SMART
MATURE
RESILIENCE

SMR

FOR MORE RESILIENT CITIES IN EUROPE

RESILIENCE MATURITY MODEL

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HANDBOOK

SMR Smart Mature Resilience

RESILIENCE MATURITY MODEL

The Resilience Maturity Model is a strategic tool designed to provide cities with a roadmap towards enhanced resilience. It provides a holistic overview of the resilience building process and helps end users to understand resilience as a multidimensional objective. The Maturity Model enables cities to assess their current maturity stage and to identify the policies to implement in order for the city to evolve and move to the next maturity stage.

WHAT IS THE MATURITY MODEL FOR?

The Resilience Maturity Model...

✓ can be used as part of strategic planning

✓ helps cities to identify suitable policies to implement to develop resilience based on diagnosis and assessment

✓ provides a point of reference for self-assessing the effectiveness of resilience development

✓ helps cities assess their current resilience maturity stage

✓ can provide cities with justification for need for funding for specific measures

✓ helps cities prioritise resilience policy implementation

WHO IS THE MATURITY MODEL FOR?

1. **Decision-makers as part of a strategic management cycle: Politicians** and **high-level strategic planning staff** involved in drafting and approving long-term plans such as city resilience strategies and integrated city development plans

2. **Practitioners implementing policies: Technical staff, desk officers** and **employees in public-private companies** working with critical infrastructures and risk management

3. **Other city stakeholders** such as citizens, volunteers, academic and scientific entities and media to raise awareness of the importance of resilience and engage them in the process
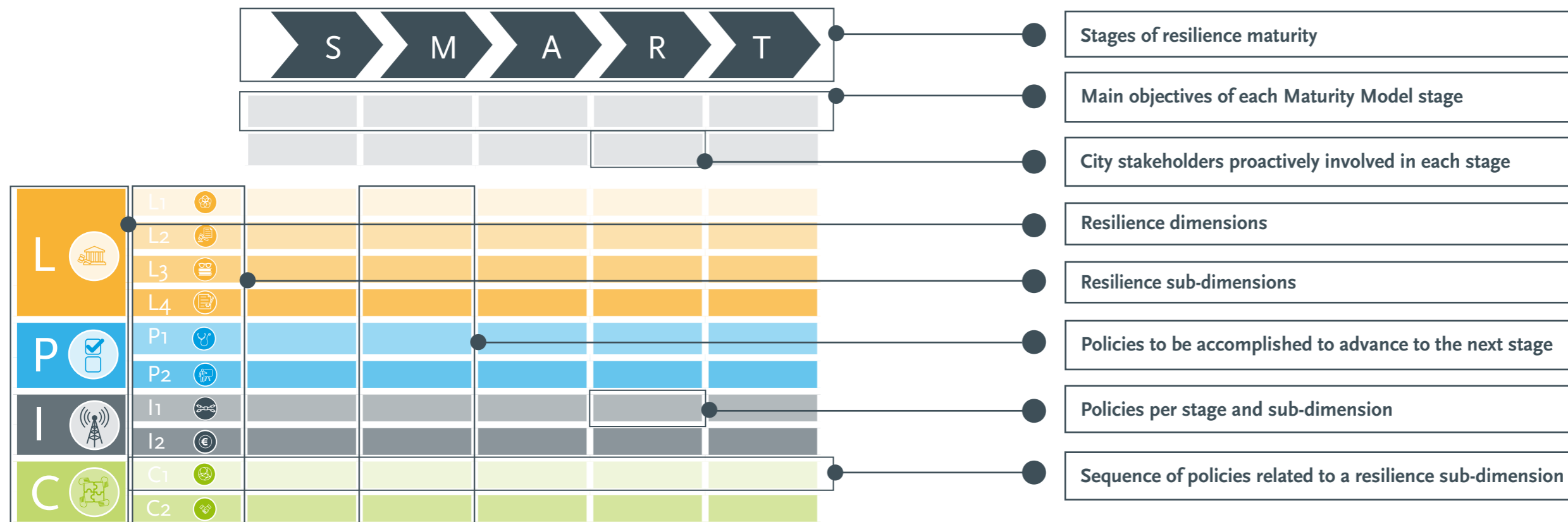
Supported by the Simulation Model

Supported by the Policy Tool

Supported by the Resilience Information Portal

HOW CAN THE MATURITY MODEL BE USED?

1. **Assess and re-assess your city's policies to diagnose your resilience maturity stage:** Compare the policies of the Resilience Maturity Model to the policies and projects the city has already implemented or currently has in place to evaluate the level of resilience maturity. This can be repeated in an evaluation cycle.

2. **Plan and implement your long-term resilience journey:** Following this assessment, you can identify missing or urgent policies that would be advisable for implemetation in your city.

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Stages of resilience maturity

Main objectives of each Maturity Model stage

City stakeholders proactively involved in each stage

Resilience dimensions

Resilience sub-dimensions

Policies to be accomplished to advance to the next stage

Policies per stage and sub-dimension

Sequence of policies related to a resilience sub-dimension

L	L1					
	L2					
	L3					
	L4					
P	P1					
	P2					
I	I1					
	I2					
C	C1					
	C2					

Try the interactive online Resilience Maturity Model on the SMR website!

smr-project.eu/MM

The Resilience Maturity Model uses a system of icons and abbreviations to help you quickly find and understand policies useful to you. These are explained in the tables below.

As a city progresses through each maturity stage, new stakeholder groups become involved in the process and stakeholders from previous stages continue their involvement. The table below shows the new stakeholders to join each maturity stage.

MATURITY STAGES

S	**TARTING**	Starting with local (departmental) resilience plans
M	**ODERATE**	Integration of local (departmental) resilience plans
A	**DVANCED**	Implementation of the integrated (holistic) resilience plan
R	**OBUST**	Internationalising resilience
T	**VERTEBRATE**	Leading resilience city

STAKEHOLDERS PER MATURITY STAGE

S	Local government	Emergency services	Critical infrastructures
M	Public-private companies	NGOs · Volunteers	Regional government
A	Academic and scientific entities	Media · Citizens	National government
R	European legislative body		
T	International organisations		

RESILIENCE DIMENSIONS

 LEADERSHIP & GOVERNANCE

 PREPAREDNESS

 INFRASTRUCTURE & RESOURCES

 COOPERATION

RESILIENCE SUB-DIMENSIONS

L1: Municipality, cross-sectorial and multi-governance collaboration

L3: Learning culture (learning and dissemination)

L2: Legislation development and refinement

L4: Resilience action plan development

P1: Diagnosis and Assessment

P2: Education and Training

I1: Reliability of infrastructures

I2: Resources to build up resilience

C1: Development of partnerships with city stakeholders

C2: Involvement in resilience networks of cities

STARTING

STARTING WITH LOCAL (DEPARTMENTAL) RESILIENCE PLANS

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STAKEHOLDERS

Local Government | Emergency services | Criticial Infrastructures

So far, crisis management is based on risk assessment without taking an integrated multi-hazard approach. This means that risk assessment is still fragmented and incomplete regarding hazards.

Critical infrastructure providers operate independently of each other, therefore there is a need for greater organisation and cooperation among the critical infrastructure providers, especially in times of emergency when a disruption to one critical infrastructure can have cascading effects across other infrastructures. Measures to improve critical infrastructures' reliability and robustness are identified.

Different city departments have started developing resilience policies; however, there is no coordination between them. A common strategy among the municipal departments is still missing. Additionally, the relevant stakeholders and sectors outside the municipality also work independently from others.

At this stage, the local government recognizes the need to develop an integrated resilience action plan with common practices and approaches, so that the resilience approach or strategy is included in the city's agenda at a strategic level.

This way, the city makes the resilience strategy central to the Municipal Plan, although the resilience action plan is still

focused on dealing with shocks without considering chronic stresses.

At the moment, the resilience action plan is limited within the city's borders. The local authority adopts a local governance approach, not yet recognizing the need for a multi-governance approach. As a consequence of this local governance approach, there is a lack of collaboration with suburban or regional stakeholders. The participation of the local municipality in resilience networks is also incipient.

1 Incipient policies for resilience development

2 Lack of integrated approach towards multi-hazards

3 Incomplete risk assessment

4 Community/ public-private cooperation incipient

5 City centred

6 City is not part of larger networks

7 Limited funding or no budget for resilience

LEADERSHIP & GOVERNANCE	Municipality, cross-sectoral and multi-governance collaboration (L1)	**(L1S1)** Establish a working team responsible for resilience issues in the city
		(L1S2) Integrate resilience into visions, policies and strategies for city development plans
	Learning culture (learning and dissemination) (L3)	**(L3S1)** Develop a strategy to create a resilience culture
	Resilience action plan development (L4)	**(L4S1)** Identify city requirements regarding the resilience process
PREPAREDNESS	Diagnosis and Assessment (P1)	**(P1S1)** Assess and manage a wide range of risks
		(P1S2) List and prioritize critical services and assets
		(P1S3) List existing plans and response mechanisms and guidelines for shocks and stresses
	Education and Training (P2)	**(P2S1)** Conduct training and arrange emergency drills with the emergency teams and critical infrastructure providers
		(P2S2) Inform citizens of volunteering opportunities in the local community
		(P2S3) Develop a common understanding of the resilience approach among stakeholders
INFRASTRUCTURE & RESOURCES	Reliability of infrastructures (I1)	**(I1S1)** Develop cooperation/collaboration agreements with CI providers
		(I1S2) Develop plans to monitor critical infrastructures' functionality
		(I1S3) Develop contingency plans for critical infrastructures
	Resources to build up resilience (I2)	**(I2S1)** Assess current initiatives and funding opportunities for the development of resilience
		(I2S2) Develop a list of the physical resources currently available for response
		(I2S3) Deploy a disaster relief fund for emergencies
COOPERATION	Development of partnerships with city stakeholders (C1)	**(C1S1)** Map relevant stakeholders to develop the resilience action plan
		(C1S2) Develop a public website with emergency information

MODERATE

INTEGRATION OF LOCAL (DEPARTMENTAL) RESILIENCE PLANS

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STAKEHOLDERS

Public-private companies | NGOs | Volunteers | Regional government

The resilience action plan includes policies to be prepared and respond to shocks and chronic stresses using a holistic approach.

The city sets up the organizational structure to manage the resilience action plan and deploys resources for its development.

The city starts monitoring the implementation of the policies included in the resilience action plan using control measures, although there is a lack of a formalized resilience management process.

A communication strategy that will scale up resilience building efforts is set up. The city carries out initiatives such as events and training activities to increase the awareness level of the different stakeholders to foster a resilience culture among them.

Regarding collaboration, the city recognizes the importance of networks and platforms for engagement of stakeholders and knowledge sharing. At this point, the platform is internal to the municipality and emergency services. Moreover, the city has started planning for networking with other cities at regional level with regard to resilience and sustainability.

1 Implementation of resilience policies using effective control mechanisms

2 Creation of a department/committee for coordinating resilience development

3 Plans to improve cooperation among all the stakeholders

4 Arrangement of events to increase stakeholders' awareness

LEADERSHIP & GOVERNANCE

Municipality, cross-sectorial and multi-governance collaboration (L1)

(L1M1) Establish a resilience department or committee and a cross-departmental coordination board and procedures

(L1M2) Align, integrate and connect the resilience action plan with regional plans

(L1M3) Adopt climate change preventive actions

(L1M4) Promote equality of access to services and basic infrastructure to vulnerable sectors of society

Legislation development and refinement (L2)

(L2M1) Develop a white paper on the multi-level governance approach

Learning culture (learning and dissemination) (L3)

(L3M1) Promote a culture of resilience

(L3M2) Review of best practices to deal with shocks and stresses used in different sectors and other cities

Resilience action plan development (L4)

(L4M1) Develop a resilience action plan to respond to shocks and long term stresses

PREPAREDNESS

Diagnosis and Assessment (P1)

(P1M1) Take account of interdependencies between risks when assessing and managing risk

Education and Training (P2)

(P2M1) Conduct training and arrange emergency drills including volunteers

INFRASTRUCTURE & RESOURCES

Reliability of infrastructures (I1)

(I1M1) Identify interdependencies of critical services at local level

(I1M2) Develop periodical preventative maintenance procedures for CIs

(I1M3) Develop measures to increase critical infrastructure redundancy and reliability

(I1M4) Implement monitoring systems for identifying risk, shocks and long term stresses

(I1M5) Carry out audits for critical infrastructure providers

Resources to build up resilience (I2)

(I2M1) Allow for the resilience action plan in the local government budget

(I2M2) Promote resources/tool sharing among critical infrastructure providers within a region during crises

COOPERATION

Development of partnerships with city stakeholders (C1)

(C1M1) Develop a stakeholder engagement plan defining its roles and responsibilities

(C1M2) Develop an internal communication platform for sharing information with different municipal departments and emergency services

Involvement in resilience networks of cities (C2)

(C2M1) Establish alliances with cities facing similar risks

ADVANCED

IMPLEMENTATION OF THE INTEGRATED (HOLISTIC) RESILIENCE PLAN

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STAKEHOLDERS

Media **l** Citizens **l** Academic and scientific entities **l** National government

The city has developed an operational resilience action plan with a holistic approach that integrates all sectors and relevant stakeholders. The resilience action plan contains measures to increase the flexibility of city infrastructures to deal with shocks and stresses and to adapt to on-going circumstances.

The progress of the resilience action plan is monitored using indicators in order to assess the effectiveness and impact of the implemented policies.

The resilience action plan is continuously revised based on the non-compliances identified and improved including lessons learned and best practices obtained through institutionalizing regular debriefing sessions to facilitate a shared understanding, reflection and discussion.

Fostering community resilience and public and private cooperation is part of the resilience approach. The city recognizes that in order to increase the engagement and mobilization of relevant stakeholders there is a need for a shift from top-down city level to bottom-up initiatives. Providing incentives for citizens and the private sector to

develop solutions they can implement at local level helps strengthen social cohesion and support the goals of the resilience action plan.

The municipality changes its role, becoming a facilitator instead of having a central guiding policy role.

The multi-governance approach with a European dimension is included in the plans, but not yet fully operationalized.

The city is member of a major network of European cities with regard to resilience and sustainability.

1. Develop a framework to manage and operationalize resilience
2. Monitoring of the action plan through indicators
3. Community resilience and public-private cooperation are fostered
4. Multi-governance approach with European dimension well-linked but not fully operationalized
5. City becomes member of a major network

LEADERSHIP & GOVERNANCE

Municipality, cross-sectorial and multi-governance collaboration (L1)
- **(L1A1)** Align, integrate and connect the resilience action plan with national plans
- **(L1A2)** Develop a plan for a multi-level governance approach involving the municipal, regional and national levels of governance

Legislation development and refinement (L2)
- **(L2A1)** Conduct certification processes to achieve conformity with national standards

Learning culture (learning and dissemination) (L3)
- **(L3A1)** Formalize the learning process and institutionalize regular debriefing meetings

Resilience action plan development (L4)
- **(L4A1)** Develop leading indicators for assessing the performance of the resilience action plan

PREPAREDNESS

Diagnosis and Assessment (P1)
- **(P1A1)** Assess and prioritise risk scenarios and their implications through consideration of risk systemicity (e.g. using Risk Systemicity Questionnaire)

Education and Training (P2)
- **(P2A1)** Provide training for citizens and public and private companies
- **(P2A2)** Conduct emergency drills at national level
- **(P2A3)** Develop education programs in schools about the resilience action plan
- **(P2A4)** Assess and refine the training programs

INFRASTRUCTURE & RESOURCES

Reliability of infrastructures (I1)
- **(I1A1)** Develop flexibility measures

Resources to build up resilience (I2)
- **(I2A1)** Promote and provide incentives for initiatives that contribute to building resilience
- **(I2A2)** Implement centralised control of coordination of critical resources and activities during shocks and stresses
- **(I2A3)** Encourage stakeholders to have appropriate insurance coverage
- **(I2A4)** Promote and provide incentives for the development of sustainable urban infrastructures

COOPERATION

Development of partnerships with city stakeholders (C1)
- **(C1A1)** Align the objectives of different stakeholders and develop a common understanding of resilience
- **(C1A2)** Develop formal partnerships between academic and scientific entities to improve the resilience building process
- **(C1A3)** Undertake public consultations to receive feedback on the resilience action plan
- **(C1A4)** Develop a public communication platform to interact with stakeholders

Involvement in resilience networks of cities (C2)
- **(C2A1)** Join a major network of European cities
- **(C2A2)** Develop formal partnerships with regional stakeholders

ROBUST

INTERNATIONALISING RESILIENCE

STAKEHOLDERS European legislative body

All relevant stakeholders to be involved in the resilience action plan have been identified and and the majority of them have been engaged in the city resilience building process, so at this stage we can speak of a CITY*. Stakeholders are proactive and perceive value added by resilience to the welfare of society. They are also aware that the resilience approach is a never-ending process. Resilience is part of daily thinking and acting.

The resilience action plan is monitored and assessed based on regularly collected information and the successes and possible drawbacks of the process are reported, giving feedback for the resilience action plan revision process. The resilience action plan is continuously improved and updated based on the feedback and suggestions received from the city stakeholders through consultation processes and participatory platforms.

The CITY is capable of 'bouncing back, bouncing forward', and ensuring protection from shocks and stresses.

Local communities can work as self-organized systems that

can deal with the uncertain situations. The multi-governance approach with a global dimension is well developed and operationalized.

The CITY is participating in a variety of important networks with regard to resilience and sustainability, with a proactive attitude and continuous learning, transferring knowledge and best practices to be prepared for unknown events.

1 Engagement of all the agents -> CITY

2 Agents perceive the value added by resilience

3 A multi-governance approach is well developed and operationalized

4 The city is member of a major network, has a proactive attitude and learns continuously

5 Resilience action plan is continuously monitored and improved

LEADERSHIP & GOVERNANCE	Municipality, cross-sectorial and multi-governance collaboration (L1)		**(L1R1)** Align, integrate and connect the city resilience plan with regional, national and international resilience management guidelines
	Legislation development and refinement (L2)		**(L2R1)** Conduct certification processes to achieve conformity with international standards
	Learning culture (learning and dissemination) (L3)		**(L3R1)** Create a learning city
	Resilience action plan development (L4)		**(L4R1)** Assess and monitor the resilience action plan's efficiency periodically in order to continuously improve it
PREPAREDNESS	Diagnosis and Assessment (P1)		**(P1R1)** Undertake regular and long-term risk assessment with a focus on risk systemicity
	Education and Training (P2)		**(P2R1)** Establish a strong network of volunteers
			(P2R2) Conduct frequent joint training exercises between European cities
INFRASTRUCTURE & RESOURCES	Reliability of infra structures (I1)		**(I1R1)** Identify interdependencies of critical services at international level
	Resources to build up resilience (I2)		**(I2R1)** Promote and provide incentives to stakeholders for investment in R&D&I projects regarding resilience
			(I2R2) Monitor an effective use of resources to ensure strong performance of the resilience building process
COOPERATION	Development of partnerships with city stakeholders (C1)		**(C1R1)** Widen collaborative networks with stakeholders to reflect on and make decisions about the progress of the city resilience
			(C1R2) Arrange multi-stakeholder debriefing meetings
			(C1R3) Develop a public platform to enhance sharing among city stakeholders
	Involvement in resilience networks of cities (C2)		**(C2R1)** Participate proactively in regional, national and international networks to promote initiatives, exchange experiences and learn

* Our units of analysis are entities that we denominate by **CITIES**. Each **CITY** is analyzed from the perspective of serving **their citizens and their metropolitan area**, with the **Critical Instrastructures (CIs)** residing in or affecting such area, in **their functional role as part of Europe in a multi-level governance perspective**, and **linked with other CITIES** by shared interests and responsibilities through formal and informal networks so as to yield a **resilience backbone**.

VERTEBRATE

LEADING RESILIENT CITY

STAKEHOLDERS International organisations

The CITY excels regarding its resilience as part of the regional, national and global system of resilience, understanding that in order to become resilient the environment needs to be resilient as well.

The CITY is active both nationally and globally to spread resilient and sustainable initiatives.

The CITY acts as a vertebra in the European resilience backbone and has an internalized resilience culture.

The resilience action plan is continuously improved based on lessons learned from past events.

There is a full integration of all known stakeholders in the resilience action plan, with a high level of participation of these stakeholders in the decision-making process. Communities are able to self-organize in order to help in case a crisis occurs.

The CITY acts as a leader in global networks and participates in the definition of resilience standards.

Actions implemented in the CITY are presented to third parties as best practices.

The CITY is proactive in supporting the development of resilience in other CITIES and regions as it understands that coexisting in a more resilient environment makes the CITY more resilient.

1 The CITY proactively promotes resilience practices

2 The CITY defines its policies and plans understanding that it is part of a ecosystem that has to be resilient

3 CITY acts as a vertebra in the European Resilience Backbone

4 There are implemented and accepted procedures for the continuous improvement of the resilience action plan

LEADERSHIP & GOVERNANCE

Municipality, cross-sectorial and multi-governance collaboration (L1)

(L1T1) Support the development of other city resilience plans aligned, integrated and connected with regional, national and international resilience management guidelines

Legislation development and refinement (L2)

(L2T1) Contribute to the development of standards on resilience guidelines and policies

Learning culture (learning and dissemination) (L3)

(L3T1) Develop formal procedures to assess the effectiveness of the learning process

(L3T2) Promote leadership for knowledge transfer and sharing among global cities, regions and nations

Resilience action plan development (L4)

(L4T1) Share the CITY's expertise in resilience action plan development with other cities about to start the process

PREPAREDNESS

Diagnosis and Assessment (P1)

(P1T1) Assess the value added by CITY contributions to the resilience of other CITIES

Education and Training (P2)

(P2T1) Develop training plans in cooperation with other CITIES

(P2T2) Develop training activities for other CITIES

(P2T3) Support self-organisation of the involved agents to improve the resilience of the CITY

INFRASTRUCTURE & RESOURCES

Reliability of infrastructures (I1)

(I1T1) Encourage the continuous improvement of policies, to take advantage of any shock and stress to bounce forward and improve or re-design

(I1T2) Apply big data approaches to analyse the information obtained

Resources to build up resilience (I2)

(I2T1) Assess the impact of innovation on the resilience building process

(I2T2) Monitor the insurance level of stakeholders

COOPERATION

Development of partnerships with city stakeholders (C1)

(C1T1) Support self-organization of the cooperation among all the stakeholders involved in resilience development

(C1T2) Involve all stakeholders in the learning process

Involvement in resilience networks of cities (C2)

(C2T1) Active involvement of local authority and stakeholders in networks (local, national, European and global)

(C2T2) Encourage stakeholders to present their experience concerning the resilience building process as a reference for other CITIES

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