knowledge framework



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In summary…

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Shelter

Ambitious…

But doable!

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