SMART MATURE RESILIENCE

DELIVERABLE 5.9

EUROPEAN RESILIENCE MANAGEMENT GUIDELINE

ICLEI European Secretariat | March 2018

	European Resilience Management Guideline
Deliverable no.	D5.9
Work package	5
Dissemination Level	Public
Author (s)	Vasileios Latinos, ICLEI European Secretariat
Co-author(s)	Susan Howick, Colin Eden, Igor Pyrko (University of Strathclyde), Clara Grimes (ICLEI European Secretariat), Mihoko Sakurai, Tim A. Majchrzak, Jaziar Radianti, Ahmed Aboughonim (CIEM), Josune Hernantes, Leire Labaka, Marta Iturriza (TECNUN)
Date	31/03/2018
File Name	D5.9.SMR_European_Resilience_Management_Guideline.pdf
Revision	
Reviewed by (if applicable)	Susan Howick, Colin Eden (University of Strathclyde), Leire Labaka, Jose M. Sarriegi, Josune Hernantes (TECNUN), Clara Grimes, Julia Peleikis (ICLEI European Secretariat)

This document has been prepared in the framework of the European project SMR – SMART MATURE RESILIENCE. This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement no. 653569.

Funded by the Horizon 2020
programme of the European Union

EXECUTIVE SUMMARY

The European Resilience Management Guideline is the main outcome of the Smart Mature Resilience project. Smart Mature Resilience (SMR) is a multi-disciplinary research project working for more resilient cities in Europe. Researchers and cities come together to enhance cities' capacity to resist, absorb and recover from the hazardous effects of climate change, by developing, implementing and validating a European Resilience Management Guideline, which includes a holistic approach on city resilience development, supports strategic planning and management and defines the ideal path a city needs to follow to further advance local resilience, by promoting across-sector and beyond silos collaboration between stakeholders.

The European Resilience Management Guideline is a framework that directs all available resources towards well-defined goals, secures transparency and the democratic principles of decision-making for city resilience development and planning. This framework provides guidance and aims at training and supporting municipalities and relevant stakeholders in implementing an integrated management process that enhances city resilience.

The European Resilience Management Guideline makes use of five strategic, resilience-building tools and can be described as a journey with iterative steps, where cities and municipalities have different starting points and where they position themselves into different stages of resilience maturity.

The European Resilience Management Guideline provides guidance to cities and local governments in assessing, but also strengthening their local resilience status. This is achieved through providing through setting measurable targets together with local stakeholders and co-creating a city resilience strategy making use of the five tools to build local resilience and progress within the maturity stages.

The five tools developed within the project are: 1) a Resilience Maturity Model, 2) a Risk Systemicity Questionnaire, 3) a Resilience Information Portal, 4) a City Resilience Dynamics Tool and 5) a Resilience Building Policies tool.

TABLE OF CONTENTS

1. INTRODUCTION

European cities face an increasing frequency and intensity of hazards and disasters, which are exacerbated by climate change hazards, critical infrastructure challenges and social dynamics, such as demographic change or ageing populations. As Europe's cities continue to grow, there is an urgent need for far-reaching and holistic approaches to enhance cities' resilience towards potentially critical effects of hazards.

1.1. The SMART MATURE RESILIENCE PROJECT

The European Resilience Management Guideline is the main outcome of the Smart Mature Resilience project. Smart Mature Resilience (SMR) is a HORIZON 2020 funded, multi-disciplinary research project working for more resilient cities in Europe.

Researchers and cities come together to enhance cities' capacity to resist, absorb and recover from the hazardous effects of climate change, by developing, implementing and validating a European Resilience Management Guideline, which includes a holistic approach on city resilience development, supports strategic planning and management and defines the best recommended path a city needs to follow to further advance local resilience maturity, by promoting cross-sector collaboration between the city's administration, local stakeholders and citizens.

1.2. A NEW DEFINITION FOR CITY RESILIENCE

The project has developed a definition of city resilience, which is:

"the ability of a city or region to resist, absorb, adapt to and recover from acute shocks and chronic stresses to keep critical services functioning, and to monitor and learn from on-going processes through city and cross-regional collaboration, to increase adaptive abilities and strengthen preparedness by anticipating and appropriately responding to future challenges" (Bång, Rankin 2016).

1.3. NEED FOR A RESILIENCE MANAGEMENT PROCESS

Cities and their local governments are confronted with challenges to sustainability and resilience management, including the from lack of data availability, lack of knowledge of the costs and benefits of adaptation and resilience activities at municipal or regional level, lack of indicators that measure the success of these activities, and the absence of coordination between the different tiers of governance and lack of cross-silo collaboration.

Work with municipal employees and practitioners at local level has shown that when dealing with cities, managing tasks individually and sectorally is often inefficient and leads to increased workloads and weak results.

City practitioners who work on resilience-related projects and are aware of the potential multiple benefits to be gained can struggle to win political commitment and secure mandates for action or receive financing for necessary projects. However, in practice, cities are political organizations; they need to do regular planning of their activities and need to engage and provide public services to their citizens.

A detailed planning approach is therefore needed, which takes into account the political element, involvement of stakeholders and provides for ongoing communication for resilience-building activities. Re-organising existing practices, plans and strategies into an integrated resilience planning process can systemize the work, boost efficiency and provide a multitude of positive outcomes.

These will include:

- awareness raising on city resilience and sustainability;
- improved decision support at local level in cities;
- increased transparency and advanced monitoring action;
- enhanced trust in local and regional governance;
- activation and mobilization of citizens through co-creation activities;
- contribution to a sustainable and resilient economy;
- better perspectives for a bottom-up inclusive resource governance at local level

Inevitably, local planning for resilience needs to take into account commonly accepted concepts for climate change adaptation and sustainability. The European Resilience Management Guideline can also be described as a journey towards robustness and resilience maturity, in which the city participates through five consecutive steps that support one another.

Therefore, the use of a European Resilience Management Guideline for cities will help channel resources towards defined goals and secure commitment and accountability in decision-making. Using an integrated and systematic approach for city resilience development can help harness the effort otherwise lost in running several parallel management systems and processes, and feed this into increased sustainability and resilience.

2. THE EUROPEAN RESILIENCE MANAGEMENT GUIDELINE

The European Resilience Management Guideline is a framework that directs available resources towards well-defined goals, while securing transparency and the democratic principles of decision-making for city resilience development and planning.

This framework makes use of five strategic resilience-building tools, which support the various steps, thus forming an iterative and systematic resilience-building process where cities may have different starting points and needs in terms of resilience maturity.

The European Resilience Management Guideline should be used at least once during every political cycle, especially if the local leadership changes, and when the city is clearly moving from one stage of resilience maturity to the next one.[1]

The European Resilience Management Guideline provides guidance to cities and local governments in assessing and strengthening their local resilience status. This is achieved through setting measurable targets together with local stakeholders and co-creating a city resilience strategy making use of the five tools to build local resilience and progress within the maturity stages.

[1] For more information on resilience maturity as understood by the project, please see 6.1.

The European Resilience Management Guideline therefore defines an operational framework that provides guidance and aims at training and supporting municipalities and relevant stakeholders in implementing an integrated management process that enhances city resilience.

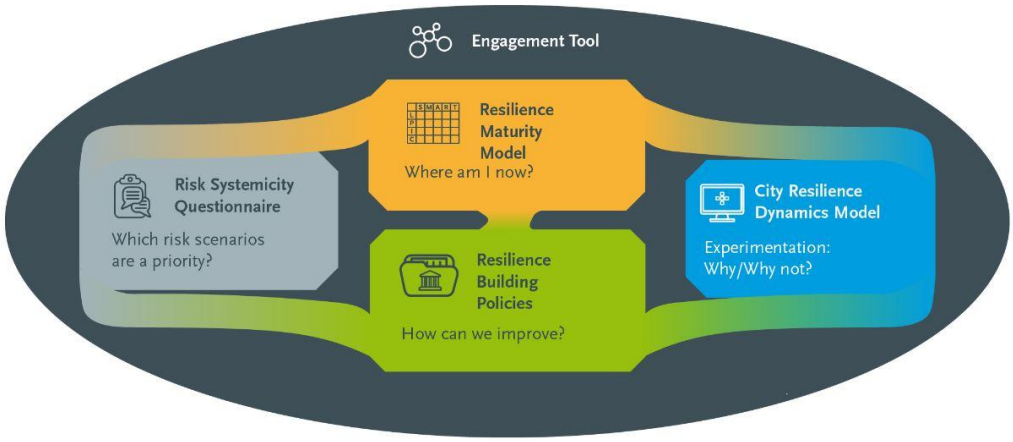
In a nutshell, the European Resilience Management Guideline:

1. **Provides guidance** to cities and local governments in assessing their local resilience status;
2. **Sets measurable targets** together with local stakeholders, using the five tools to help the city further build local resilience and progress within the maturity stages;
3. **Defines an operational framework** that trains and supports municipalities and relevant stakeholders in implementing an integrated management system that enhances city resilience and helps cities improve their resilience maturity status

The five tools developed within the project are:

1. Resilience Maturity Model
2. Risk Systemicity Questionnaire
3. Resilience Information Portal
4. City Resilience Dynamics Tool
5. Resilience Building Policies tool

The figure below shows how the five resilience-building tools that are included in the European Resilience Management Guideline interact and interrelate with one another. More information on each tool are mentioned and described in Chapters 4 and 6 of this report.



Graph 1: *The interrelations of the five resilience-building tools that are included in the European Resilience Management*

The European Resilience Management Guideline enables the creation of strategic thinking within the local government or municipality in a way of understanding the fundamental drivers of the resilience building process and challenging conventional thinking about it, in discussion with municipal staff and involved stakeholders.

2.1. MAIN USERS AND SECTORS

The European Resilience Management Guideline is primarily targeted towards:

1. Policy and decision makers at city level and councillors working for climate adaptation and urban resilience; also those involved in civil protection and social welfare
2. Other city stakeholders working on resilience in their cities, (e.g. (not limited to) critical infrastructure managers, service providers, emergency services, media, civil society associations, non-governmental organizations, academic and research institutions, consultancies)

Apart from these two major groups, the European Resilience Management Guideline can be potentially used by any stakeholder or citizen interested in resilience topics.

Also, the European Resilience Management Guideline is targeting the following 3 sectors at city level:

1. Climate Change
2. Critical Infrastructure
3. Social Dynamics

2.2. FIVE STEPS TO OPERATIONALISE CITY RESILIENCE

The European Resilience Management Guideline consists of five steps that shall be repeated in regular cycles; typically these cycles would be annual, but subject to the specific needs of cities. Although the system follows a regular cycle, full revision shall be required once per political cycle or after an election period – and preferably at the outset - unless evaluation of achievements and results at the end of an annual cycle suggests reconsideration.

These **five steps** that can help each city to build resilience are the following:

1) Baseline review
2) Risk awareness
3) Co-creation of resilience strategy
4) Implementation and monitoring
5) Evaluation and reporting

Two cross-cutting elements are required and need to be kept into mind, and perform relevant activities, throughout the steps of the cycle, and these are:

— A comprehensive and targeted organizational setup, including the formation of teams, sub-teams and working groups that have well-defined objectives and clear tasks and responsibilities

— The continuous communication and engagement with stakeholders, including the general public, through citizen associations and activated citizens

From the very beginning of the cycle, it is important to carefully plan who is involved in the process, what their responsibilities are and in what and how they can contribute. Identifying and reaching out to as many actors and stakeholders as possible who are directly or indirectly involved in activities related to resilience will make the effort a common interest and thereby more likely to succeed.

In addition, well-functioning organizational setup of the operational guidance will exert decisive impact on the success of the undertaking. Cooperation with stakeholders should always be considered as a cross-cutting element, and for this reason, the European Resilience Management Guideline makes use of a communication and engagement tool in the form of a Resilience Information Portal, basically throughout all operational steps, with a tailored but varied approach.

In each of the five steps of the operational guidance framework, one or more of the following five tools support the city resilience development:

1) Resilience Maturity Model;

2) Risk Systemicity Questionnaire;

3) Resilience Information Portal;

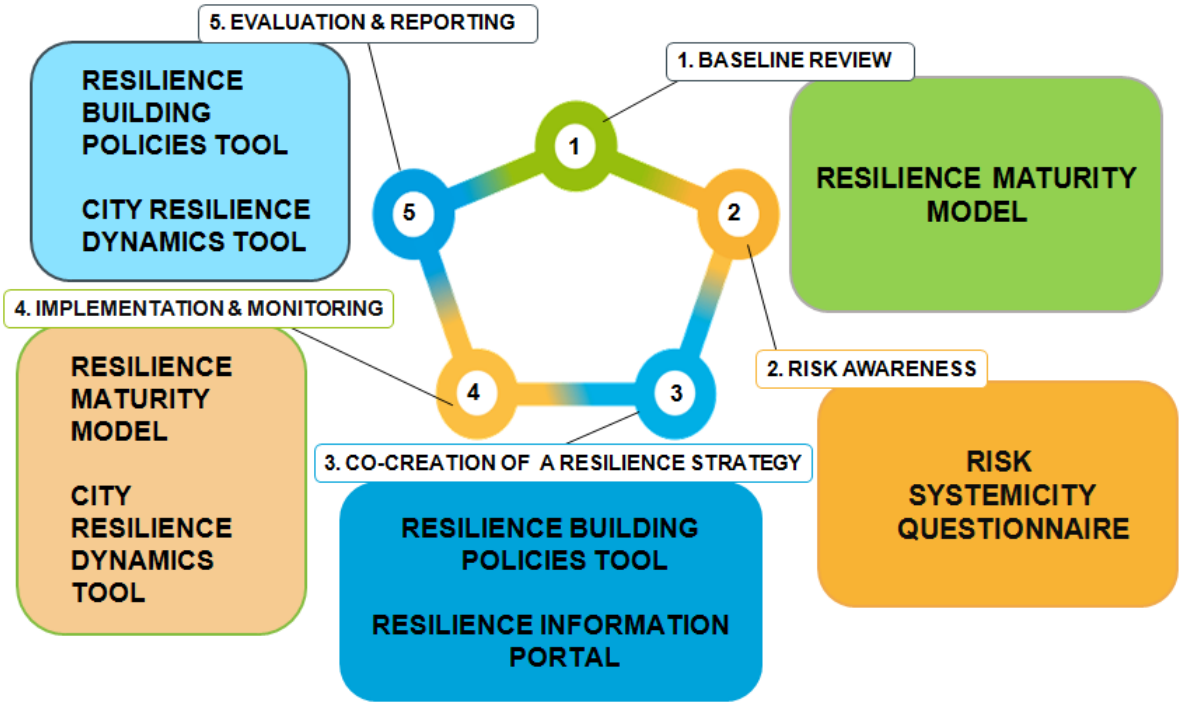
4) City Resilience Dynamics Tool and

5) Resilience Building Policies tool

Graph 2 shows the activities and actions that are included in each of the steps of the European Resilience Management Guideline or, in other words, the operational guidance framework that the European Resilience Management Guideline proposes. These activities will be described in detail in the Chapter 3.

Graph 3 shows which tools are used in each of the steps of the European Resilience Management Guideline. More information on how to practically use each tool, including additional examples in the form of good practices for the implementation of each step are mentioned and described in the Chapters 4 and 6 of this report.

Graph 2 — *the European Resilience Management Guideline*



Graph 3 — *the use of Resilience tools within the operational steps of the European Resilience Management Guideline*

3. TOWARDS A EUROPEAN RESILIENCE MANAGEMENT GUIDELINE

3.1. THE JOURNEY IN A NUTSHELL

The European Resilience Management Guideline and its supporting tools were developed as part of a co-creation process, at the core of which lay an emphasis on cities learning from cities.

Building cross-cultural awareness and recognizing differences in local circumstances are standard practices for international practitioners in various sectors. However, when new information, technology and tools are added to this already sensitive process, further support is needed in order to ensure that new technologies are transferred as context-appropriately as possible and to facilitate further external support through network-building.

The European Resilience Management Guideline aims to provide this support by guiding practitioners in adopting and performing an integrated management process for local resilience building, through a step-by-step approach.

3.1.1. THE EUROPEAN RESILIENCE BACKBONE

The project followed an approach that engaged different cities in 4 tiers – three pilot cities, 4 peer-reviewer cities, 9 engaged cities and 10 learning cities.

TIER 1: THREE PILOT CITIES

Glasgow, Kristiansand and Donostia / San Sebastián were active project partners and served as a testing ground for the pilot tools. These cities were actively involved in co-creating the tools.

TIER 2: PEER-REVIEWER CITIES

The partner cities included in the second circle (tier 2 cities), Bristol, Rome, Riga and Vejle, were each paired with one of the pilot cities according to common levels of resilience maturity. These cities

learned together with their partner Tier 1 cities. In their role as peer-reviewers ('critical friends') they evaluated the implementation and provided.

Learning and benefits were transferred onto the tier 2 cities through the comparison and exchange regarding current policies and procedures in their cities, as the tier 1 cities tested the project's pilot tools. Tier 2 cities learnt from the structures already in place in the core cities and had close collaborative relationships with their partners from tier 1 cities.

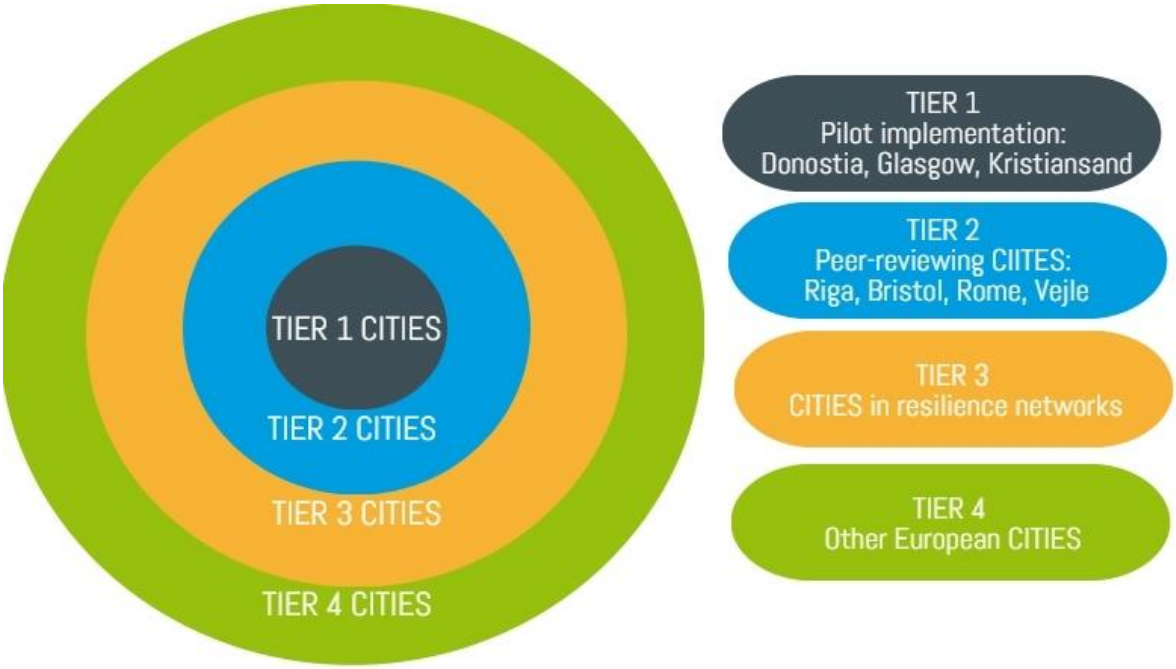
TIER 3: ENGAGED CITIES

The 'Engaged cities' were cities already active with regard to resilience, e.g. those who are already active participants in international resilient cities projects and networks.

These cities were invited to attend a Stakeholder Dialogue and Stakeholder Workshop and also four Regional Cluster Workshops (all part of a final pilot implementation process), where they had the opportunity to receive training on the use of the tools during the workshops. These cities were invited to tell their resilience story and be recognized for their progress towards ensuring a more resilient city for their citizens. These cities were already engaged in resilience networks or collaborating with project partners on resilience-related activities**.** Their involvement in the project included a written albeit non-legally binding agreement to be involved in the project. Relevant resilience networks are: ICLEI member cities, members of 100 Resilient Cities and cities working on projects and collaborating in events with ICLEI as another project partner or coordinator (e.g. RAMSES, RESIN, GREEN SURGE and Open European Day).

TIER 4: INFORMED CITIES

'Informed CITIES' refers to the fourth circle of cities, which is made up of those cities potentially interested in the project outcomes. Tier 4 cities were informed through communication activities and by invitation to events, like the Stakeholder Dialogue and Stakeholder Workshop and also the four Regional Cluster Workshops (all part of a final pilot implementation process), where they had the opportunity to receive training on the use of the tools during the workshops. These cities were also invited to the final project city conference in April 2018, scheduled to take place back-to-back with the Open European Day 2018.



Graph 4 — *the four tiers of cities involved in the project*

The following table shows the distribution of cities in the different tiers.

TIER 1	TIER 2	TIER 3	TIER 4
PILOT CITIES	**PEER-REVIEWER CITIES**	**RESILIENT CITIES**	**LEARNING CITIES**
Donostia-San Sebastian, SPAIN	Bristol, UNITED KINGDOM	Greater Amman Municipality, JORDAN	London, UNITED KINGDOM
Glasgow, UNITED KINGDOM	Riga, LATVIA	Athens, GREECE	Larissa, GREECE
Kristiansand, NORWAY	Rome, ITALY	Thessaloniki, GREECE	Pavlos Melas Municipality, GREECE
	Vejle, DENMARK	Stirling, UNITED KINGDOM	Alba, ITALY
		Malmö, SWEDEN	Prague, CZECH REPUBLIC
		Greater Manchester,	Cagliari, ITALY

	UNITED KINGDOM	
	Malaga, SPAIN	Potenza, ITALY
	Münster, GERMANY	

Table 1: *the distribution of cities within the four tiers*

As mentioned above, tier 3 and tier 4 cities were involved in a final pilot implementation process of the European Resilience Management Guideline as a whole, from November 2017 to March 2018 and were able to provide their feedback and contribute to the finalization of the Guideline. The results and outcomes of this pilot implementation process are summarized in project deliverables D7.4 and D7.6.

3.1.2.PILOT TESTING WHILE CO-CREATING

From the beginning of 2016 to the end of 2017, the pilot and peer-reviewer cities were engaged in a facilitated, iterative pilot implementation process that aimed to test, validate and peer-review the resilience building tools that were developed by the research partners. The main elements of the iterative implementation in each city were:

1) An initial 'kick-off workshop' in each that aimed to gather the most relevant stakeholders in the implementing cities for the selected security sector;

2) A series of webinars, together with the peer-reviewer cities that had the opportunity to ask questions and provide their insights and feedback on the ongoing tool development (external stakeholders were always invited to attend the webinars);

4) A review workshop during which the implementing cities provided feedback on the implementation process to the tool developers, while the peer-reviewing cities shared their additional feedback and summarized their recommendations for the finalization of the tool through a combination of facilitated discussion, based on guiding questions, and conduct of interactive exercises in breakout groups; and

5) Stakeholder training workshops in each implementing city, once the tools were already functional in beta version; these workshops mainly aimed to present the tool to the most relevant stakeholders and provide with an up-to-date and ready-to-use application that could support the city's resilience building efforts. The stakeholders were then asked to provide their feedback and shape the next version of each tool

In preparation of each training, workshop or meeting, value was added by including considerations of environmental, economic, societal and individual interests within existing resilience networks upon planning and organization of the training session. In each workshop, mini-lectures introduced the tools, and will aim to hint already on potential challenges and difficulties in transferring to other contexts. The facilitators co-created, together with the city partners, case studies that were relevant and applicable at local city context to serve as a basis for the application of tools during the workshops.

The pilot implementation activities took place with the support of the local research partners in the implementing cities, while ICLEI was acting as external coach and coordinator, facilitating knowledge and information exchange between partners and city officials and representatives. During this period, partners and city stakeholders had the chance to explore and validate the tool in the security sectors that were already identified and to provide input to the tool developers for the finalization of it; input that was used to constantly update the portal's functionalities and improve the tools' qualities.

For more information on the methodological approach and the way that the pilot implementation process took place, please consult the project deliverables D5.1 - D5.7.

3.2. METHODOLOGICAL APPROACH AND LESSONS LEARNT

During the pilot implementation process, in total 15 stakeholder training workshops took place in the pilot cities for a period of 14 months (this does not include the 6 additional workshops with the involvement of the nine tier 3 cities in a period of 6 months) - and with thematic focus on local planning for resilience, risk awareness, baseline review etc.

Practitioners improved recognition of key determinants for local resilience planning and identified appropriate institutional networks and local processes for transferring the European Resilience Management Guideline and the innovation on resilience it proposes to their local context.

Emphasis was placed on integrated network-building approaches that considered:

(1) cultural geographical and climatic appropriateness,
(2) market and infrastructure feasibility of implementation in the recipient cities and regions,
(3) individual determinants like acceptance, perceived quality of life and demands

Participants were able to apply the knowledge gained in scenarios explained by the instructors to plan out local strategies for resilience that could potentially transfer to real city processes. In most time they were encouraged to discuss this strategy with their departments and superiors and were introduced into train-the-trainer modules to be able to further discuss and introduce the tools to their colleagues.

Some examples from the implemented workshops are listed here;

- in Glasgow, stakeholders were engaged in a scenario planning exercise around a severe flooding incident
- in Kristiansand some cases focused on challenges revolving from social dynamics, like social alienation, youth loneliness and ageing population, while
- in San Sebastian the scenarios focused around pluvial and fluvial flooding and cascading effects like energy outages and landslides

Semi-structured discussions followed the exercises centered on each tool, with a main focus on improving strategies for applied resilience building activities.

One of the most important element for the success of the stakeholder focus groups was the identification of what city stakeholders require to increase the city resilience level and the barriers that still need to be overcome has been helpful to define the specific requirements that each of the five tools included in the European Resilience Management Guideline should fulfill.

Additionally, invited citizens were also involved in the focus groups and workshops in order to better engage with the civil society and to make sure that the tools will be as much as possible tailor made to the implementing cities' needs. This appeared to be a complex issue, as not many citizens responded to this call, something that reinforced the earlier adopted approach that the tools are mainly targeting crisis and infrastructure managers, as well as municipal staff and stakeholders engaged in strategic planning and management. Citizens interested in the topic of resilience could therefore be using the European Resilience Management Guideline in their future work, but this is subject to their own motivation.

The facilitators in collaboration with the city partners identified the existing action and master plans existing in each city on sustainability, climate change, critical infrastructure/emergency planning and environmental management and tried through the workshops to find how the resilience tools and the integrated European Resilience Management Guideline framework can complement the existing

frameworks and also to identify gaps and potential challenges that have not been considered when developing these action plans.

Despite the overall success of the pilot implementation, it should be noted that limitations of scenario building became apparent in the stakeholder training workshop. While the creation of scenarios that are suitable and useful for testing of the tools beta versions is confirmed, scenarios that are realistic depictions of incidents in cities have been said difficult to create.

3.3. STANDARDIZATION WORK BASED ON THE EUROPEAN RESILIENCE MANAGEMENT GUIDELINE

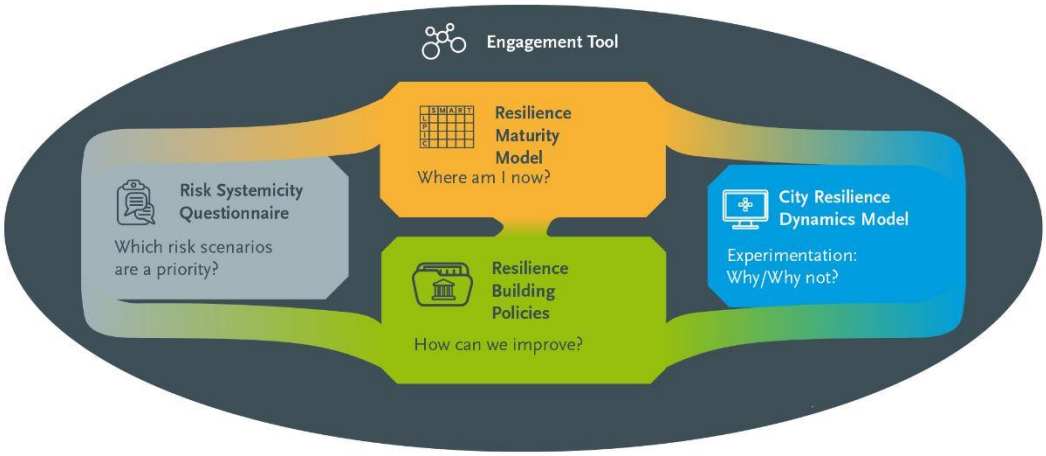
The project partners engaged in a standardization process, through which a standards series with the overall name 'City Resilience Development' was developed. In this series, three standards have been under development from June 2017 to June 2018 and these are: City Resilience Development – Information Portal, City Resilience Development – Maturity Model, and City Resilience Development – Operational Guidance.

The CEN Workshop Agreement City Resilience Development – Operational Guidance was developed in parallel with the last pilot implementation process with the involvement of the tier 3 cities and also fed the development of the Deliverable D 5.9 European Resilience Management Guideline and the co-creation of the Guideline as a whole.

In more detail, the CEN Workshop Agreement describes a framework that provides operational guidance for city resilience development in five steps, and afterwards it provides detailed information about each step, including the activities, actions and processes each step entails. The annex gives an example of how the operational guidance could be implemented at city level and gives more information on the tools used in each step. The main outcomes of this combined work have provided input for the finalization of the European Resilience Management Guideline and are included in chapter 5 of this report. For more information about this CEN Workshop Agreement, please refer to the project deliverable D6.5.

4. THE RESILIENCE TOOLBOX

The five tools developed within the project are: 1) a Resilience Maturity Model, 2) a Risk Systemicity Questionnaire, 3) a Resilience Information and Communication Portal, 4) a City Resilience Dynamics Model and 5) a Resilience Building Policies tool. The SMR Tools are all available here: http://smr-project.eu/tools/



Graph 5: The SMR resilience toolbox

2.1. The *Resilience Maturity Model* (RMM) helps cities to assess their resilience status and identify the ideal path for the evolution of the resilience building process from an initial stage to a more advanced stage, going through a number of intermediate stages. The RMM enables, on a strategic level, the development of an assessment of a city's current resilience status identifying areas of improvement. Based on this initial assessment, a city uses the RMM to guide the definition of the strategy to increase their resilience level, based on the policies included in it. The main goal of the RMM is to provide an optimum path to increase the resilience level of cities. The RMM also aids reflection since it provides a holistic overview of the resilience building process and helps end-users to understand resilience as a multidimensional objective.

The tool is accessible through the project website and the link: http://smr-project.eu/tools/maturity-model-guide/resilience-maturity-model/

For more information regarding the use of the *Resilience Maturity Model* (RMM) and how to use it, please refer to chapter 5 of this report.

2.2. The *Risk Systemicity Questionnaire* (RSQ) has been developed to address the risk assessment aspect of increasing the resilience level of cities. The RSQ has been designed as an interactive set of questions, which city stakeholders typically complete in a group. The main purpose of the tool is to encourage focused, interdisciplinary conversations about those risks that are of greatest concern to the city. It focuses on ten risk areas that became significant as the data that was gathered from Tier 1 and Tier 2 cities was analyzed, where each risk area contains 10-12 significant risk scenarios. The RSQ considers risk scenarios as causal chains and vicious cycles. For each risk scenario users are asked to provide an answer with respect to the likelihood of occurrence of that scenario in their own city. Upon completion of the RSQ, the user is presented with a prioritization which may then be used as a focus for developing mitigation strategies.

The tool is accessible through the project website and the link: http://smr-project.eu/tools/risk-systemicity-questionnaire/

For more information regarding the *Risk Systemicity Questionnaire* (RSQ) and how to use it, please refer to chapter 5 of this report.

2.3 The *Resilience Information and Communication Portal* (RP) serves as a toolbox that can complement and enhance the platforms and software that cities already have in place. It allows cities to display data internally or publicly that is already available to the city as it applies to resilience, vulnerability and crisis situations. The portal allows for different levels of users to allow for city managers, critical infrastructure providers, citizens or other stakeholders to be able to contribute information as applies to a given city context. The portal offers added value not available otherwise to cities (as they self-reported), as the cities have multiple (and in Glasgow's case, dozens) of platforms in place in their municipalities for internal communication, but the wealth of information available to them is not integrated, streamlined or fully utilized.

The tool is accessible through the project website and the link: http://smr-project.eu/tools/resilience-information-portal/resilience-information-portal/

For more information regarding the *Resilience Information and Communication Portal* (RP) and how to use it, please refer to chapter 5 of this report.

2.4. The *City Resilience Dynamics Tool* (CRD) aims to help city disaster managers diagnose, explore and learn about the resilience building process. They can use the tool to make decisions and be able to take the correct actions in the resilience building process. The simulation model encapsulates the most important aspects of the RMM and helps to encompass the RMM in a training environment for the cities to learn about the path towards improving resilience. The model allows the user to try different policy options, identifying the implications of each of them in the resilience improvement process.

The tool is accessible through the project website and the following two links, respectively for the full version (including 45 policies) and the shorter version (including 19 policies): http://agder-ikt78.uia.no/cityrd45/ and http://agder-ikt78.uia.no/cityrd19/

For more information regarding the *City Resilience Dynamics Tool* (CRD) and how to use it, please refer to chapter 5 of this report.

2.5. The *Resilience Building Policies* (RBP) tool is an extension of the online version of the RMM. It combines custom ways to view policies contained in the RMM with detailed information and examples from case studies detailing policy implementation in partner cities, references of sources to case studies from other cities around the world, and links to risk mitigation actions that support the policies.

The tool provides a comprehensive reference centre for high-level strategic managers in cities as well as municipal workers tasked with implementing the policies that have been planned; comprises illustrative real case studies of policy implementation in cities; includes references to other sources that provide details of case studies of policy implementation in cities; provides a practical point of reference for cities considering the implementation of related policies; provides illustrative detail for the policies in the RMM and the CRD and can be navigated conveniently via a dedicated webpage that also includes a wiki format and invites cities to upload their own case studies and be part of a European resilience culture.

The tool is accessible through the project website and the link: http://smr-project.eu/tools/resilience-building-policies/

For more information regarding the Resilience Building Policies Tool and how to use it, please refer to chapter 5 of this report.

5. HOW TO OPERATIONALISE AND DEVELOP CITY RESILIENCE

The present chapter describes in detail what each step of the European Resilience Management Guideline means for the resilience-building process and what are the activities that each city should implement in order to fulfil the step's requirements, while it also provides with some lessons learnt from the cities that participated in the co-creation process.

5.1. BASELINE REVIEW

The first step of the European Resilience Management Guideline, therefore the first step in the resilience-building process refers to the assessment of the present resilience condition of a city, performed by its local government through a dedicated team. The local government and in particular those departments that deal with climate adaptation/resilience, sustainability and/or civil protection/social welfare (depending to each administration structure) create an assessment framework that will later serve as a basis for setting priorities and targets for the co-creation of a resilience strategy and action plan and for the monitoring of progress by making use of indicators.

The Baseline Review refers to an analysis of the challenges and pressures that have led to the current situation as well as the impacts those pressures have on various parts of the society, economy and environment, and the policies and measures already in place. The baseline review is a regularly performed action, which shall be conducted by a cross-sectoral working group or team.

5.1.1. TEAM FORMATION

Each city engages in the creation/formation of a team that shall work in the resilience-building process and will be responsible for all topics, issues and challenges that will be related to resilience, but also with regard to its mainstreaming into traditional practices. The team will be responsible for the development of a work plan with clear targets, milestones and planned actions and activities. The city, through the resilience team will engage in an exhaustive stakeholder mapping and analysis. Following the stakeholder mapping, the team will develop a communication and engagement strategy that will be followed throughout the consecutive steps of the European Resilience Management Guideline.

5.1.2. VULNERABILITY ANALYSIS

The Baseline Review involves a comprehensive and detailed vulnerability analysis of the city, which maps key statutory duties and requirements and existing frameworks that are relevant to resilience, data regarding all significant aspects, emerging issues and trends, political priorities in the city's sustainability and resilience agenda, departments and external organizations involved, existing instruments and systems, risks and opportunities.

The team that performs Baseline Review will also engage in collecting and reporting upon the resilience of key infrastructure assets in the city shall be conducted- largely desktop based, but also supplemented by interviews with relevant officers in municipality. The team should assess and evaluate existing and available tools to perform vulnerability analysis, considering adopting the use of new tools that will be identified, while also assessing the resources that will be needed to perform a vulnerability analysis.

Before moving to the next step, the local government, involving relevant departments and municipal staff should also identify and promote the economic strategy of the city, including assessment of financial/funding/investment opportunities. The Baseline Review determines the geographical and thematic scope of the European Resilience Management Guideline, setting its boundary conditions and should be performed each time that new conditions and information comes into place or when the city is moving up further in the resilience maturity process.

5.1.3. LESSONS LEARNT FROM CITIES

The Baseline Review should be renewed at least once in a political cycle or more often if the evaluation either suggests significant deviation from targets or surrounding conditions have changed substantially, as new trends and information emerged. The Baseline Review should promote cross-sectoral cooperation involving external urban stakeholders (city operators) and especially citizens when evaluating the resilience maturity status of the city.

The city should engage in the appointment of a sub-team in the cross-sectoral working group to perform regular Baseline Review, regardless of political changes or other challenges and continuously update the existing data as judged as necessary. Baseline Review should evaluate how the various tools that are used for vulnerability analysis, but also for the resilience-building process complement each other. All relevant stakeholders for the resilience-building process should be carefully mapped and ideally contacted to create momentum for resilience and ensure future mainstreaming into traditional city practices.

5.1.4. USE OF THE RESILIENCE MATURITY MODEL WITHIN THE STEP

In this step, the *Resilience Maturity Model* (RMM) is used to identify the resilience maturity stage in which the city is, what the policies in place are and what the activities that the city has already undertaken in the resilience building process are. The Resilience Maturity Model provides a common understanding of the resilience building process. Using the Resilience Maturity Model, cities are asked to consider their current status of resilience. The model then helps to identify the correct policies to implement in order for the city to evolve and move to the next maturity stage.

Within the Baseline Review, the Resilience Maturity Model helps cities to assess their resilience status and to identify the ideal path for the evolution of the resilience building process from an initial stage to a more advanced stage, going through a number of intermediate stages. The RMM enables, on a strategic level, the development of an assessment of a city's current resilience status identifying areas of improvement. Based on this initial assessment, a city shall use the RMM to guide the definition of the strategy to increase their resilience level, based on the policies included in it. The main goal of the RMM is to provide an optimum path to increase the resilience level of cities. The RMM also aids reflection since it provides a holistic overview of the resilience building process and helps end-users to understand resilience as a multidimensional objective.

For more information on how to make use of the Resilience Maturity Model within the Baseline Review, please see chapter 5 of this report.

5.2. RISK AWARENESS

In the second step of the European Resilience Management Guideline, the city within its relevant directorates and departments shall conduct regular risk assessment/analysis of the perils the city faces, in different sectors and levels of governance.

“Resilience … requires actively understanding the risk landscape” (van der Vegt et al, 2015: 972) therefore this step refers to performing regular risk analysis to appreciate the uncertainties that are of greatest priority to a city. A range of stakeholders are required to participate in this step to ensure a wide perspective is taken with respect to the types of risk a city faces and to get people to think differently about risk, considering the complex consequences that can arise when risks interact with one another.

5.2.1. INTRODUCTION OF A NEW TOOL

Next to the regular risk assessment that cities are performing, this step uses a tool, the Risk Systemicity Questionnaire, to help understand the interconnections between risks. This ensures that the city moves beyond traditional approaches that attempt to understand the impact of individual risks and, instead, considers the impacts of risk scenarios that are created from the interconnections between risks and how they change over time.

A working group that includes the future resilience strategy team for the city, along with stakeholders who play a key role in the development of the resilience strategy would meet to discuss different risk scenarios for the city. The working group will identify those risk scenarios that are of greatest priority to the city and thus action focused on mitigating these scenarios and their consequences will be discussed and prioritized. The process may highlight areas where further experts need to be consulted in order to be able to judge whether some risk scenarios are of concern to the city.

By making use of the Risk Systemicity Questionnaire, the working group will discuss the interdependencies between risks through exploring risk scenarios created by these interdependencies. Some of these scenarios will include vicious cycles – scenarios that escalate and get worse over time, with a multitude of cascading events.

The tool will support prioritisation of those risk scenarios of greatest concern to the city. The working group will then review risk mitigating and adapting actions and start developing individual strategies, for tackling the risk scenarios and their potential devastating consequences.

5.2.2. LESSONS LEARNT FROM CITIES

A city, in this step, should bring together multi-disciplinary groups to share knowledge and discuss risk interdependencies and their consequences. The Risk Systemicity Questionnaire should be used regularly be to enhance more traditional risk assessment approaches.

The city should make sure that the team is working on this step, performing risk assessment and making use of the Risk Systemicity Questionnaire each time that a significant new risk or challenge appears and changes the city risk environment. Nevertheless, the Risk Systemicity Questionnaire could and should be further used to promote dialogue on risk awareness and to emphasise engagement with stakeholders, by inviting them in multi-disciplinary working groups.

The city should ensure they reflect on the dynamic and changing nature of risks at local, regional and even national level. The city should introduce a system perspective through looking at the complex network created by risks and their interdependences and how this changes over time.

Risk awareness is an important part of risk mitigation i.e. providing information to citizens about risk and should be perceived as such. The city should organise workshops and discussion sessions that will invite and involve citizens and raise their risk awareness.

5.2.3. USE OF THE RISK SYSTEMICITY QUESTIONNAIRE WITHIN THE STEP

In this stage, the Risk Systemicity Questionnaire shall be used to identify and prioritize risk scenarios, where interdependencies between risks are shown to lead to networks of risks including vicious cycles and to review and prioritize mitigation and adaptation actions.

The *Risk Systemicity Questionnaire* (RSQ) is an Excel based tool that presents a range of risk scenarios that may occur in a city and asks users to consider the relative likelihood of these risk scenarios occurring in their city. Users are expected to use the RSQ as a group to promote discussion and awareness about the interconnections between risks across multiple stakeholders. These risks that are presented are spread across ten risk areas and are considered as networks of interrelated risks. These networks of risks are presented as risk scenarios, some of which result in vicious cycles. Users progress through the tool by completing questions, which ask them to consider whether defined risks scenarios are likely or not to occur in their cities. Based on the responses to the questions participants are provided with a prioritisation of the risk scenarios for their city. In addition users can access policies recommendations that may be used to address those risk scenarios that are of most threat to the city. The purpose of the questionnaire is for it to be used by groups of users with diverse areas of expertise so that it can prompt valuable discussions where different stakeholders' experiences can be brought together to determine a city's priorities to enable them to anticipate and appropriately respond to future challenges.

For more information about how to use the Risk Systemicity Questionnaire, refer to chapter 5 of this report.

5.3. CO-CREATE A CITY RESILIENCE STRATEGY

In the third step, a city will engage in developing a resilience strategy which will include a strategic action plan, across different timescales with targets, indicators and timeframes, aimed at the prevention of risk, the reduction of risk and the strengthening of economic, social, health and environmental resilience (UNISDR Sendai Framework, p. 17 276).

5.3.1. MAKING USE OF AVAILABLE RESOURCES AND PROCESSES

A city needs to utilise the tools to support its ability to customize aspects of the strategy development process to the city's unique challenges, including shocks and stresses, and potentials (e.g. financial and technical resources). The strategy should definitely have an ambitious vision for 30-50 years ahead, while the action plan should include proposals by stakeholders and achievable and practical aims; and having a more limited timeframe.

The process is not linear, but rather iterative, and shall be carried out across different timescales, with the city continuously collecting information, data and tools, synthesizing results and cross-evaluating them. The process shall involve identification and definition of resilience priorities, options and opportunities linked to shocks and stresses, while in parallel mainstreaming resilience into existing plans and projects,

The city will mainstream resilience and the resilience-building process into existing strategies, draft action plans and existing frameworks on other topics, like smart cities, sustainability or sustainable mobility; this shall happen only when relevant and linked to identified shocks and stresses in step 1 or vicious circles of risks in step 2. The city should engage a wide team of municipal employees and stakeholders in the identification of barriers and drivers for the resilience building process at city level.

The city will also adopt existing or formulate new resilience indicators and city metrics that will be used for the evaluation and reporting upon the implemented activities in step 5. The city shall review available and existing funding sources and shall bring in new partners and stakeholders from across the city to engage in the co-creation process. Stakeholders, including politicians and citizens shall be consulted as part of the strategy development and drafting process. The city shall engage with the general public to get feedback; this shall be done also by making use of the Resilience Information Portal (see chapter 5 of this report).

5.3.2. LESSONS LEARNT FROM CITIES

A city should follow EU guidelines on open data, while collecting and sharing data among its departments. This process is not linear, but rather iterative with the city continuously collecting information, data and tools, synthesizing results and cross-evaluating them, in a targeted effort to mainstream resilience and create resilience culture among citizens and stakeholders.

The local government should organize open consultation meetings and workshops for the development and internal evaluation of the strategy, before its release and for awareness-raising. The city should learn from good practices and especially from challenges that other cities have faced, i.e. by using the Resilience Building Policies tool. Most importantly, the city should not only replicate, but mainly adapt and improve existing use cases. Communication between departments and between the city and its stakeholders should be improved and data belonging to the municipality should be shared between departments.

5.3.3. USE OF THE RESILIENCE TOOLS WITHIN THE STEP

In this step, the Resilience Information Portal (RP) should be used to create the necessary momentum for the expected release and the adoption of the city resilience strategy among the citizens, but also to reinforce the importance of the resilience building process and get the necessary political commitment.

The *Resilience Information Portal* serves as a toolbox that can complement and enhance the platforms and software that cities already have in place. It allows cities to display (internally or publicly) data that is already available to the city as it applies to resilience, vulnerability and crisis situations. The portal allows different levels of users to contribute information to a given city context. It also offers added value not available otherwise to cities, as the cities have multiple platforms in place in their municipalities for internal communication, but the wealth of information available to them is not integrated, streamlined or fully utilized. A city can set up its own information portal by using the web-based template the project has provided. The portal then shall be used on the one hand to raise awareness about the resilience building process, but also will reinforce the creation of strategic partnerships and will communicate the resilience strategy (already during its development).

Additionally, in this step the Resilience Building Policies tool should be used, as it provides a database of good practices from other European cities, along information about what worked well and what not

in the implementation of similar policies in other cities. The users can therefore use these lessons learnt for the benefit of the city, avoid mistakes and guide the development of the strategy in a more effective manner.

The *Resilience Building Policies* (RBP) tool is an extension of the RMM. It combines custom ways to view policies contained in the RMM with detailed information and examples from case studies detailing policy implementation in partner cities, references of sources to case studies from other cities around the world, The tool provides a comprehensive reference centre for high-level strategic managers in cities as well as municipal officers/staff tasked with implementing the policies that have been planned; comprises illustrative real case studies of policy implementation in cities; includes references to other sources that provide details of case studies of policy implementation in cities; provides a practical point of reference for cities considering the implementation of related policies; provides illustrative detail for the policies in the RMM and the CRD and can be navigated conveniently via a dedicated webpage that also includes a wiki format and invites cities to upload their own case studies and be part of a European resilience culture.

5.4. HOW TO PERFORM IMPLEMENTATION OF ACTIONS AND CONTINUOUS MONITORING

In this step of the European Resilience Management Guideline, the implementation of the resilience strategy and the included action plans as well as a continuous monitoring of all implemented actions and activities takes place.

5.4.1. FROM STRATEGY TO IMPLEMENTATION

The main objective of this step is to improve the way the city functions in terms of resilience development and long-term sustainability. The implementation of activities described in the resilience strategy that was created in the previous step is a demanding task in terms of organisation and coordination of all parallel actions that are included in the strategy and aim at responding to the identified risks at city level.

Turning measures outlined in the action plan into projects requests a proper project planning including work-plan, roles and responsibilities for an individual action. Therefore, implementation requires

detailed and comprehensive planning of activities and prioritization of actions, while again concrete organisational setup and above all communication and stakeholder involvement.

The step includes elaboration of concrete project plans, development and reinforcement of strategic partnerships and the practical implementation of plans and projects. In parallel, and for the purpose of being able to measure and report the results, the implementation of the resilience strategy and its action plans shall be monitored in an appropriate way and fed back to the politicians and the involved relevant stakeholders, especially the ones that have been involved actively in the co-creation process that was used to develop and deliver the resilience strategy.

5.4.2. GUIDELINES FOR SUCCESSFUL IMPLEMENTATION

Important part of this step is the allocation of responsibilities among the involved team members and available resources per activity to be implemented.

The city also needs to secure the political mandate for the implementation of the strategy, something that will lead in securing funding and resources for the implementation of the action plan. After securing the political mandate, the city will implement a networking approach with politicians and stakeholders based on the communication and engagement strategy.

The city will go on with the initiation and implementation of projects based on the actions identified and prioritized as well as having the support of the affected stakeholders (e.g. CI providers). The city needs to perform continuous revision as well as possible adaption of the available resources and personnel during implementation of actions. Monitoring of actions by the involved partners and stakeholders (also from regional and national level) needs to be performed.

5.4.3. LESSONS LEARNT FROM CITIES

A resilience office with staff from different departments at city level should be set up in order to perform the implementation of the resilience strategy. The team within the resilience office should promote and reinforce the involvement of politicians when implementing the communication and engagement strategy. The resilience office should consider other city actions or ongoing activities related to the actions and projects to safeguard human and financial resources.

The city in close cooperation with the resilience office should establish subgroups to conduct actions, preferable from staff coming from different departments. The city in close cooperation with the resilience office should consider different ways of funding and adjustment of funding possibilities. Existing systems and tools for implementation and monitoring of actions should be adopted and used.

In this step of the European Resilience Management Guideline, the Resilience Maturity Model and City Resilience Dynamics Tool are applied, in this case by municipal workers and technical workers carrying out the policies and strategies planned by decision-makers as part of the first step, to support the practical implementation process.

Municipal staff working within the resilience office, should anyway regularly consult the Resilience Maturity Model to monitor and evaluate the implementation of activities and make use of performance indicators. This activity should be reinforced, in case new information comes into play or if there is any change in the political leadership of the city.

5.4.4. USE OF THE RESILIENCE TOOLS WITHIN THE STEP

In this step of the European Resilience Management Guideline, the City Resilience Dynamics Tool can be used to test and validate the relationships between the different policies that could, potentially, be included in the resilience strategy of a city and their impact in building local resilience.

The *City Resilience Dynamics Tool* (CRD) can help city disaster managers to diagnose, explore and learn about the resilience building process. The model can help cities to understand the precedence relationship of the policies included in the Maturity Model and it will provide a learning environment to better understand how the Resilience Maturity Model (RMM) works, and how the RMM should be implemented. Users begin by calibrating the model, determining the values of the most important parameters of the model. The City Resilience Dynamics then runs simulations of the effects of implementing certain policies over a realistic timeframe (yearly to a total of 40 years). When users implement the policies in the appropriate, wise and effective order, they achieve effective results and their resilience level increases eventually until reaching 100% in each of the resilience dimensions, helping city managers to explore and learn about the resilience building process. The simulation model encapsulates the most important aspects of the RMM and helps to encompass the RMM in a training environment for the cities to learn about the path towards improving resilience. The tool allows

the user to try different policy options, identifying the implications of each of them in the resilience improvement process.

The tool can also be used as a debate instrument, to solve conflicts and disagreements regarding the potential influence and impacts of the implementation of policies at city level.

For more information about how to use the City Resilience Dynamics Tool, refer to chapter 5 of this report.

5.5. HOW TO PERFORM EFFECTIVE EVALUATION AND REPORTING

In the fifth and final step of the European Resilience Management Guideline, the evaluation of results and an effective process for reporting back to politicians and stakeholders, but also the general public, is the main activity the city performs. Co-creation processes show that informing thoroughly stakeholders, including politicians and citizens is important and necessary to secure their active participation and involvement in the long term.

5.5.1. INCREASED NEED FOR EVALUATION AND REPORTING

Evaluation and reporting is the last step of the European Resilience Management Guideline and the resilience-building cycle, however:

- it provides the basis for starting a new cycle with a new cycle of strategic management and resilience-building activities;
- it analyses what has happened during the year in order to understand why things succeeded or failed to succeed;
- it provides the local government, and especially involved decision-makers and practitioners active in topical themes, with a basis for taking further decisions on the targets, actions and activities for the subsequent year in the resilience-building process;

- It also provides involved and relevant stakeholders, including the general public, with a report on what the city has done during the cycle and how they have succeeded or failed in fulfilling their resilience targets

The fifth step requires not only internal, but also independent evaluation of the intensive implementation process and activities, including monitoring data and referring back to original and set-out in step 3 targets and goals to evaluate achievements and progress. For this purpose, a clear set of the indicators that have been developed in step 3 should be in this step chosen, adopted and agreed accordingly within the evaluating team. These indicators will set the criteria for the concrete and transparent evaluation of the implemented activities and actions. The evaluating team will assess and evaluate separately all the implemented actions and activities.

The team will therefore review and analyse new information compared to the start of the cycle, while data collected through monitoring shall be used for evaluating both the results obtained through the implementation of strategy and action plan activities and the way the whole process and the resilience management cycle are working. The team will draft, compile and publish reports back to stakeholders and citizens in order to keep them informed about the city's progress during the cycle.

5.5.2. LESSONS LEARNT FROM CITIES

Evaluation and reporting is the last step of the cycle, but provides the basis for starting a new year with a new cycle of strategic management and resilience-building activities.

A team should be created with main task to assess and evaluate separately all the implemented actions and activities. The evaluating team should consist of members of the resilience team, municipal employees, stakeholders and citizens. The evaluating team should use commonly accepted templates and following specific guidelines when drafting the evaluation reports.

5.5.3. USE OF THE RESILIENCE TOOLS WITHIN THE STEP

The cities should draft and upload on the Resilience Building Policies tool detailed case studies as part of reporting back to stakeholders. Therefore, the RBP is used to share the results of the evaluation with politicians, stakeholders and citizens as well as other cities. The RBP tool can also be used as a means to report back to stakeholders, by drafting good practices/case studies and publishing them online through the Information Portal.

The City Resilience Dynamics Tool is used to evaluate the effectiveness and performance of the implemented policies and to provide a simulation of the results to compare with those results observed in reality. Finally, the Resilience Information Portal is used to share the results of the evaluation with politicians, stakeholders and citizens as well as other cities.

5.6. STARTING A NEW CYCLE

By reaching the end of the cycle, and starting a new one, the MM is used once more to assess the most recent resilience maturity stage in which the city has placed itself. Following the evaluation of the resilience status of the city, the cyclical process shall start again.

6. HOW TO USE THE RESILIENCE TOOLBOX

The five tools developed within the project and which aim to build and strengthen city resilience, are: 1) a Resilience Maturity Model, 2) a Risk Systemicity Questionnaire, 3) a Resilience Information and Communication Portal, 4) a City Resilience Dynamics Model and 5) a Resilience Building Policies tool. The SMR Tools are all available here: http://smr-project.eu/tools/.

6.1. RESILIENCE MATURITY MODEL – USER MANUAL

6.1.1. IN A NUTSHELL

The Resilience Maturity Model (RMM) provides a common understanding of the resilience building process. Using the Resilience Maturity Model, cities are asked to consider city's current status of resilience. The model then helps to identify the correct policies to implement in order for the city to evolve and move to the next maturity stage.

The *Resilience Maturity Model* (RMM) seeks to "guide cities in the resilience building process". The Resilience Maturity Model helps cities to assess their current resilience status and to identify the ideal path for increasing their resilience level. A city shall use the RMM to guide the definition of the strategy to increase their resilience level, based on the policies included considering the stakeholders to involve in each step. The RMM may also help understanding the resilience as a multidimensional challenge that needs to break down silos and foster collaboration among different stakeholders. This tool facilitates a process of continuous discussion among the stakeholders that leads to building the scientific, technical, local and tacit knowledge needed to address the resilience process.

In contrast to traditional resilience frameworks, the key advantage of using the RMM is that it helps the operationalization of resilience, providing a sequence of stages and policies to guide cities in the resilience building process. This tool enables, indeed, moving from theory to practice and making resilience tangible and practical for cities.

The Resilience Maturity Model:

- can be used as part of strategic planning
- helps cities identify their level of resilience maturity
- helps cities to identify suitable policies to implement to develop resilience
- provides a point of reference for self-assessing effectiveness of resilience development
- helps cities prioritise resilience policy implementation on the basis of diagnosis and assessment
- can provide cities with justification for need for funding for specific measures

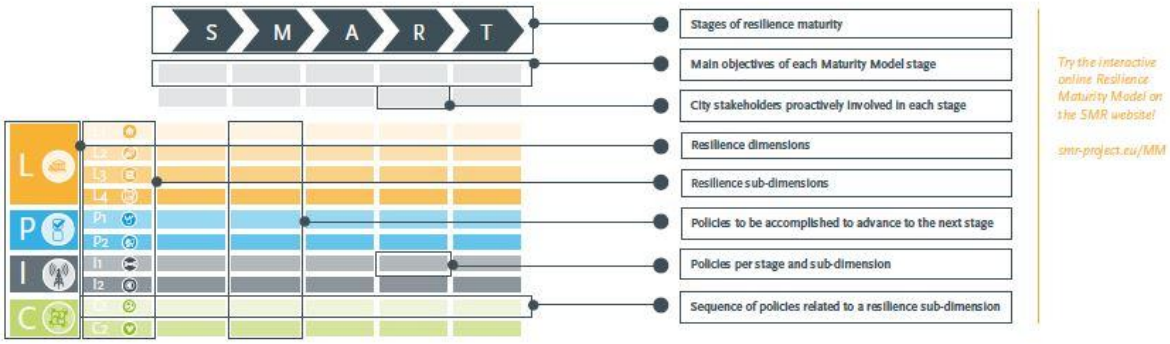
Users of the Resilience Maturity Model:

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

6.1.2. HOW TO USE THE RESILIENCE MATURITY MODEL

The Resilience Maturity Model comprises five maturity stages to guide cities through the optimal path of building resilience from a strategic approach. Each maturity stage contains a description of the objectives of that maturity stage, the stakeholders that need to be engaged in each stage in addition to a list of policies that should be developed in order to achieve the objectives defined in that maturity stage. A set of indicators have also been identified for monitoring and assessing the performance of these policies and justify their investments on resilience. The resilience maturity model is used in order to:

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



Graph 6*: Try the interactive online Resilience Maturity Model at the SMR website*

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.

Graph 7: *The Resilience maturity stages and involved stakeholders*

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

Graph 8: *The Resilience dimensions and sub-dimensions*

STAGE 1: STARTING

STARTING WITH LOCAL (DEPARTMENTAL) RESILIENCE PLANS

INVOLVED STAKEHOLDERS

Local Government - Emergency services - Critical 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.

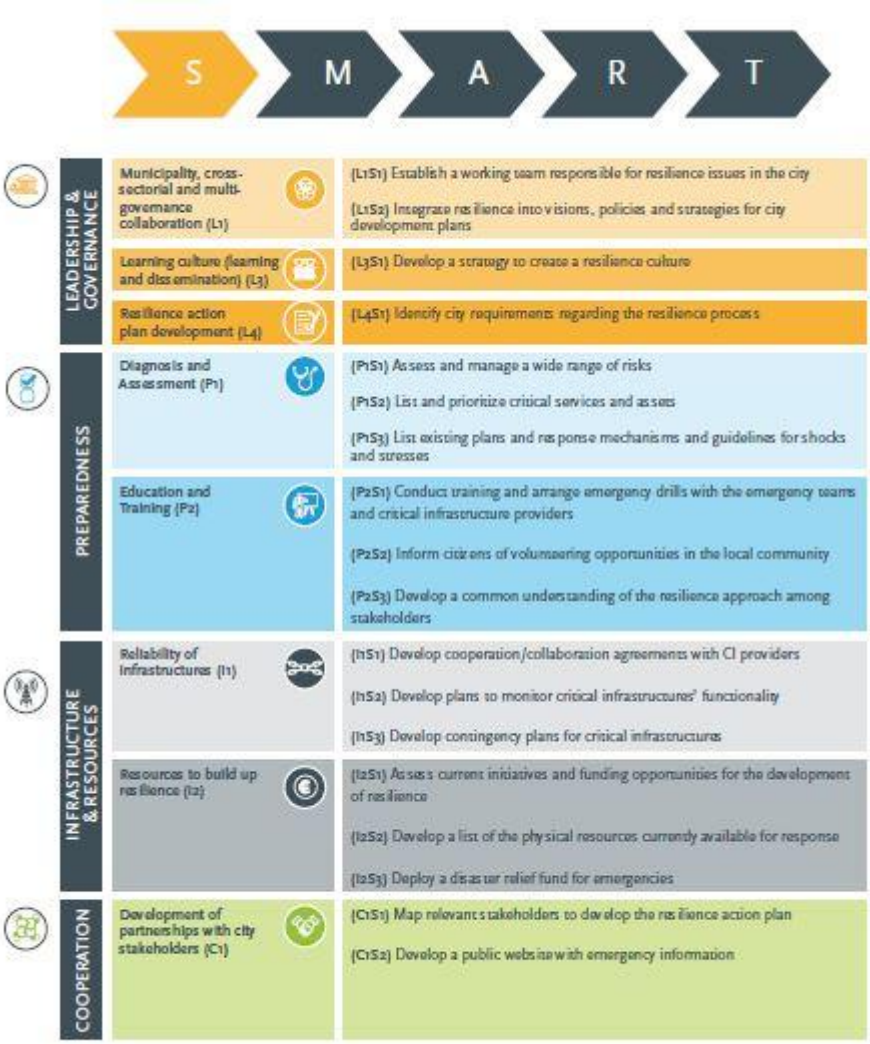
Critical infrastructure providers operate independently of each other; therefore there is a need for greater organisation and cooperation among the critical infrastructure providers, especially in times of emergency when a disruption to one critical infrastructure can have cascading effects across other 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, as we can see from the list below:

- Incipient policies for resilience development
- Lack of integrated approach towards multi-hazards
- Incomplete risk assessment
- Community/ public-private cooperation incipient
- City centred
- City is not part of larger networks
- Limited funding or no budget for resilience



Graph 9: *The Starting stage of the Resilience Maturity Model*

STAGE 2: MODERATE
INTEGRATION OF LOCAL (DEPARTMENTAL) RESILIENCE PLANS

INVOLVED STAKEHOLDERS

Public-private companies - NGOs - Volunteers - Regional government

These stakeholders are added in this stage but the ones involved in the previous stage are still involved in the resilience-building process.

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, as we can see from the list below:

- Implementation of resilience policies using effective control mechanisms
- Creation of a department/committee for coordinating resilience development
- Plans to improve cooperation among all the stakeholders
- Arrangement of events to increase stakeholders‘ awareness

Graph 10: *The Moderate stage of the Resilience Maturity Model*

STAGE 3: ADVANCED

IMPLEMENTATION OF THE INTEGRATED (HOLISTIC) RESILIENCE PLAN

INVOLVED STAKEHOLDERS

Media - Citizens - Academic and scientific entities - National government

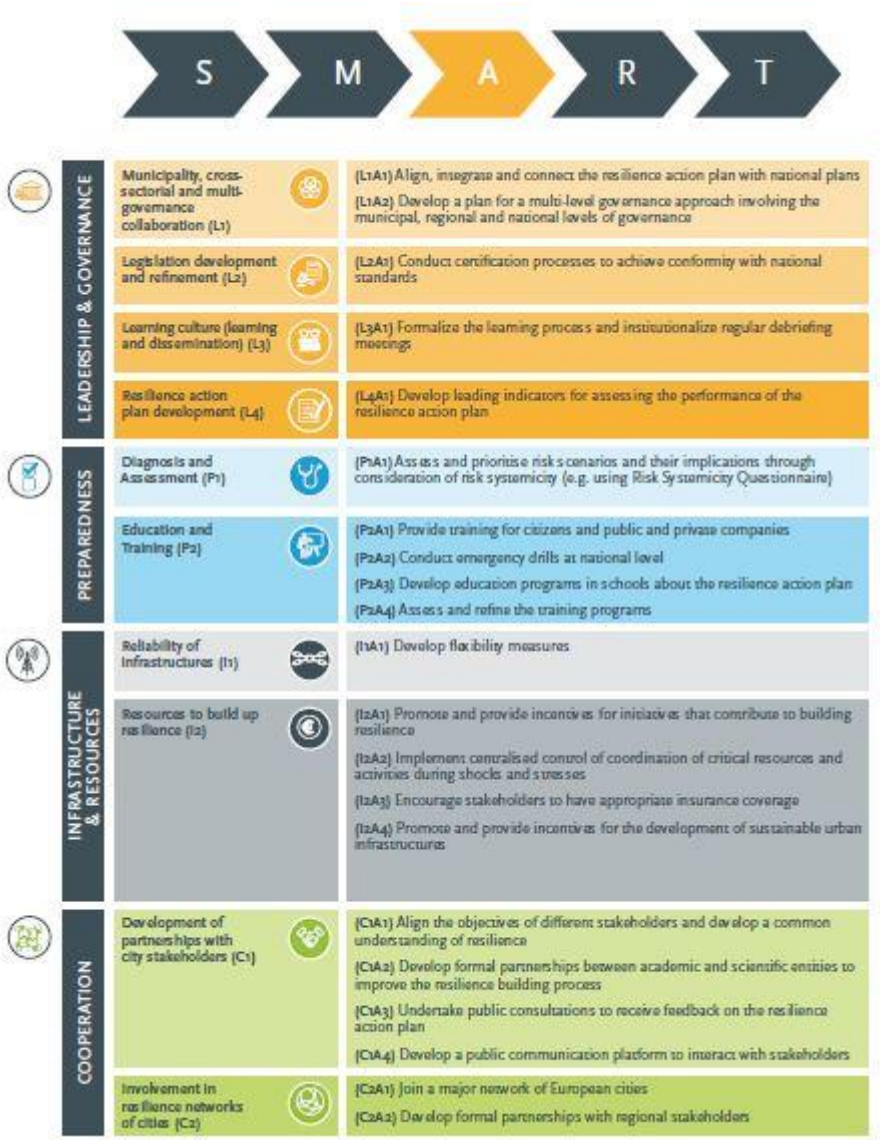
These stakeholders are added in this stage but the ones involved in the previous stage are still involved in the resilience-building process.

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. In this stage the city has the following characteristics, listed below:

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



Graph 11: *The Advanced stage of the Resilience Maturity Model*

CITY = 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 Infrastructures (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.

STAGE 4: ROBUST
INTERNATIONALISING RESILIENCE

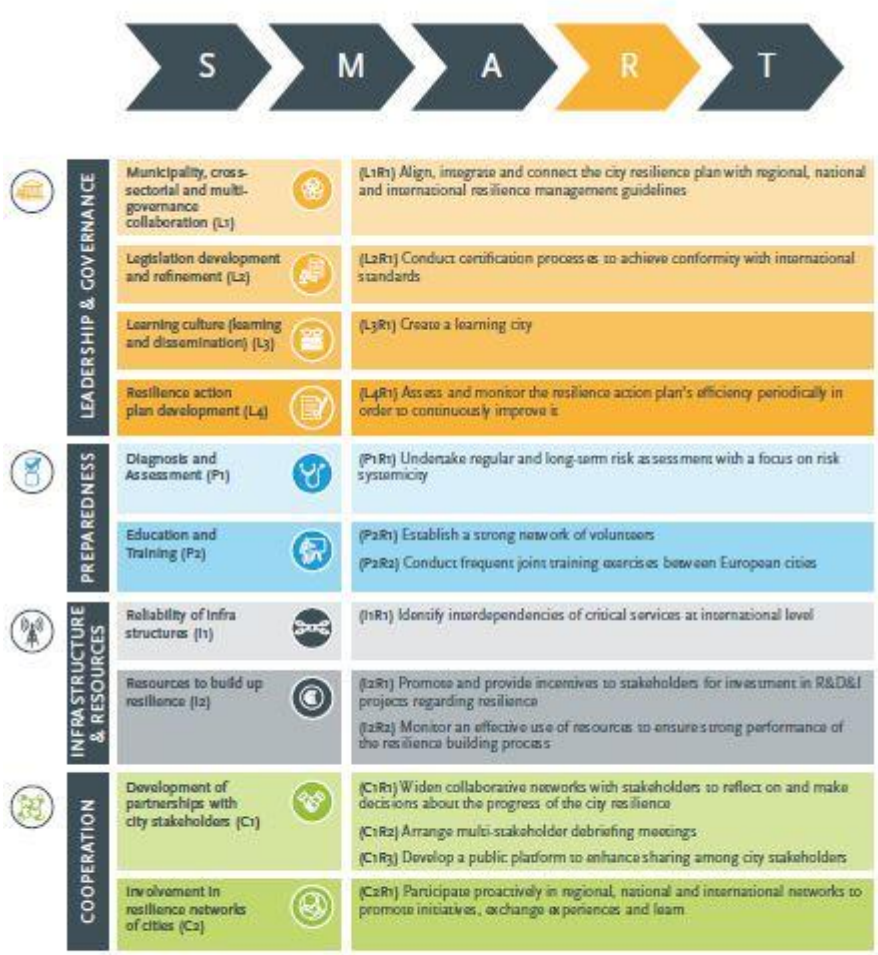
INVOLVED STAKEHOLDERS

European legislative body

These stakeholders are added in this stage but the ones involved in the previous stage are still involved in the resilience-building process.

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.



Graph 12: The Robust stage of the Resilience Maturity Model

STAGE 5: VERTEBRATE

LEADING RESILIENT CITY

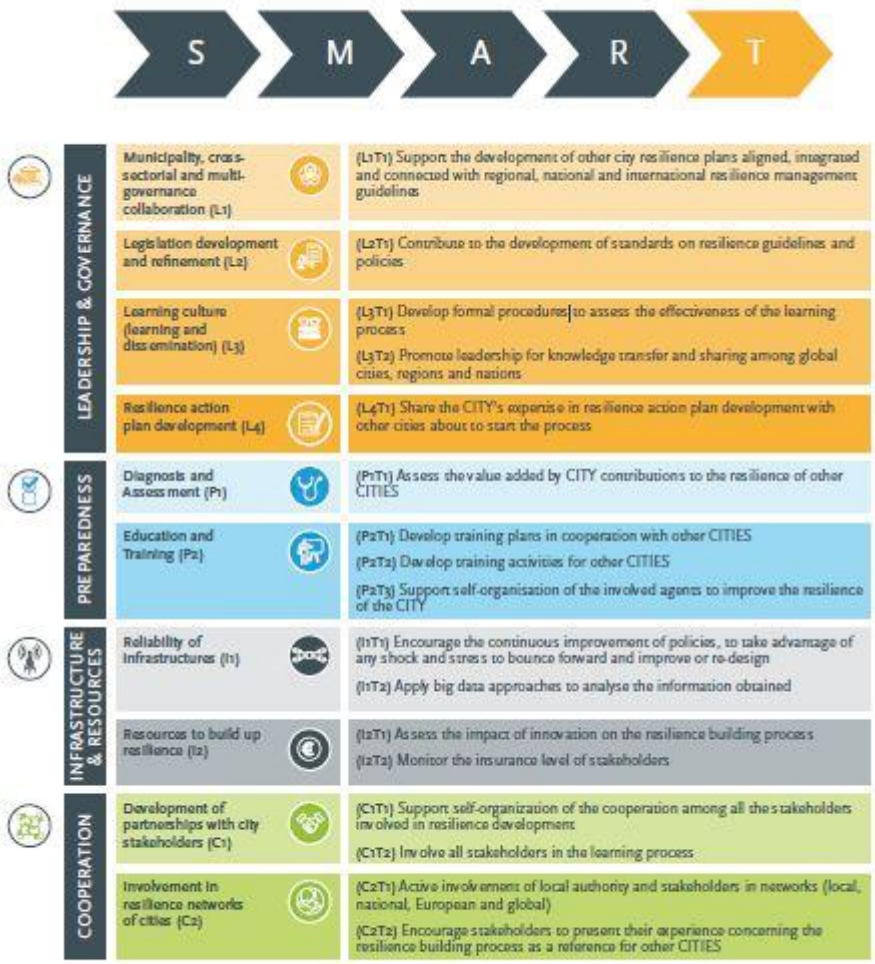
INVOLVED STAKEHOLDERS

All the stakeholders involved in previous stages, plus international organizations

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.

- The CITY proactively promotes resilience practices
- The CITY defines its policies and plans understanding that it is part of a ecosystem that has to be resilient
- The CITY acts as a vertebra in the European Resilience Backbone
- There are implemented and accepted procedures for the continuous improvement of the resilience action plan



Graph 13: *The Vertebrate stage of the Resilience Maturity Model*

6.2. RISK SYSTEMICITY QUESTIONNAIRE – USER MANUAL

> "Resilience reflects the ability of systems to absorb and recover from shocks, while transforming their structures and means for functioning in the face of long-term stresses, change, and uncertainty. This **requires actively understanding the risk landscape**" (van der Vegt et al, 2015: 972)

The Risk Systemicity Questionnaire (RSQ) seeks to supports cities in "actively understanding the risk landscape" by improving their risk assessment beyond traditional methods through an innovative focus on the interactions between different types of risks. The RSQ has been co-created in close collaboration with representatives of seven European cities, and it presents a range of risk scenarios – perspectives of the future reflecting how one risk might cause others, thus presenting a 'scenario' of risks. By exploring a range of risk systemicity *scenarios*, the user is able to prioritise the high risk areas which may require particular attention. The RSQ enables cities to develop their knowledge of the risk landscape which affects them, thereby developing their resilience.

In contrast to traditional risk registers, the key advantage of using the RSQ is that it promotes a perspective on risks where risks are not seen as being independent from one another, but they form complex networks of interdependencies. A particular focus of the RSQ is on scenarios that are vicious cycles – scenarios that escalate and get worse. Such cycles can occur when the interdependencies between risks create feedback loops that reinforce themselves over time. Vicious cycles of risks are notoriously difficult to mitigate.

In order to tackle the risk systemicity scenarios identified as a priority for a city, the RSQ offers a range of possible mitigation actions – both tried and tested by at least one of the collaborating cities, as well as suggestions that might be considered. Using the RSQ, groups and individuals are invited to think more intentionally about the implications of risk systemicity for their city, and how to deal with its ramifications.

The RSQ is intended to support a group's discussions regarding risks that are of importance to their city. This manual describes additionally a number of uses of the RSQ all of which involve the RSQ facilitating discussion amongst a range of stakeholders who have an interest in assessing and

managing risks across a city. It should be noted that the intention of the RSQ is not to provide objective measures of risks. As a tool to facilitate discussion, it encourages users to think differently about risks, through interacting risk scenarios, and to consider the implications of these scenarios for their city.

The aim of this manual is to explain how to use the RSQ. This manual is structured according to the following sections:

Section	*Title*	*Purpose*
2	Using the Risk Systemicity Questionnaire: a quick guide	Explains key function of the RSQ
3	Summary of key points	Summary of key messages regarding recommended approaches for using the RSQ
4	Technical reference	Compliments the initial 'quick guide' section with a more detailed explanation of the functionalities of the RSQ
5	Uses of the RSQ	Approaches to using the RSQ in cities which target different user groups
6	Appendix A	Enabling macros in Excel
7	Appendix B	Editing scenarios in the RSQ
8	Appendix C	Mapping risks and building risk scenarios

Table 2: *Structure of the RSQ manual*

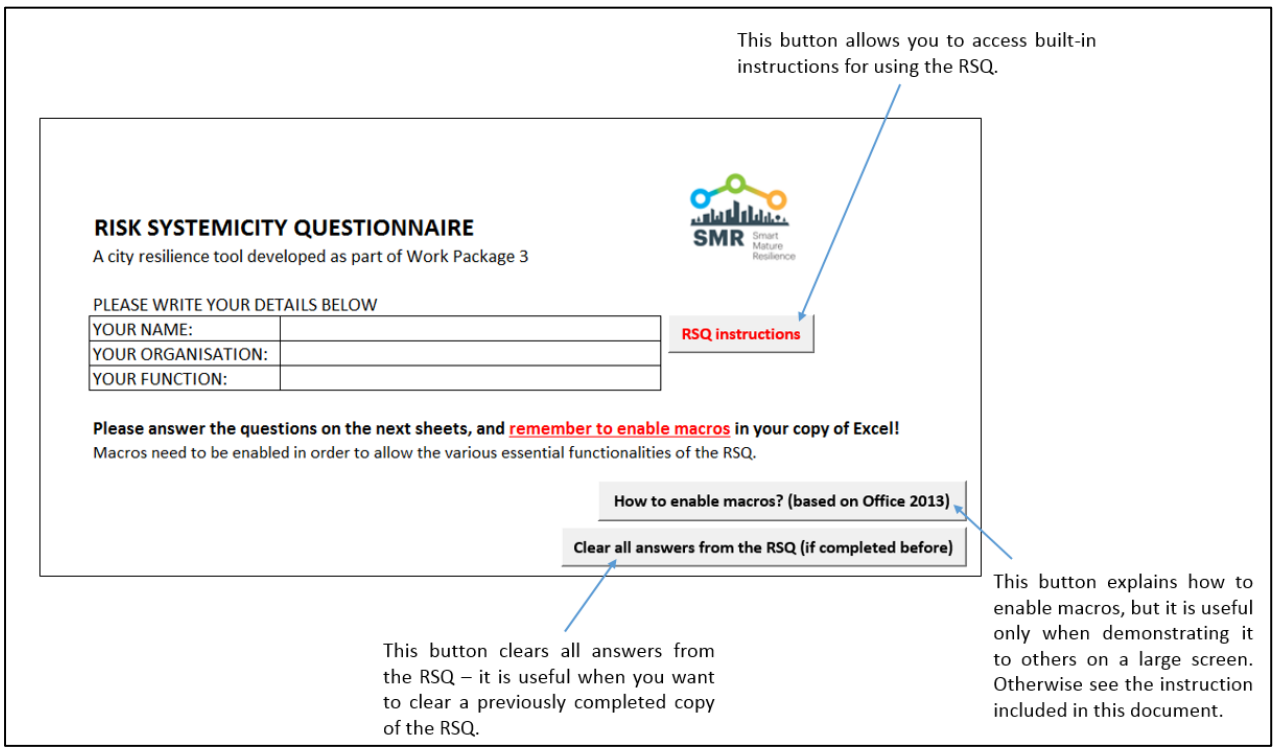
6.2.1. USING THE RISK SYSTEMICITY QUESTIONNAIRE: A QUICK GUIDE

Step 1: Opening the RSQ

The RSQ has been designed so that it does not require any specific technical skills.

Open the RSQ in Excel, and the use of 'macros' has to be enabled (see Appendix 'A' – enabling macros).

On the starting page of the RSQ (Graph 144), the user can fill in basic information about themselves, and can also i) view a demonstration how to enable macros (see Appendix for further information); ii) view the built-in user instructions, iii) clear all answers from this copy of the RSQ if it has been completed previously. It is also recommended to save the RSQ with a new file name so as not to overwrite the 'master copy' which can be used in future applications.



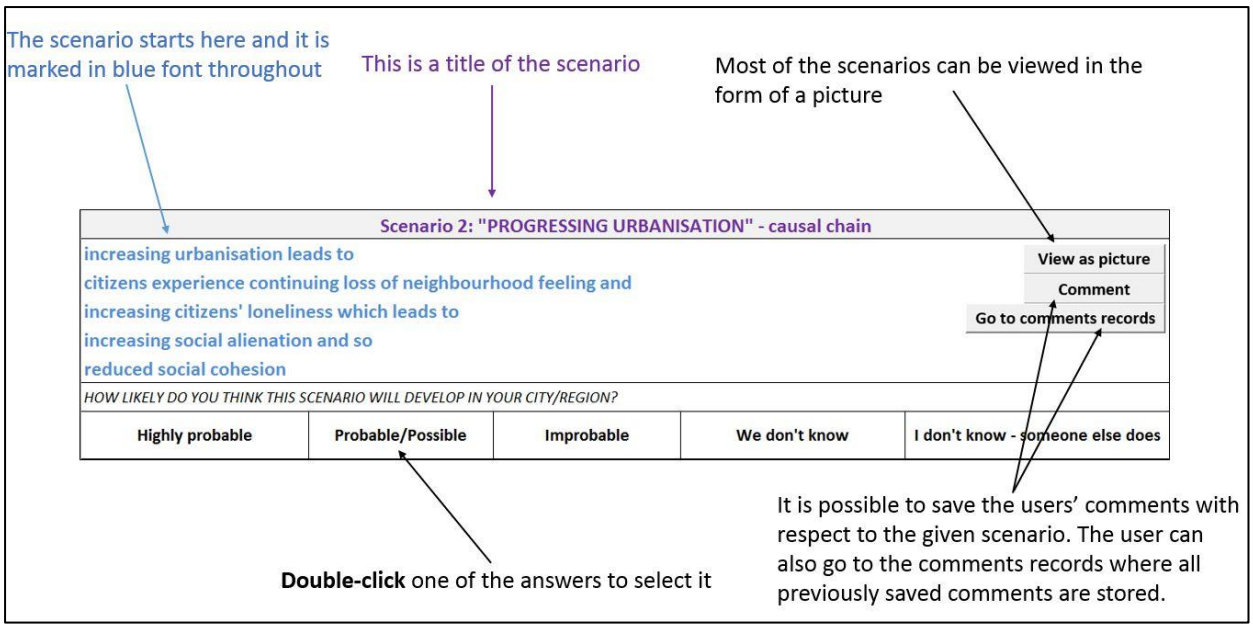
Graph 14: *Starting page of the Risk Systemicity Questionnaire*

Step 2: Completing the RSQ topics

Select one of the Excel tabs which explore the **10 risk topics** that are covered in the RSQ. Depending upon the focus of the user group's discussion, you may wish to select particular risk topics that are of interest to the group, or complete all 10 risk topics.

Each of these topics comprises of a number of risk scenarios, and the user is asked to consider how likely these scenarios are to occur in their city (Graph 15). There are five possible responses to each scenario which can be chosen by double-clicking on the respective response:

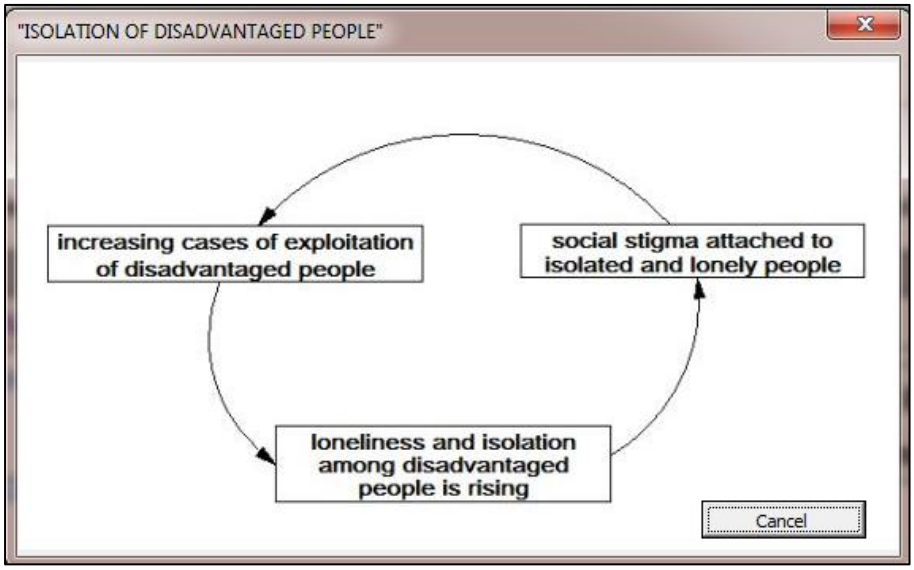
- *Highly probable* – signifying a >60% chance of occurring
- *Probable/possible* - signifying a 20-60% chance of occurring
- *Improbable* - signifying a <20% chance of occurring
- *We don't know* – which means that no-one in the City, or in the project team who are the RSQ users, is likely to be able to answer this question.
- *I don't know but someone else does* - which means that the user does not know the answer to this question, but believes someone else in the City, or in the project team, is likely to be able to answer this question



Graph 15: Example of a risk scenario in the Risk Systemicity Questionnaire

As seen in Graph 15, in addition to reading the risk scenarios as text, a **scenario can also be viewed in the form of a picture** (by clicking a 'view as picture' button). Some of the pictures represent causal

chains of risks, while other pictures represent self-reinforcing, closed vicious cycle (see section 5 for a more detailed explanation of the difference between causal chains and vicious cycles), and so pictures may assist in understanding better the structure of the given risk scenario.

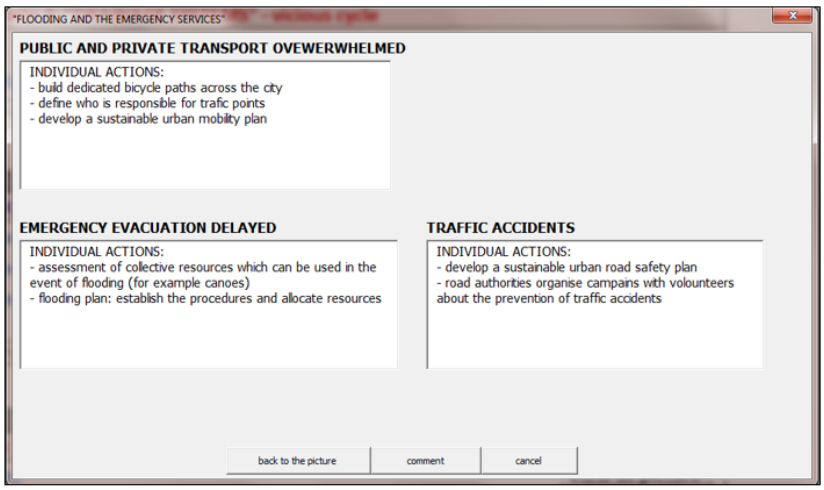


Graph 16: *A picture of a vicious cycle in the RSQ*

The '**comment**' button allows the user to save their own comments about the risk scenarios. All comments are stored on a separate 'comments record' page which can be accessed by clicking on the '**go to comments record**' button.

Upon completion of a given topic (tab), the user can click the 'see **risk mitigating actions**' button at the bottom of the page. The user will then be taken back to the top of the topic, and, if mitigation actions are included, a new button ('**view mitigating actions'**) will appear for some of the risk scenarios which will direct the user to a screen from where they can explore a portfolio of possible mitigating actions for that scenario (Graph 17).

Editing scenarios is possible. However, to avoid destroying the background programming in the RSQ it is necessary that lines in scenarios are not deleted. There are two ways of modifying scenarios: i) edit lines in a scenario (including making a line of a scenario blank), without changing the overall logic of a scenario, and ii) copying and pasting a scenario into a comment box and then editing it.



View mitigating actions

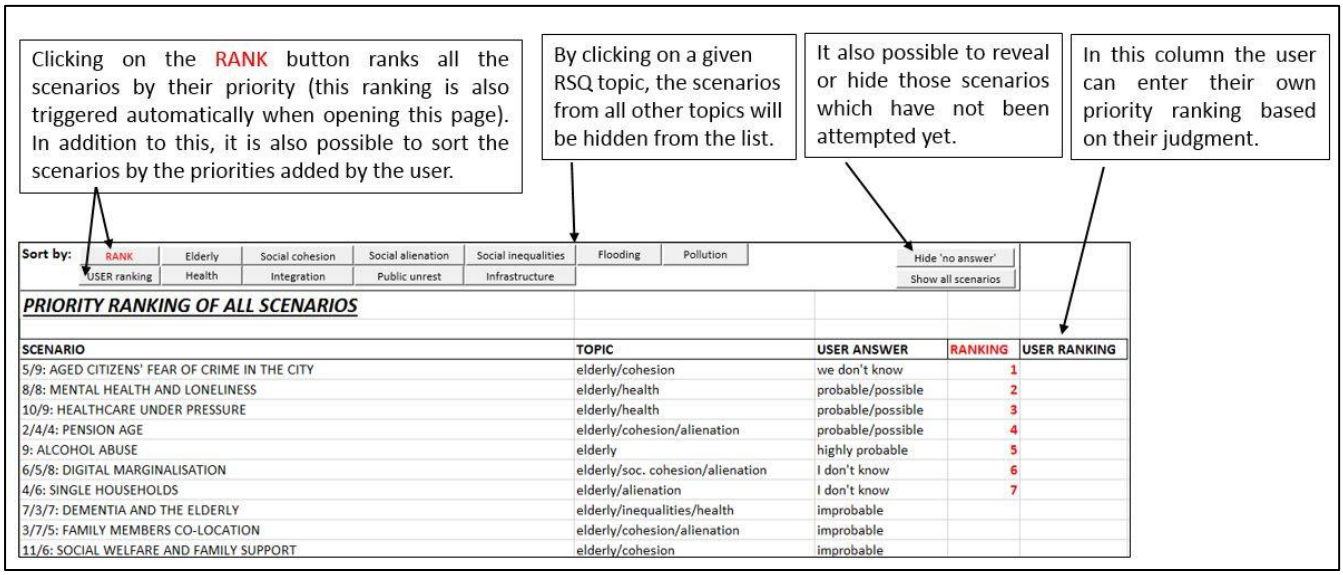
Upon completing each of the RSQ topics, a 'view mitigating actions' button will appear next to the relevant scenarios (right under the 'view as picture' button).

After clicking the 'view mitigating actions' button, you will be presented with a number of suggestions for risk mitigating actions with respect to the given scenario. You can copy those actions (using Ctrl+C shortcut) and paste them into the comment box (using Ctrl+V shortcut) which will allow you to edit and expand them.

Graph 17: *Mitigating actions*

Step 3: Checking the priorities

The **'priorities'** tab in the RSQ provides a ranking of the completed scenarios according to their assessed priority (Graph 18). This ranking automatically updates itself as new scenarios are being completed, and it does not require that all scenarios are completed – which means that, for example, the user may choose to complete two topics only and still receive a priority ranking. These priorities are based on an analysis of i) the extent of the scenario's ramification, and ii) their impact on key outcomes. They are intended only as a basis of a discussion that leads to a revised set of priorities that take account of local context.



SCENARIO	TOPIC	USER ANSWER	RANKING	USER RANKING
5/9: AGED CITIZENS' FEAR OF CRIME IN THE CITY	elderly/cohesion	we don't know	1	
8/8: MENTAL HEALTH AND LONELINESS	elderly/health	probable/possible	2	
10/9: HEALTHCARE UNDER PRESSURE	elderly/health	probable/possible	3	
2/4/4: PENSION AGE	elderly/cohesion/alienation	probable/possible	4	
9: ALCOHOL ABUSE	elderly	highly probable	5	
6/5/8: DIGITAL MARGINALISATION	elderly/soc. cohesion/alienation	I don't know	6	
4/6: SINGLE HOUSEHOLDS	elderly/alienation	I don't know	7	
7/3/7: DEMENTIA AND THE ELDERLY	elderly/inequalities/health	improbable		
3/7/5: FAMILY MEMBERS CO-LOCATION	elderly/cohesion/alienation	improbable		
11/6: SOCIAL WELFARE AND FAMILY SUPPORT	elderly/cohesion	improbable		

Graph 18*: Priority ranking*

6.2.2. SUMMARY OF KEY POINTS

Before starting to work with the RSQ, please be reminded of the following list of 'key points' which help to clarify the purpose of this tool:

- RSQ is primarily a tool for *facilitating group discussions* about RISK SCENARIOS; it is not a quantitative diagnostic tool.
- It is recommended to take notes using the comment box both when completing the RSQ as a group or as an individual. However, remember about the limit of 8000 characters (including spaces) for each scenario (8000 characters amount to about 2 pages of text – see section 4 for more information). When the 8000 words character limit in the comment box is exceeded through copy-pasting, a new comment will not be saved by the RSQ and the user will be notified about it.
- It is very likely that you will disagree with a part of some of the scenarios – a focus of the group discussion should be on how the scenarios do, or do not, fit with your city context. When you disagree with a scenario, the group should discuss how the scenario should be presented with respect to their city, and save these comments in the comment box.
- When completing the RSQ, you will find that some scenarios appear in more than one topic – for example the same scenario about air pollution may appear under the 'air pollution' topic and under the 'health' topic. However, it is sufficient to complete the scenario only once – all

other ‘repetitions’ of that scenario will be completed automatically. These types of repetitions serves two purposes: i) each topic will necessarily include scenarios and causal links that are in other topics, which thereby points to the systemic nature of risks and ii) it is anticipated that users may want to tackle only one or two topics and so it is important to ensure that the individual topics cover all the relevant scenarios from the RSQ.

- The main benefits of using the RSQ is in supporting users, and especially user groups, in conducting interdisciplinary conversations about the systemicity of risks faced by their cities – that is how different types of risks interact with one another. These discussions are further supported by an ability to i) prioritise the risk scenarios, and ii) access suggestions for risk mitigating actions.
- Priorities are suggestions only, where the suggested *priorities are based on an analysis* of the impact of a scenario within the full context of all scenarios and therefore should be adjusted to the local context of the city
- There is no imposed timeframe for working with the RSQ, which means that it is expected that it is the users who will select an appropriate timeframe for themselves. Although this can be determined based on the specific context for which the RSQ is being used, during the construction of the RSQ the city partners have found a period of 3-5 years a usual timeframe to consider.

6.2.3. TECHNICAL REFERENCE

In this section you will find additional information regarding the features of the RSQ described in section 2 ‘a quick guide’, as well other technical information relevant to the use of the RSQ.

Computer requirements

The following are the recommended technical requirements for the machines running the RSQ:

- A ‘modern’ PC computer.
- MAC users are recommended to try using a PC emulator on their machines.
- Windows 7 operating system or later, and Windows must be fully patched and updated – especially with the Service Packs.
- MS Office 2013 or later, with Macros enabled in Excel (see Appendix).
- Avoid loading the RSQ from a pen drive – it is important that the file is transferred to a desktop before using the RSQ.

- Use a simple name for the RSQ file (e.g. “RSQ_city”) and avoid any dots in the name (dashes are fine).
- When using old PC machines, in situations when the RSQ is already processing a task, the user is recommended to wait until the ‘processing’ icon of the mouse cursor is ready before proceeding to another command.

RSQ topics

The RSQ comprises of 10 topics which fall under the three broad themes of the Smart Mature Resilience project, and which are: social dynamics, climate change, and critical infrastructure. Each topic can be accessed in a dedicated Excel tab, and it consists of around 10-14 risk scenarios. These ten topics are:

- Elderly population
- Social alienation
- Social cohesion
- Social inequalities
- Air pollution
- Flooding
- Health
- Community integration
- Public unrest
- Critical infrastructure

Although the topics can be explored individually, they are not separate from one another. Indeed, interaction between risk scenarios occurs across risk topics. Such interactions result in some scenarios appearing in multiple RSQ topics (for example a scenario may appear both under ‘health’ and ‘air pollution’). However, the user is only asked to provide an answer to that scenario once – the same scenario which also appears in a different RSQ topic will then be completed automatically. Thus, the interacting scenarios allow chains of arguments which cross between different RSQ topics to be captured. This feature of the RSQ emphasises the importance of considering the interdependencies between risks. Note that those scenarios which interact across the different tabs can be differentiated by the purple font of their headlines, whilst the remaining scenarios have red headlines.

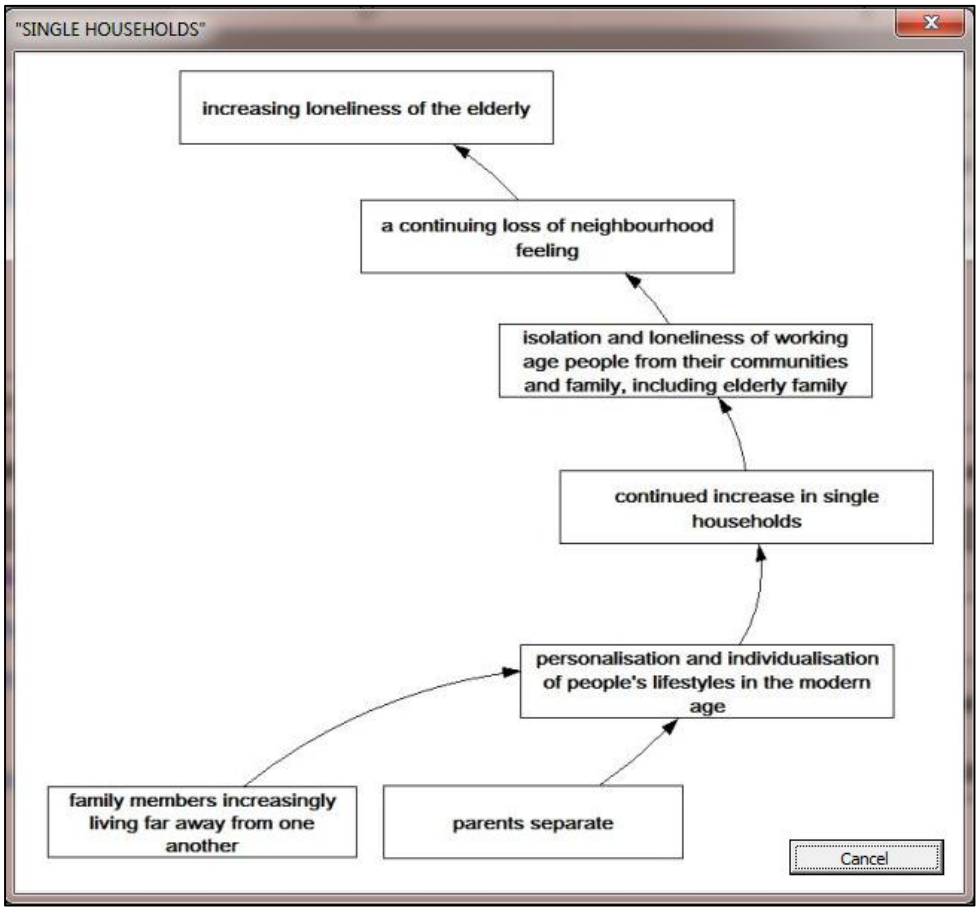
In addition to this, some scenarios act as triggers for other scenarios. When a trigger scenario is answered as being 'improbable', then the scenarios which would otherwise follow from that 'improbable' scenario are disabled and effectively hidden from the RSQ. This feature applies particularly to the first scenario in each tab, which tends to be a 'general' scenario which asks whether the given topic is of relevance to the user (e.g. 'is your city subject to increased social alienation?'). For these kinds of scenarios, upon given an 'improbable' answer, the entire topic is disabled, and the user can proceed to spending time on other topics which may be of higher relevance to them.

Risk scenarios: causal chains and vicious cycles

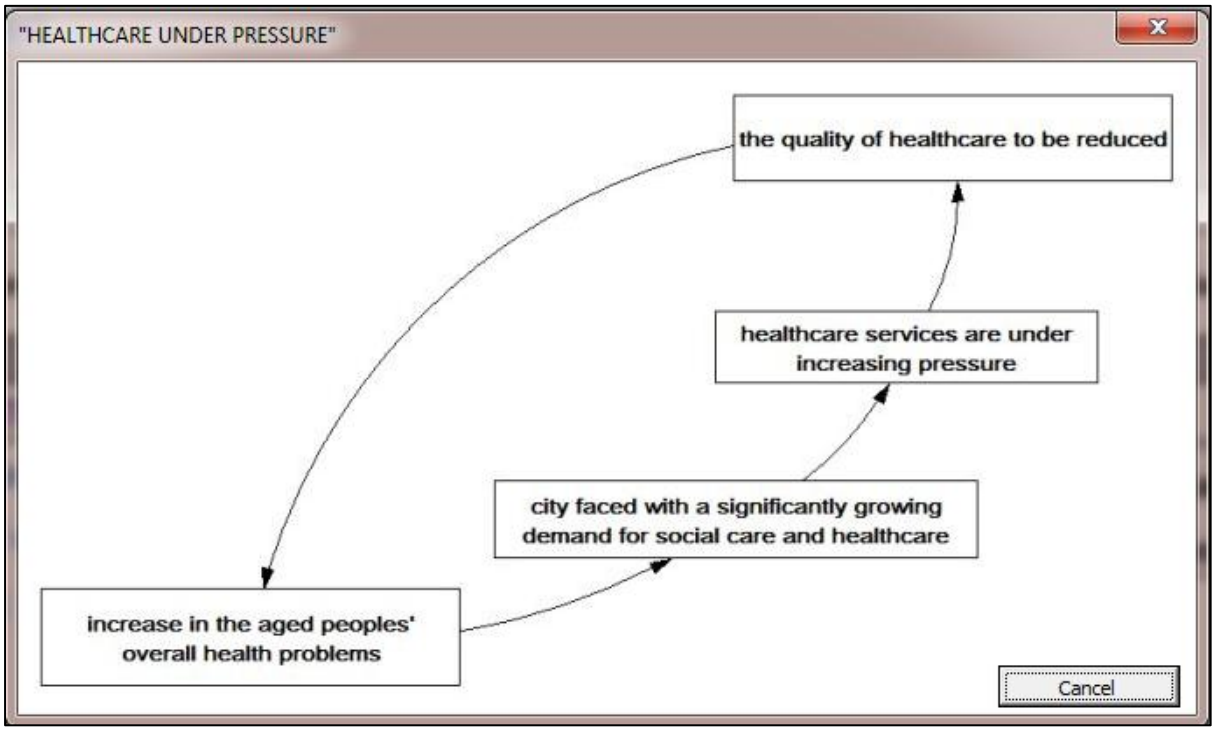
All elements of risk scenarios are linked causally, which means that one risk can lead to another risk – as when, for example, 'flooding disrupts the transportation system and also causes an increased number of traffic accidents in the region, which also constrains the mobility of citizens and emergency services'. Therefore, each scenario describes a chain of risk events and some of these chains of events form vicious cycles as seen above in Graph 16. The characteristic feature which distinguishes vicious cycles from other types of causal chains is that vicious cycles tend to have a self-reinforcing nature.

For example, in Graph 17 is presented a causal chain where 'family members live increasingly far away from one another' and 'parents separate', which both lead to 'personalisation and individualisation of peoples' lifestyles in the modern age', which then leads to 'continued increased in single households', leading to 'isolation and loneliness of working age people', which means 'a continuous loss of neighbourhood feeling', and the causal chain finally ends on 'increasing loneliness of the elderly'.

In comparison to the causal chain in Graph 17, in Graph 18 is depicted a vicious cycle. In that picture, 'increase in the aged peoples overall health problems' leads to 'city faced with a significantly growing demand for increased health care and social care', leading to 'health services are under increasing pressure', which means that 'the quality of health services is reduced'. However, instead of the scenario ending on that last risk, it goes back to, and thus reinforces, the initial trigger 'increase in the aged peoples overall health problems'.



Graph 17: *A picture of a causal chain in the RSQ*



Graph 18: A *picture of a vicious cycle in the RSQ (second example in this document)*

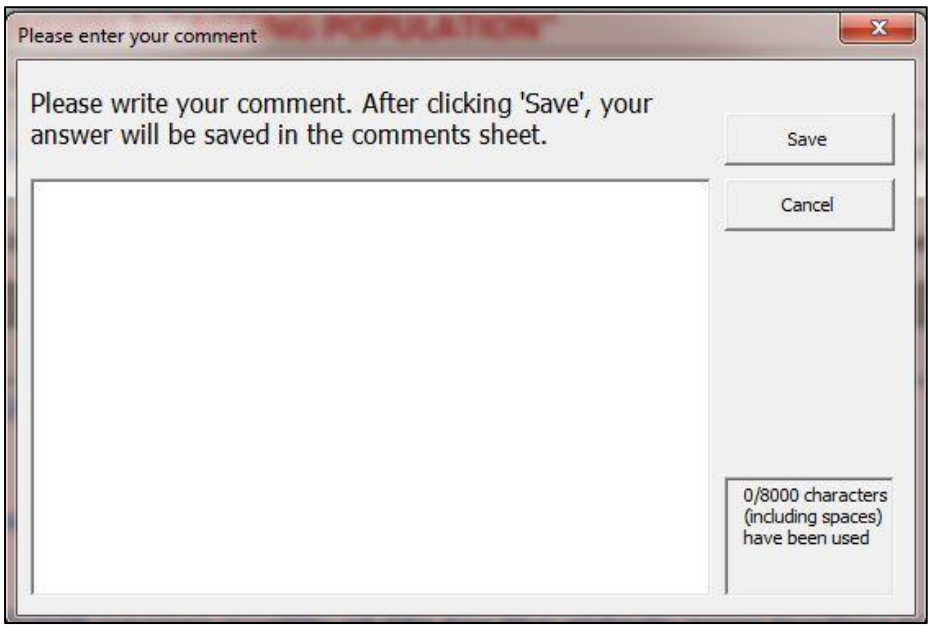
The reason why vicious cycles are important is because i) they are often difficult to identify and ii) they are difficult to deal with. There is no defined beginning or end to a vicious cycle and so you need to consider which of the different elements of the vicious cycles need to be addressed in order to tackle the cycle. In contrast, with regards to causal chains, addressing the trigger, or the elements close to the trigger, may provide an effective way of resolving the risk scenario. The RSQ therefore plays an important role in helping users appreciate the nature of various types of vicious cycles which may target their city.

Comment box

Another key feature of the RSQ is that the user can save comments, which can for example be a summary of the group discussion, and can be later accessed and edited (Graph **19**). Saved comments are automatically transferred to a separate comments record where the user can easily navigate between the previously added comments (Graph **20**). This feature enables a summary of any discussion that occurred when completing the RSQ to be captured alongside the scenarios, which prompted the discussion, providing a record of the most important aspects of the discussion.

The comment box can be accessed by clicking a '**comment**' button next to each scenario, or when viewing the risk mitigating actions which are explained in the next sub-section. As shown in Graph 19, the comment box comprises of the following elements.

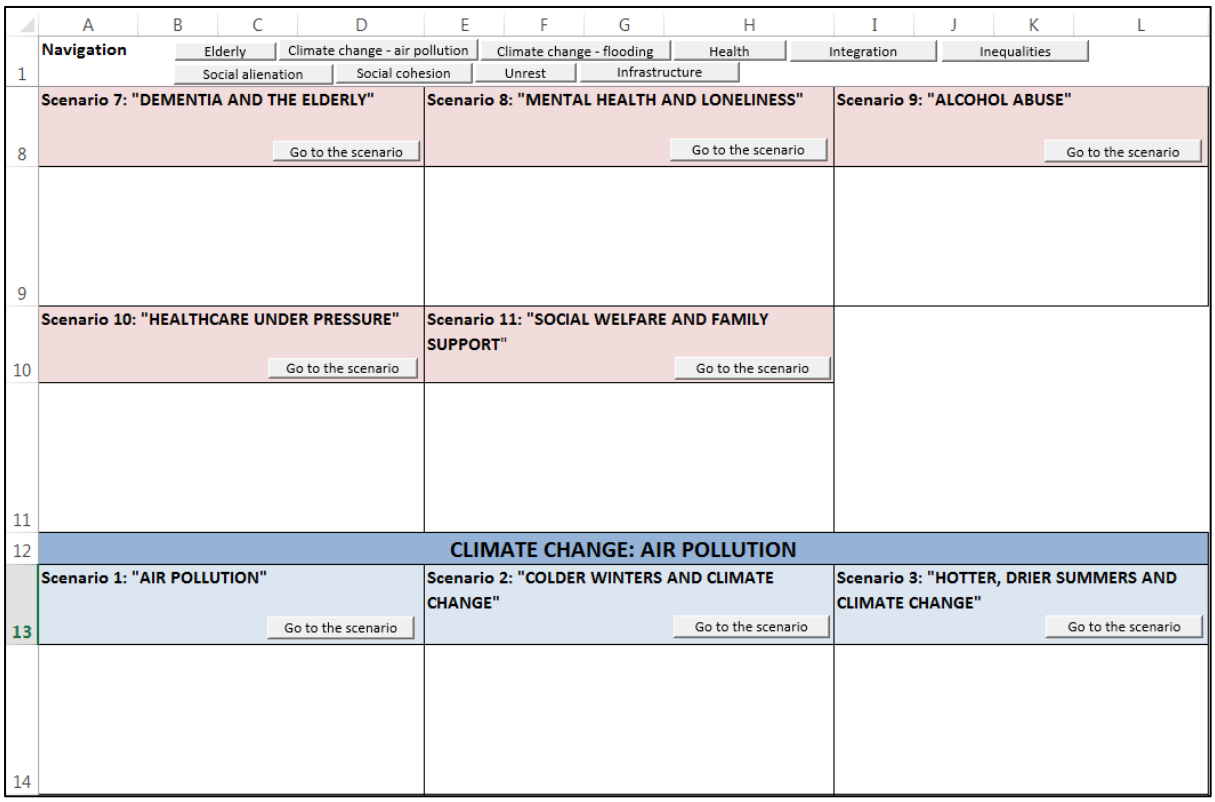
- A text box where the user can enter their text (CTRL+C and CTR+V short cuts work here respectively for copying and pasting text).
- '**Save**' button which saves the comment in a separate comments record. Clicking the 'Save' button does not close the comment box.
- '**Cancel**' button which closes the comment box.
- A box showing the current number of entered characters for the given scenario in the comment box. There is a limit of 8000 characters (including spaces) which can be added to the comment box, and that is equivalent to approximately 2 pages of text. When the 8000 words character limit in the comment box is exceeded through copy-pasting, a new comment will not be saved by the RSQ. For this reason, try to avoid copy-pasting long texts from external sources into the comment box.



Graph 19: *Comment box*

Next to each scenario there is also a '**go to comments records'** button which takes the user to the comments record where all the previously saved comments are stored. The comments record is a separate tab in Excel (see Graph 20). At the top of that page there is a navigation bar with buttons which, upon clicking them, will scroll down the page to the relevant topic. The comments record represents the structure of the RSQ, with the 10 topics comprising of a number of risk scenarios. The

risk scenarios can be identified by their headlines, and each scenario has a text box with any previously saved comments (if applicable) which can be edited. The existing comments in the comments record can be edited, but it's better to avoid adding long texts in the comments record rather than in the comment box in order to avoid exceeding the 8000 character limit. In addition to this, each scenario in the comments record has a '**go to the scenario'** button which takes the user from the comments record to the original scenario in the RSQ topic. This ways, the user can conveniently navigate between the scenarios in the RSQ and the comments record throughout their use of the RSQ.

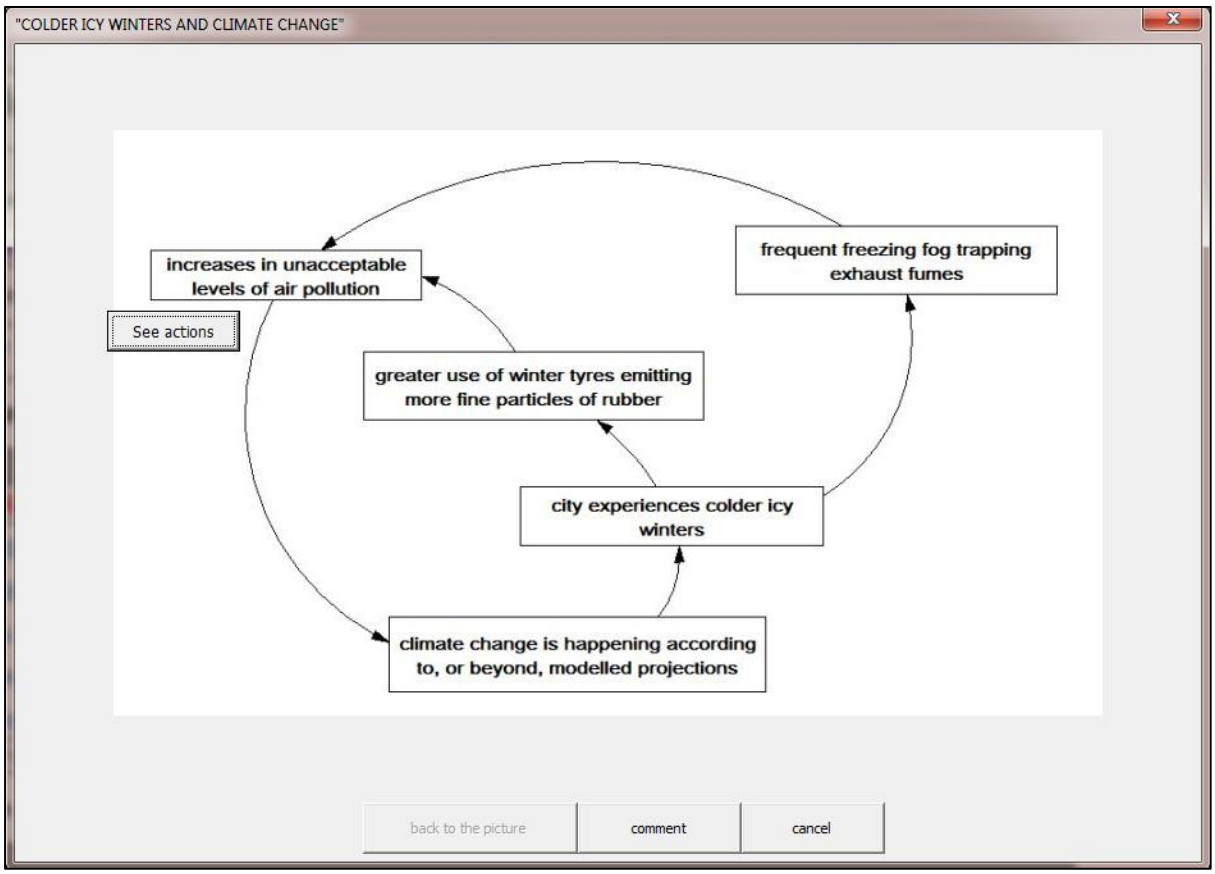


Graph 20: *Comments record*

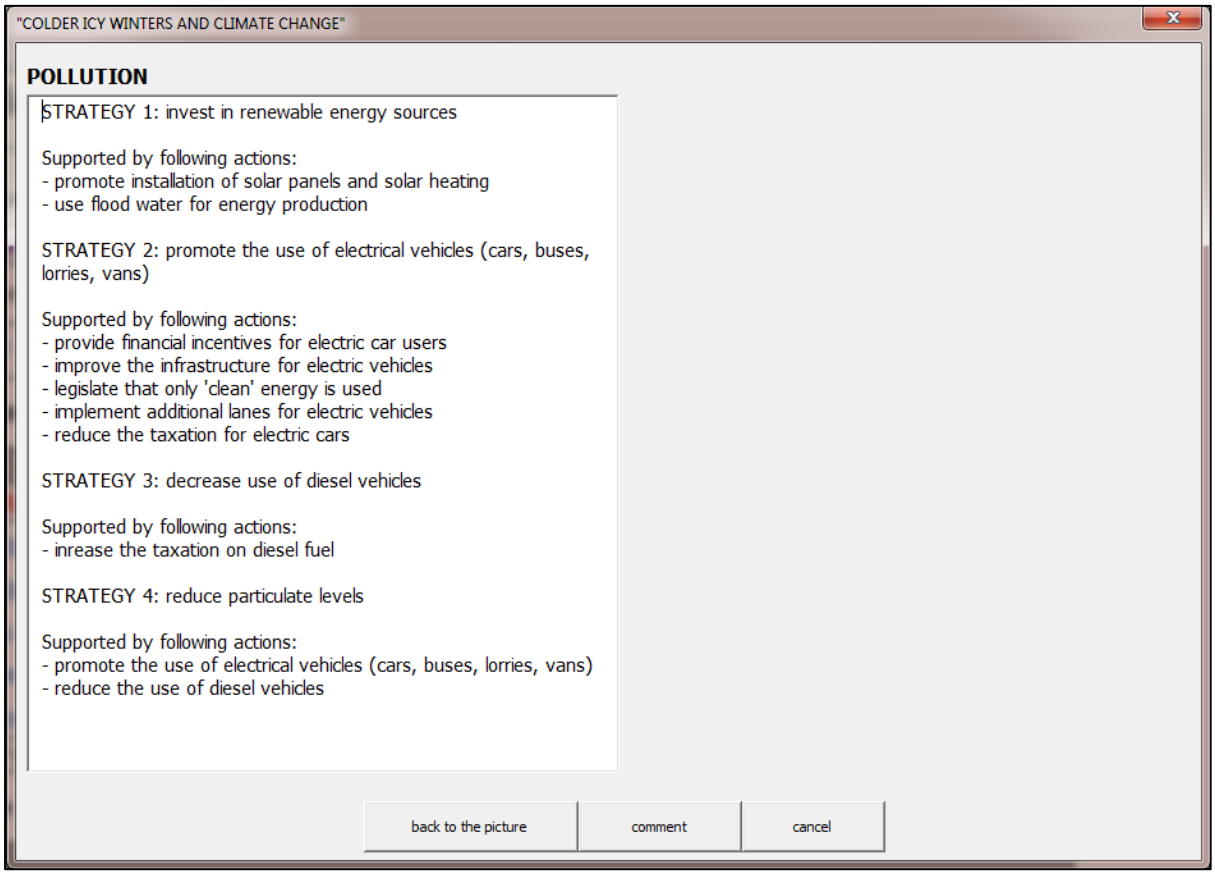
Risk mitigating actions

In addition to exploring the risk scenarios, for some of the scenarios it is also possible to view the suggestions for mitigating actions. As explained above in relation to Graph 18, the user can click the 'see **risk mitigating actions**' button at the bottom of the page of the given RSQ topic. The user will then be taken back to the top of the topic, and, if mitigation actions are included, there will appear a new button ('**view mitigating actions'**) for each risk scenario which directs the user to a picture of the

risk scenario in question, but with an addition of '**see actions**' button (Graph 21) which direct the user to a portfolio of suggestions for risk mitigating actions for that scenario (Graph 22). It is worth noting that whilst exploring the risk mitigating actions, it is possible to save comments in the comment box, which can for example include copy-pasting the risk mitigating actions of interest and then editing them to make them more relevant to the user's city.



Graph 21: *Picture of a risk scenario with an option to see the risk mitigating actions*



Graph 22*: A portfolio of risk mitigating actions for an element of a risk scenario*

Priorities

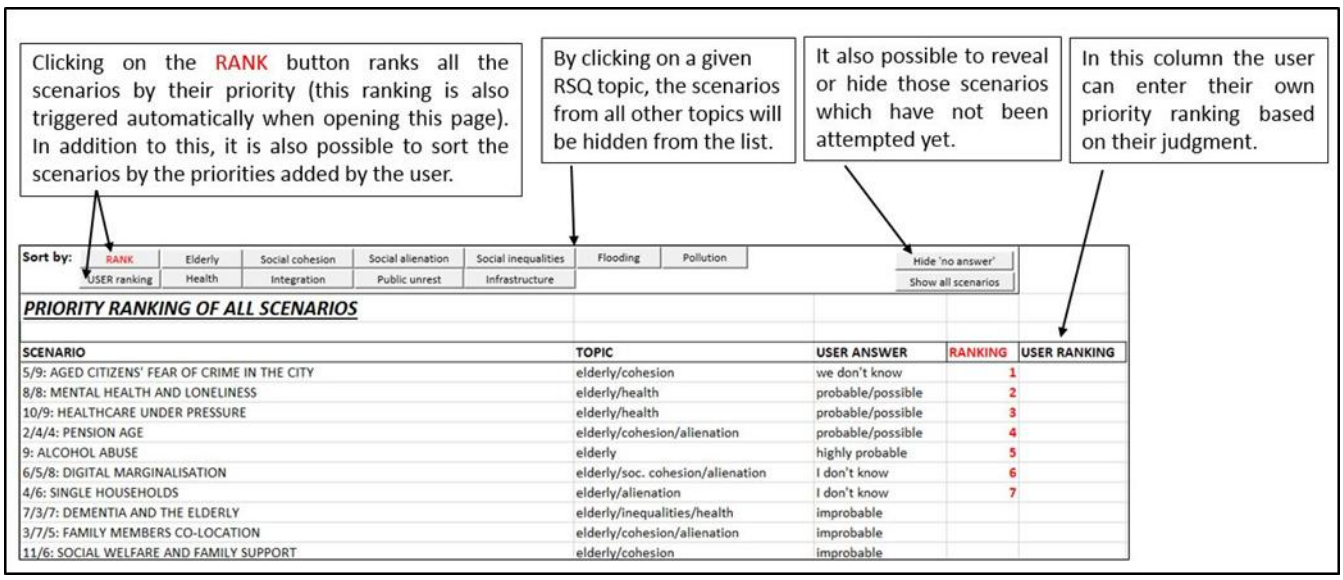
The completion of risk scenarios results in the generation of a priority ranking of scenarios which is automatically updated as the user continuously provides responses to more scenarios. The ranking of priorities of scenarios does not require that all scenarios are completed – which means that, for example, the user may choose to complete two topics only and still receive a priority ranking. These priorities are based on an analysis of i) the extent of the scenario's ramification, and ii) their impact on key outcomes. They are intended only as a basis of a discussion that leads to a revised set of priorities that take account of local context. It therefore needs to be emphasised that these priorities are not intended to serve as a form of quantitative diagnostic assessment of risks, but rather as a point of reference for interdisciplinary communication and sharing of knowledge.

As shown above in Figure 5, the priorities tab in the RSQ comprise of a number of elements. Each time the user opens the priorities tab, the ranking of priorities is immediately updated. All of the attempted scenarios are then ranked according to their priorities, with a rank of 1 signifying the

possible highest risk. The scenarios which have been answered as being 'improbable' do not receive a priority ranking.

However, in addition to viewing the ranking of priorities, the user has a number of options to choose from. Firstly, in the navigation bar at the top of the screen, the user can click on one of the '**sort**' buttons representing the RSQ topics which hides all of the scenarios from the ranking which do not belong to the chosen topic. Secondly, the user may go back to the original ranking of all scenarios by clicking the 'RANK' button. Thirdly, the user may click on the '**hide no answer**' button to hide those scenarios which have not been answered yet, and thereby simplify the current view. Fourthly, it is possible to show again all of the previously hidden scenarios by clicking the '**show all scenarios**' button. And fifthly, in the column **USER RANKING** (which is on the right side to the original RANKING), the user may enter their own ranking of scenarios based on their own judgment. The scenarios can subsequently be ranked according to the user's own ranking by clicking on the '**USER ranking**' button on the left side of the 'sort by' navigation bar at the top of the screen.

Finally, it must also be emphasised that hiding the attempted scenarios from the ranking using the 'sort' buttons does not exclude those scenarios from ranking, but it only hides them from the display. The visible scenarios will therefore retain their original ranking.



SCENARIO	TOPIC	USER ANSWER	RANKING	USER RANKING
5/9: AGED CITIZENS' FEAR OF CRIME IN THE CITY	elderly/cohesion	we don't know	1	
8/8: MENTAL HEALTH AND LONELINESS	elderly/health	probable/possible	2	
10/9: HEALTHCARE UNDER PRESSURE	elderly/health	probable/possible	3	
2/4/4: PENSION AGE	elderly/cohesion/alienation	probable/possible	4	
9: ALCOHOL ABUSE	elderly	highly probable	5	
6/5/8: DIGITAL MARGINALISATION	elderly/soc. cohesion/alienation	I don't know	6	
4/6: SINGLE HOUSEHOLDS	elderly/alienation	I don't know	7	
7/3/7: DEMENTIA AND THE ELDERLY	elderly/inequalities/health	improbable		
3/7/5: FAMILY MEMBERS CO-LOCATION	elderly/cohesion/alienation	improbable		
11/6: SOCIAL WELFARE AND FAMILY SUPPORT	elderly/cohesion	improbable		

6.2.4. EXPECTED USES OF THE RSQ

As emphasised throughout the chapter, the RSQ is intended as a tool for facilitating interdisciplinary group discussions about risk systemicity and resilience in cities. It is therefore recommended to use the RSQ as part of a facilitated workshop with groups. The facilitator will ideally be a team member or a manager, and needs to be familiarised with the RSQ. The typical RSQ workshop may consist of the following phases:

Phase 1: The group should agree on the RSQ topics that are relevant to them. The process starts with a facilitated small group meeting in which a facilitator/leader/manager helps the group to collectively complete the relevant RSQ topics. For each risk scenario within each topic, the facilitator reads out the headline of the scenario and then reads out the text of the scenario – it may be useful to display the corresponding picture of the scenario. The facilitator invites the group to discuss the scenario and consider collectively what response they may want to give to the scenario. The summary of the discussion can be saved in the comment box, including any disagreements with a part of the scenario, and ideas for new, related risk scenarios that are more relevant to the city's context. This stage is expected to help develop consensus, raise consciousness about risks, and to flush out different perspectives on risk assessment and resilience.

Phase 2: Having completed a full RSQ topic, the facilitator scrolls down the page and clicks on the 'see mitigating actions' button. The group is then invited to consider the available risk mitigating actions, and reflect on whether they could add some new risk mitigating actions, which can then be saved in the comment box.

Phase 3: The group investigates the priority ranking page and discuss the results. The facilitator may encourage the group to consider adding their own ranking in the dedicated column provided, and compare the group's own ranking with the ranking generated by the RSQ.

These three described phases can be used with any of the following uses of the RSQ, albeit due to the characteristic of the group the main focus of the discussions may vary. Typical user groups are:

Use 1 - Resilience Office Team: The RSQ could be used regularly by the resilience office team to monitor the changing impact of risk scenarios on the city's resilience strategy. The RSQ could help to

identify those areas of the city that require most attention with respect to resilience and thus help the team prioritise limited resources.

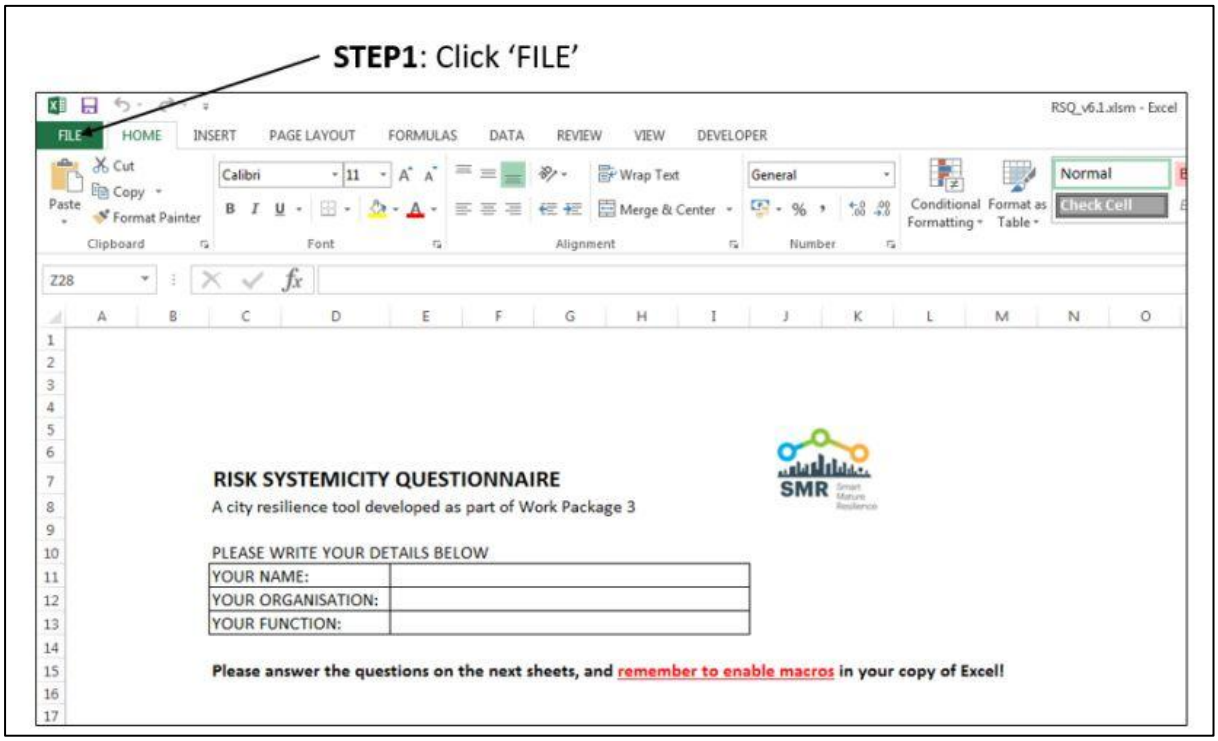
Use 2 - Project Teams: The RSQ may prove useful for teams that are working on city projects that bring together a range of stakeholders from across the city. The RSQ could be used at the beginning of a project in order for the team to think differently about risks that may impact the success of their project.

Use 3 – Politicians: The RSQ can be introduced to politicians as a way of encouraging them to discuss long-term risks that can influence their City. The discussion involved in completing the RSQ is likely to raise a general awareness of risky futures and help promote a focussed discussion of policy priorities.

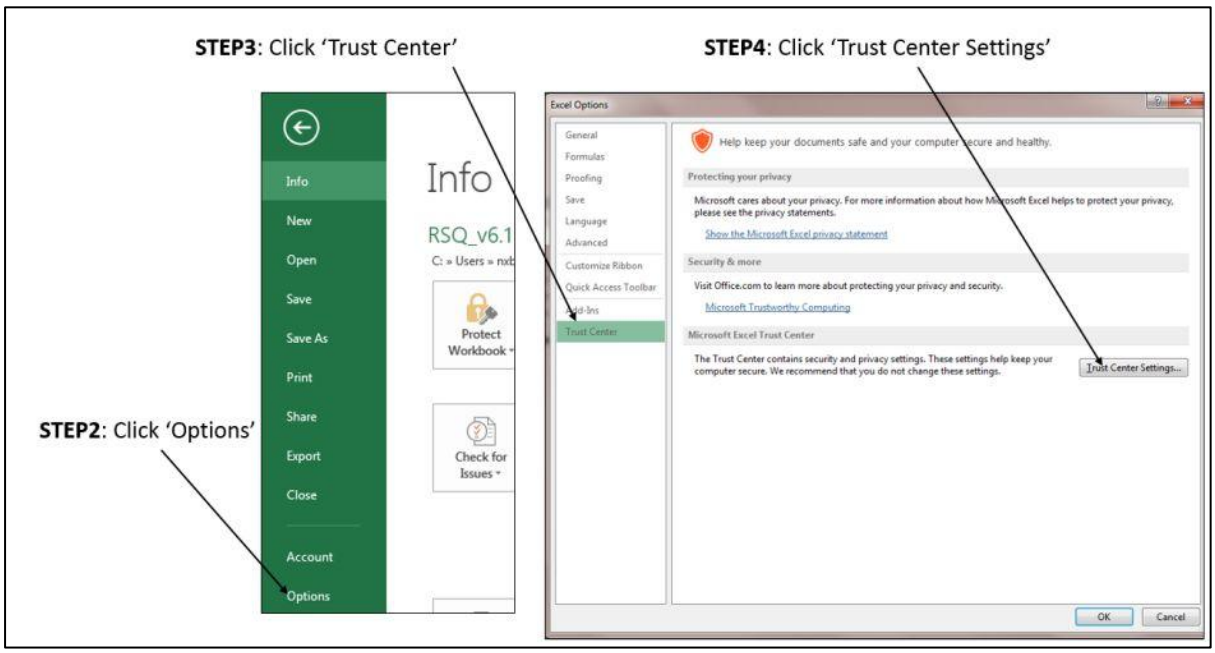
Use 3 - City stakeholders: The RSQ can be used as a way of consciousness raising among a wide set of city stakeholders – particularly a mixed group of representatives of key NGOs. The RSQ would be the basis for focus group meetings involving, for example, pressure and voluntary groups seeking to help the city become more resilient. In particular, given the significance of social cohesion as a force for making a city more resilient, the RSQ could be used to promote discussion about the potential risks to social cohesion.

6.2.5. RSQ APPENDIX A: ENABLING MACROS

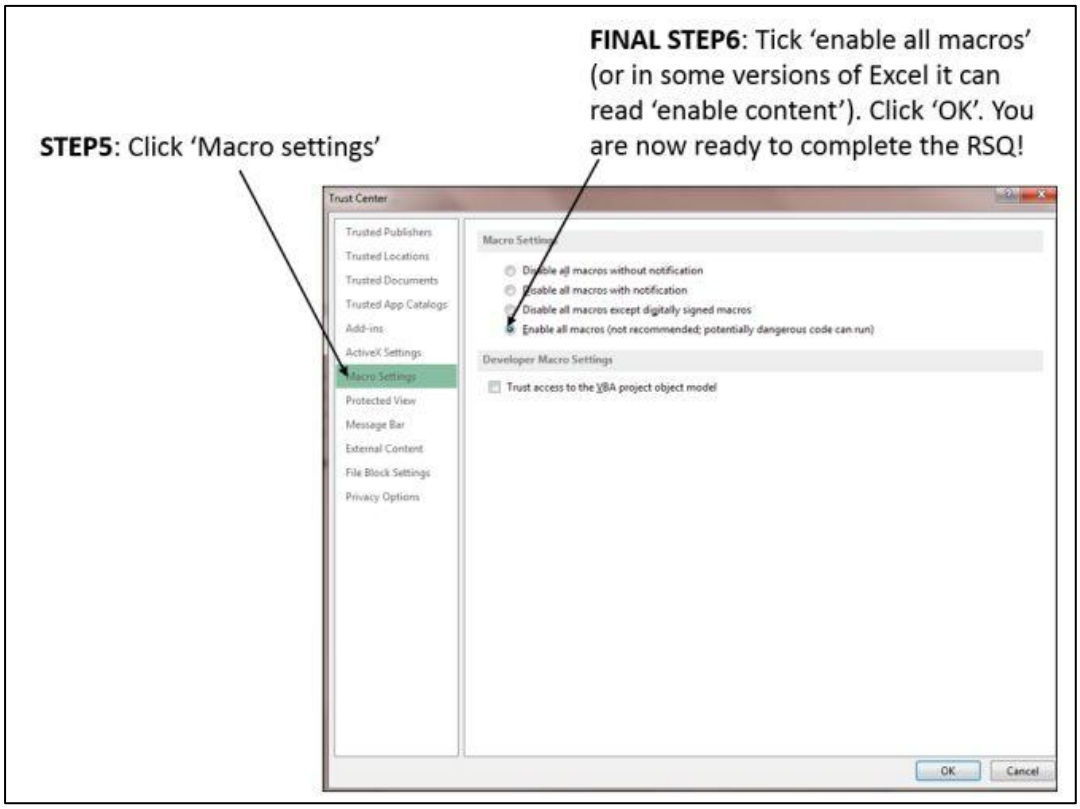
It is necessary when the RSQ to have the 'macros', which are customised programs, enabled in your version of Excel. This can be done by following six steps (based on MS Office 2013). Firstly, click on 'FILE' in the top left corner of your screen (Graph 23). Secondly, click 'Options', go to 'Trust Centre', and click 'Trust Centre Settings' (Graph 24). Thirdly, select 'Macro Settings' and tick 'Enable Macros' (Graph 25).



Graph 23: *Enabling macros (part 1)*



Graph 24: *Enabling macros (part 2)*



Graph 25: *Enabling macros (part 3)*

6.2.6. RSQ APPENDIX B: EDITING SCENARIOS IN THE RSQ

Scenarios in the RSQ can be edited by changing the text in the scenario. The text in the scenario can also be deleted and rewritten by the user (Graph 26). Also the headlines of the scenarios can be edited. However, the following rules need to be followed in order to avoid damaging the background programming which operates the RSQ:

- Do not change the number of rows.
    - If you want to make the scenario shorter, then keep the existing 'extra' rows empty.

- If you want to make the scenario longer, then write two or more lines of the scenarios in one row. The text of the scenario can cross the original border of the table where the scenario in included.

- If you change the meaning of the scenario significantly, then the priorities assigned to this scenario may no longer be relevant.

Scenario 2: "COLDER WINTERS AND CLIMATE CHANGE" - vicious cycle				
				View as picture
				Comment
				View mitigating actions
HOW LIKELY DO YOU THINK THIS SCENARIO WILL DEVELOP IN YOUR CITY/REGION?				
Highly probable	**Probable/Possible**	**Improbable**	**We don't know**	**I don't know - someone else does**

Graph 26: *Editing scenarios*

6.2.7. APPENDIX C: MAPPING RISKS AND BUILDING RISK SCENARIOS

If the group wishes to develop some city specific risk scenarios, then the following material describes a process for doing this.

The material in this Appendix has been extracted and modified from Bryson, John M.; Ackermann, Fran, and Eden, Colin. *Visual Strategy.* San Francisco: Wiley; 2014.

The main objective of risk mapping is the creation of important risk scenarios that describe possible risky futures for a City. However the mapping process also seeks to address process issues. Risk mapping helps keeps groups of people from talking over one another and going around in circles (see the cartoon below). It helps keep groups from being unclear and confused in their reasoning, unable to listen to one another, and unable to agree. Instead, risk mapping helps people speak and be heard, produce lots of ideas and understand how they fit together, make use of causal reasoning, and clarify ultimately what they want to do in terms of strategies, and actions. Risk mapping join process and content in such a way that good ideas worth implementing are found and the agreements and comments needed to implement them are reached.

Determining who should attend the workshop is an important key to success. A balance needs to be struck between having sufficient participants to allow for a diversity of views – while not also having so many views that air time for each person is limited. We recommend around 5-7 participants.

Eliciting risks

The starting point has to be: *What do we think are the important risks that the City faces in the field of xxxx*?

But, what is risk? The European Commission's staff working paper on Risk assessment and mapping guidelines for disaster management[2] describes a risk as a function of the probability of occurrence of a hazard, the exposure (total value of all elements at risk), and the vulnerability (specific impact on exposure). Risk = hazard impact * probability of occurrence.

However we recommend using a broader description: a risk can be any outcome in the future that represents a hazard, disaster, catastrophe, or crisis for the City.

Perhaps, one person thinks a risk the City is facing is: "drainage".

But this doesn't tell us much. The statement doesn't say enough to let us know what the nature of the risk is – meaning what is it that makes "drainage" a disaster

There is a need for more words, such as: "drainage system gets blocked".

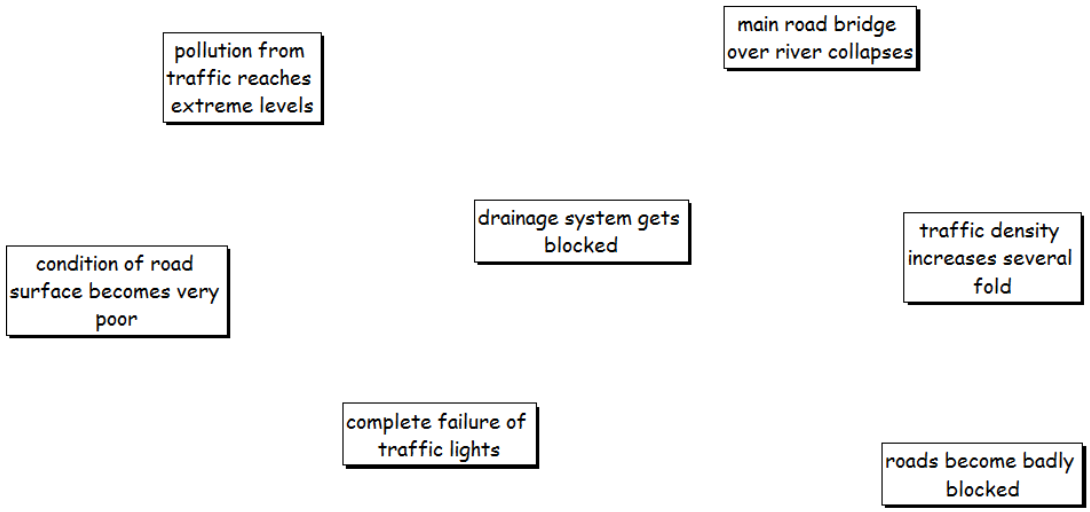
This now tells about a possible event in the future. The extra words help express more about the concern.

Sometimes two risks are embedded in one statement. For example, someone might say, "drainage system gets blocked and so roads become blocked" The "and" here indicates two separate ideas.

[2] The European Commission. 2010. "Commission staff working paper: Risk assessment and mapping guidelines for disaster management"; retrieved from: https://ec.europa.eu/echo/files/about/COMM_PDF_SEC_2010_1626_F_staff_working_document_en.pdf

The best way to see the set of risks that participants see facing the City is to write them in rectangles rather than as lists and so spread them around so that all can see them. So, we use rectangular 'stick-notes' or better still use sticky 'ovals'3.

See Graph 27 for an example of the early stages of a risk dump in answer to the question "*What do we think are the important risks that the City faces in the topic of traffic management*?"



Graph 27: *An early dump of risk relating to traffic management*

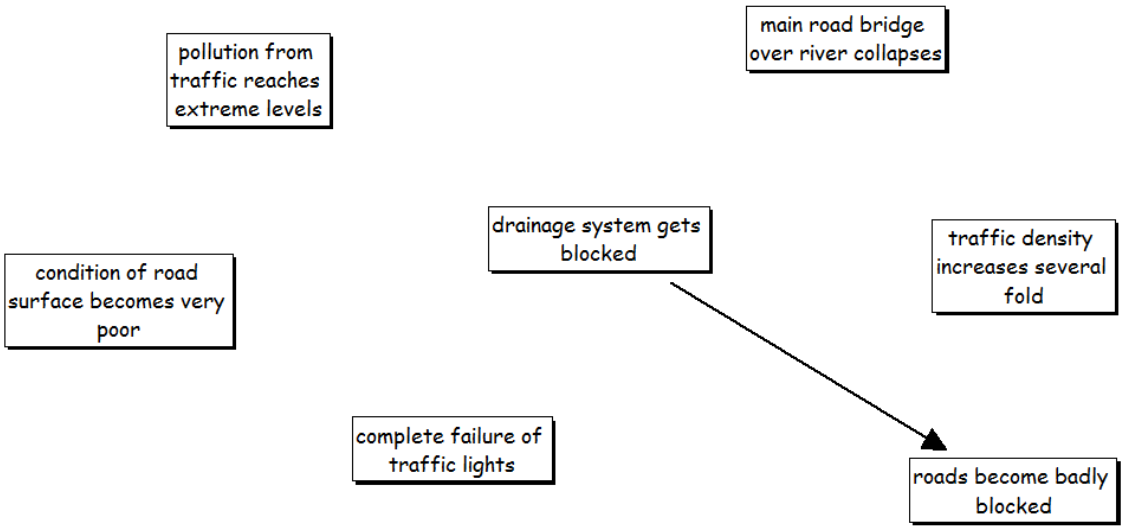
The sticky-notes or 'ovals' should be placed on flip-chart sheets on a flat wall. Typically 6 flip-chart sheets are required set out in a 3x2 format (3 across and 2 down).

The group should be encouraged to dump risks until it is clear that participants have exhausted possibilities. In practice a group can often identify up to 50 risks before they 'run down' and also the map on the wall becomes overwhelming.

Building risk scenarios – adding causal links

[3] http://banxia.com/ovalmap/ 'ovals' help a group to see connections between risks whereas 'sticky-notes' tend to encourage seeing columns and rows

An arrow is used to represent a causal link. The arrow implies “may lead to” or “may cause” or “might result in.” For example, in Graph 28 below, the arrow indicates the “and so” in the statement “drainage system gets blocked and so roads become blocked”.



Graph 28: *Causal links are shown by an arrow leading from one risk to another. The arrow shows the direction of causality: a blocked drainage system CAUSES roads to become badly blocked.*

Thus, the next step in creating risk scenarios is to get the participants to draw in the arrows they believe exist – show where they believe one risk causes another.

There is a danger of having the arrow point the wrong way and thus not express an action leading to an outcome. Thus, in a chain of arrows, the bottom of a chain of arrows (the first statement in the chain) is taken as the triggering risk.

It is easy to get the direction of arrows wrong by confusing chronological relationships with causal relationships.

Alternatively, thinking in terms of *if – then* statements can help get the causality right. For example, *if* we “[overcome] lack of good signposting,” *then* “people [will be] able to use our website effectively.”

As the risk map develops it will become messy (a lot of causal links). One way of creating a less messy initial causal map is to avoid drawing in long links by instead drawing in a short arrow that does

not go to the distant statement to which the first statement is linked, but instead points to the number of the statement written in at the end of the short arrow.

For example if one risk statement was to link to another risk statement on the opposite side of the map then adding a reference number to these 'stick-notes' enables a very short arrow out of the first risk and a short arrow in to the second risk. For example, the risk numbered 45 to the one numbered 23. However, while this is apparently less messy it can impede seeing the emergent structure and some of the interesting insights that emerge.

Often a coffee break is required to allow the facilitator to 'tidy up' the risk map by redrawing it on another set of flip-charts (or alternatively using mapping software4).

This is why 'tidying up' by remapping the material can be helpful. In order to do so, however, a break in the workshop (perhaps for coffee) usually will be required so that the facilitator and one or two participants can do the remapping.

Risk Scenarios can now be identified. The important scenarios are vicious cycles – because these are much more difficult to mitigate than chains of risks. Vicious cycles usually require concerted strategies to attack many of the elements (risks/events) that make up the cycle.

Risk scenarios are therefore: vicious cycles and causal chains that suggest a risk 'story' of significance to the city. The causal chain scenarios will usually consist of 6-10 events that are causally related, and have a triggering event (which could be the outcome from another scenario) and an outcome that represent a summary for the scenario and also represents an outcome that obviously matters to a strategic arena within the city overall strategy for the future.

Vicious cycles

Vicious cycles occur when there is circular causality, which in a map shows up as a circle of arrows These cycles, or feedback loops, are an important means of identifying priority risk scenarios. The feedback loop can represent either a "vicious" or "virtuous cycles.' In risk assessment the loops will usually be vicious cycles – that is the situation/scenario gets continuously worse over time

4 Decision Explorer – see banxia.com

Sometimes feedback loops can be counterintuitive, so that without seeing them on a map nobody is aware of their effect on the future of the City. Loops also can just be hard to see on a big map. When identified, however, loops are always worth exploring as they can be particularly problematic for a city with the scenario getting continuously worse over time.

Facilitating a risk workshop

One particularly helpful way to get started is to jointly facilitate a risk workshop with a colleague. This allows for a sharing of effort. Managing the volume of material that can be generated (the content) as well as the group and its interactions (the process) is demanding. For first time facilitators, the demands can be too great if the stakes are high and the group is new to the facilitator. Working together also allows for sharing of experiences and therefore accelerated learning. It is also more fun and can tap into different competences, skills and knowledge bases. However, when working in pairs, be clear about who is taking the lead at any one time (this might change over the course of the workshop), as this will avoid the danger of pushing in different directions or tripping over one another.

One of the real tensions for a facilitator in working with groups undertaking risk mapping is knowing when to finish with particular mapping tasks, for example, when to stop generating material, linking material, or tidying material up and identifying risk scenarios. Sometimes it will help to break the workshop into several small workshops so that the facilitators have time to 'regroup' and assess the material.

It is worth keeping in mind the Pareto Principle or the 80 – 20 rule. In this case, the rule suggests that 80 per cent of the work can be achieved in 20 per cent of the time and that successive elaborations and refinements can continue *ad nauseam* and not be very productive. Do not feel that you have to get everything perfectly right in terms of content. If there is time at the end of a workshop it is always possible to return to material that has been underexplored.

The attention facilitators pay to the workshop setting, equipment needs, and logistics can appear to non-facilitators as an excessive focus on what appears to be trivial concerns. Experienced facilitators know that getting the apparently trivial right can greatly increase the chances of success at very little cost. Developing your own facilitation *kit box* can be helpful. For risk workshops, lots of flipchart sheet paper; bullet-tipped, water-based flip chart marking pens (for writing up the issue statements and for drawing in links on the map); pencils (for drawing in tentative arrows); pads of sticky-notes (in possibly of two or three colours); a digital camera or another way to take photographs; etc. Ensuring there is plenty of everything is important, since running out is embarrassing, but more importantly means the

workshop is not nearly as productive and mindful of participants' time as it should be. In addition, make sure each participant gets the same colour pens since this will help separate proponents from their ideas about risks. In addition, make sure that the pen has a broad enough tip that participants will be forced to write in large text that it is easy for others to read.

One of the biggest mistakes that can be made is planning for a strategy workshop is not arranging to reserve the right room for workshop. Getting the room design right is fundamental. Be sure to visit the room well in advance of the workshop to make sure it is appropriate and to make sure there is plenty of time to seek an alternative, if necessary. A good room will have plenty of wall space to which two rows of at least four flipchart sheets per row may be affixed with masking tape at the top of the upper row. This means walls with no fixed pictures, no textured wall paper, and no wall panelling or rail half way up the wall. Very large windows *without mullions* can be used for creating a mapping surface. Plenty of daylight is also helpful as this helps keep participants motivated and engaged (although note that too much sun can cause discomfort). Avoid rooms with fixed heavy tables, particularly boardroom tables; heavy chairs; and many bookcases, since this will make it difficult to have participants seated in a semi-circle in front of the mapping surface. Too much heavy furniture will also make it difficult for participants to move around easily. Having comfortable (but not too comfortable) chairs on casters allows for good movement and will keep participants alert and engaged.

6.3. RESILIENCE INFORMATION AND COMMUNICATION PORTAL – USER MANUAL

6.3.1. INTRODUCTION

This chapter describes the SMR Resilience Information Portal usage. While it will be realized as a free-standing document, it is included in D4.4 to fill a gap: it is less technical and much more concrete than the functional specification, as presented in D4.2 and extended in D4.3; at the same time, it is more detailed and has broader coverage than the tutorial available on the portal and in Annex II (and the status page overview given in Annex I).

The handbook contains two main sections: the user perspective and the editor perspective. The first explains how the portal can be used, thereby also highlighting what is possible from a user's point of view. This should not only support the actual usage of the portal but also foster a better understanding of the functional specification, which describes the portal functionality in much details but – due to the nature of a specification – does not give advice how to practically realize it. The latter show how the portal can be editing, starting with simple functions but ranging to complex possibilities.

For better illustration, we heavily make use of screenshots. All screenshots have been made on the three exemplary portals that have been created as part of the SMR project for the three tier-1 cities. In general, the portal is written from the perspective of using the exemplary SMR portals; however, since these portals follow the functional specification that we encourage as the foundation for building Resilience Information Portals, the descriptions can be related to any portal generated (at least roughly) following the specification. Of course, the graphical design can be chosen freely and any screenshots should be seen as merely exemplarily in their graphical representation of functionality and content.

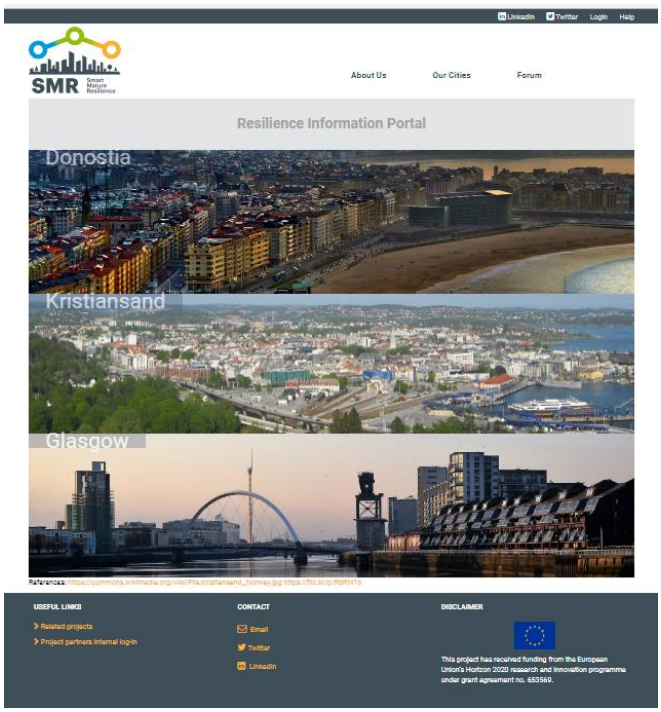
Individual sections are kept as short as possible and focus on single functions. This yields a strict separation of concerns and enables the manual not only to be used when read from beginning to end but also as a reference for reading about distinctive functionality. Words in Italics font present design principle related instruction.

6.3.2. USER PERSPECTIVE

ACCESSING THE SMR PORTAL

Any users can access the SMR Portal via the following URL:

http://smr-project-test.appspot.com/main.page



Graph 28: *Entrance page to the portals*

SELECTION OF A PORTAL

Users chose one portal from the following three by clicking the city's name or the image of the city.

Donostia: http://smr-project-test.appspot.com/RPDonostia.page

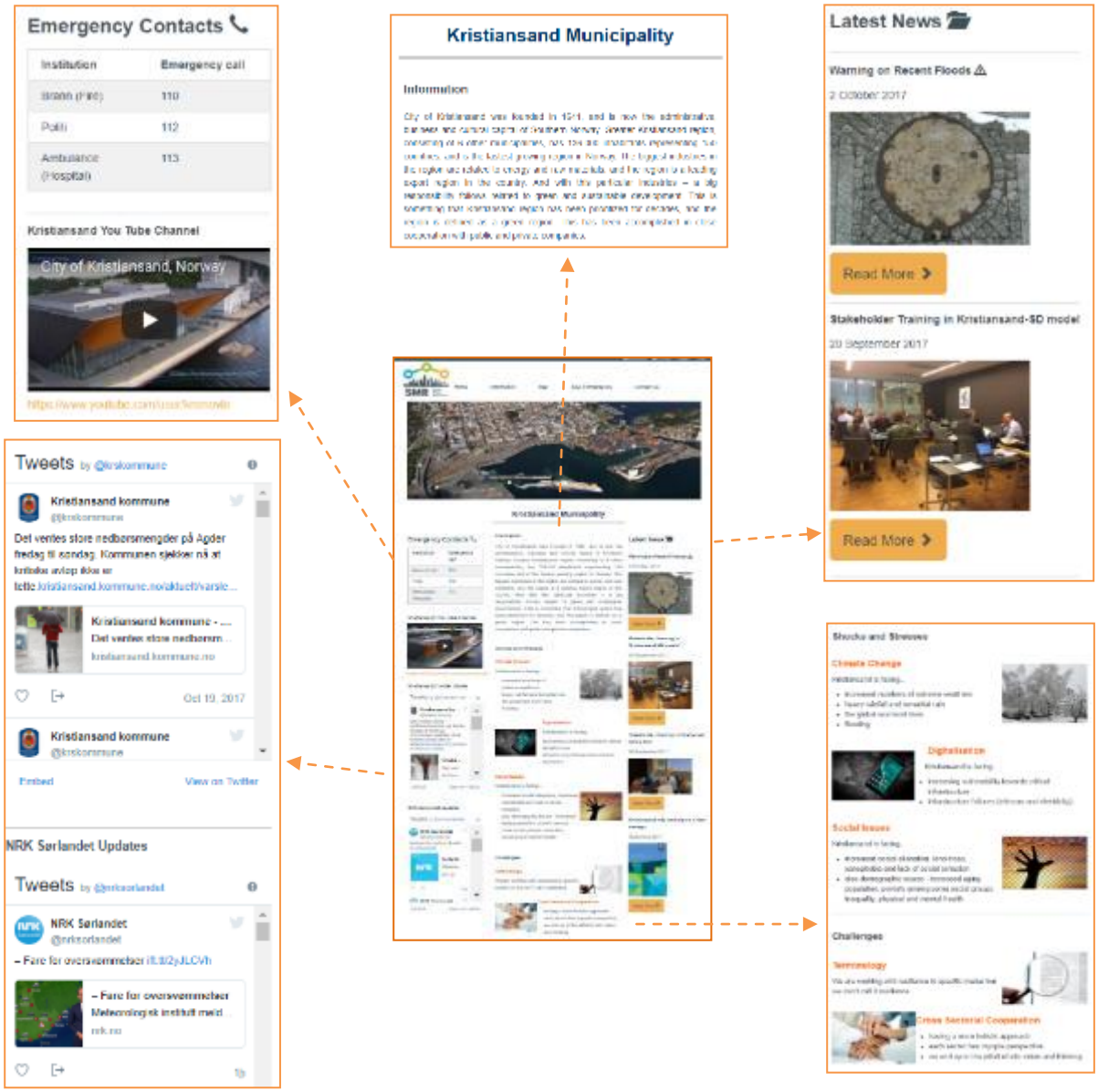
Kristiansand: http://smr-project-test.appspot.com/RPKristiansand.page

Glasgow: http://smr-project-test.appspot.com/RPGlasgow.page

THE START PAGE

Users can see the specific information about the city. For example, the home page of Kristiansand shows 1) short introduction of the city, 2) shocks and stresses towards city resilience, 3) emergency contacts, 4) latest news, 5) related social media feeds, and 6) recent work. In other cities, the structure can be different.

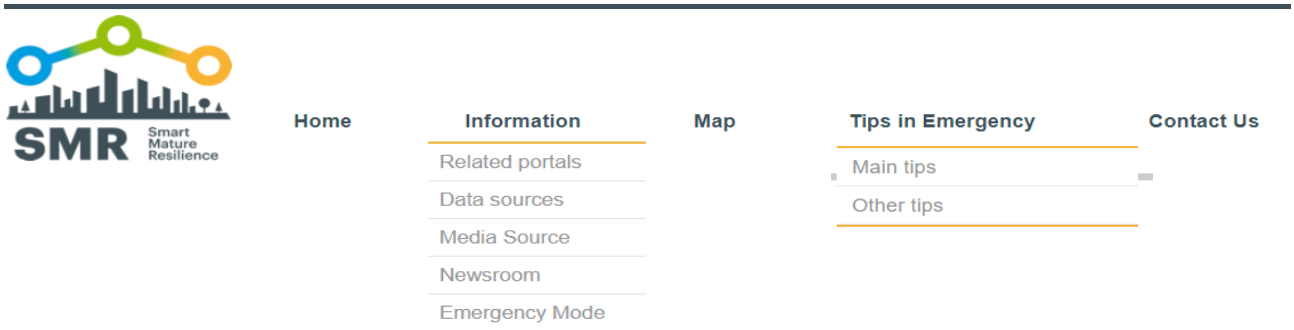
Information is provided by each portal owner individually. Portal owner may follow the SMR portals or provide a selection of information on their own creation. However, it is encouraged to follow the SMR design principles and the portal's functional specification (cf. Deliverable 4.3).



Graph 29: An example of implementation of Resilience Information Portal in Kristiansand –the main home page (in the middle). The figures in the left, right and upper parts are highlights from different section in the main page.

USING THE MENU

Users can access contents through the menu bar. The main menu bar contains “Home”, “Information”, “Map”, “Tips in Emergency” and “Contact”. Each menu has sub menus for instance, Kristiansand portal has “Related portals”, “Data sources”, “Media source”, “Newsroom” and “Emergency mode” under “Information” menu bar. Cities can change each sub menu according to their needs.

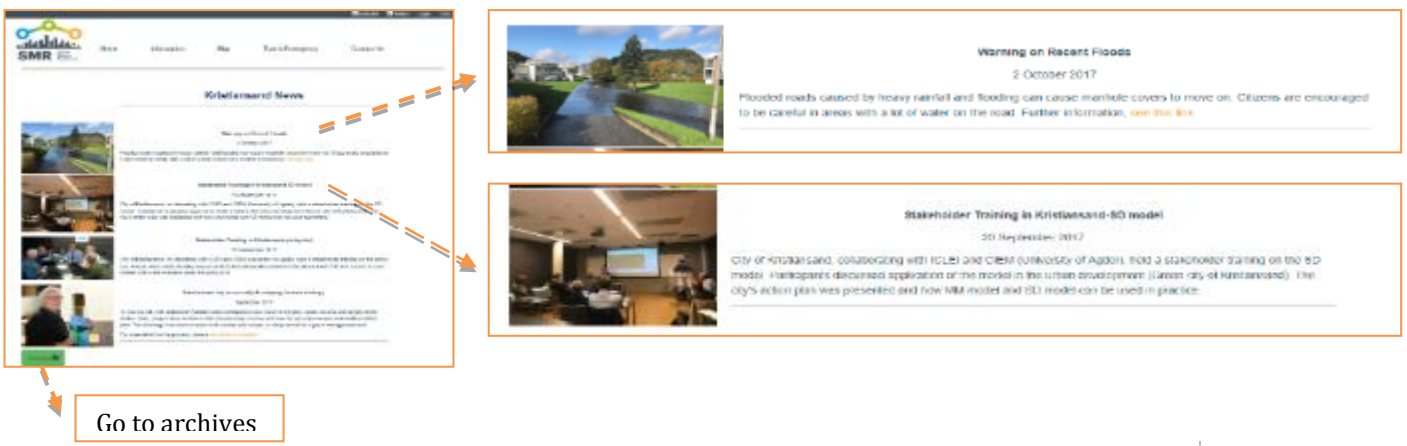


Graph 30*: Example of the Menu bar in Kristiansand Portal*

NEWS AND NEWSROOM

Cities can keep updated by *sharing information* with different departments and stakeholders.

Stakeholders and citizens can see the latest activities of cities.



Graph 31: *Example of Newsroom in Kristiansand Portal*

REGISTERING FOR THE PORTAL

To register a new user to the portal, we need to go to Login > Admin > New user

The user should provide user name, email address, password and then press Submit button. Then the new user can start participating and developing the portal (although normal users only gain user access, not the role of an administrator). Currently, the portal only support registration of a new user who will participate in administering and developing the content of the portal, and not for general user. Email verification is supported. The new user receives an email with a link to confirm which will activate the new account.

Graph 32: *Example of New User feature in Kristiansand Portal*

INTEGRATION WITH THE OTHER SMR TOOLS

From the About Us entry of the Resilience Information Portal, the user can go to the different tools of SMR as seen in **Error! Reference source not found.**.

Graph 33: *Concept of the tool integration*

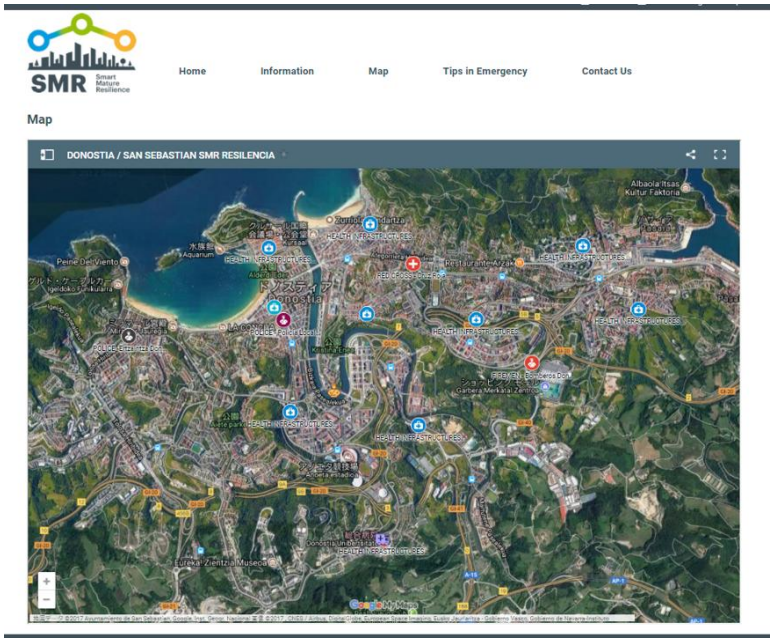
RESILIENCE LIBRARY

Cities can see best practices of others. It enhances *knowledge sharing* in different levels (regional, national and Europe).

Graph 34*: Example of Resilience Library in Glasgow Portal*

MAP MASHUPS

Users can see a geographical map which integrated data from several sources and make use of already existing capabilities (such as using Google Maps, Open Street Maps or other available maps with added icons to highlight infrastructure).

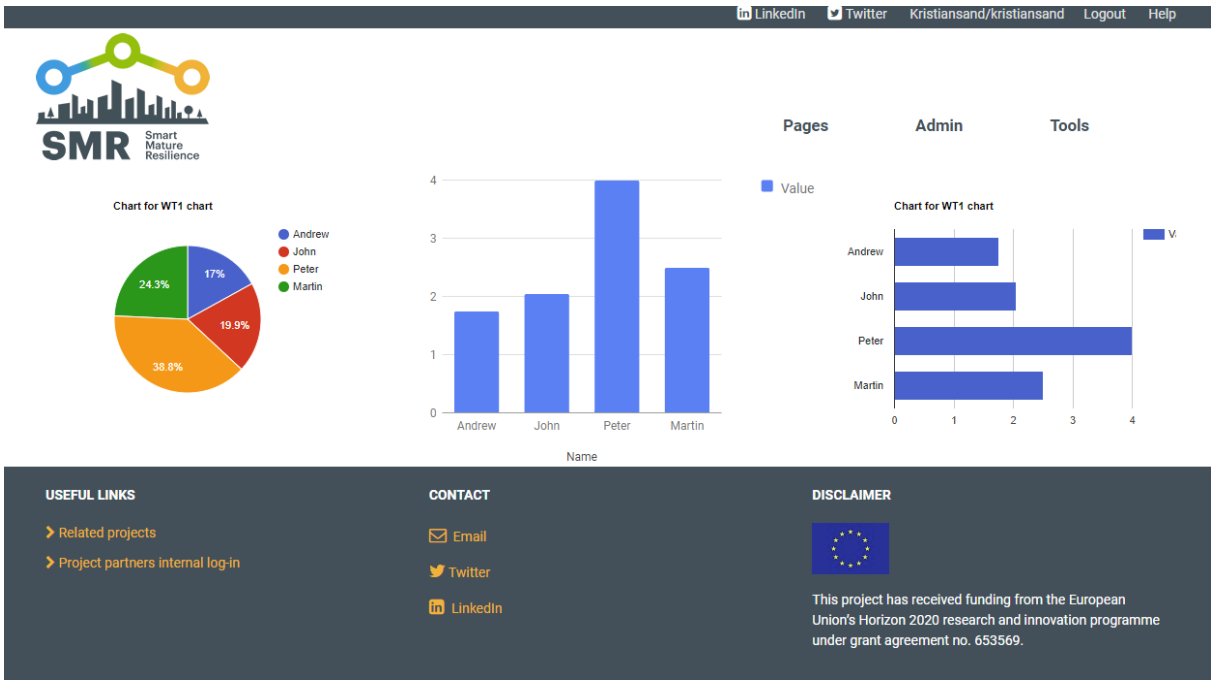


Graph 35: *Example of the map implementation in Donostia Portal*

UNDERSTANDING VISUALISATIONS

It is possible for the city to include data visualization in the portal, if the stakeholders have the need to include data defined in a data structure or external data that need to be presented or visualized in the information portal, as seen in **Error! Reference source not found.**.

The data can be introduced in the data structures created with the portal or user external data. In both cases, the data is obtained with the available APIs to access the data; typically, the API are defined and implemented in JavaScript for their use on the Web.

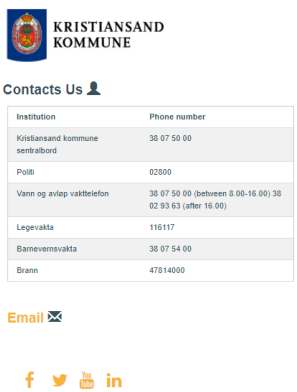


Graph 36*: Fetching External Data and Visualizing them in the Information Portal, an Example*

CONTACT LIST

Citizens can get where they should call based on their purpose.

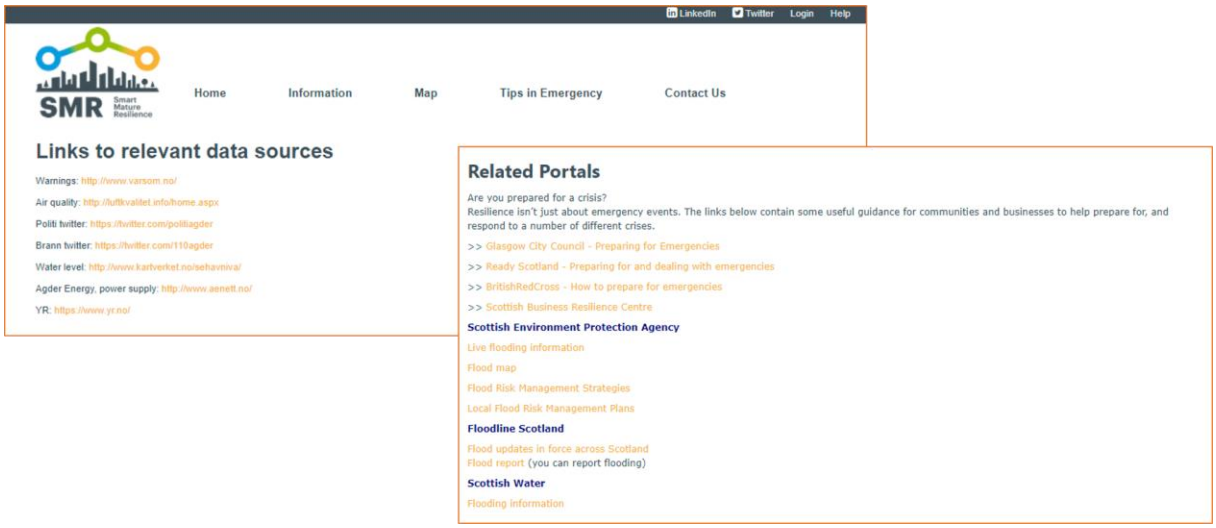
Cities can establish a *communication structure*.



Graph 37: *Example of the contact list in Kristiansand Portal*

RELATED PORTALS AND DATA SOURCES

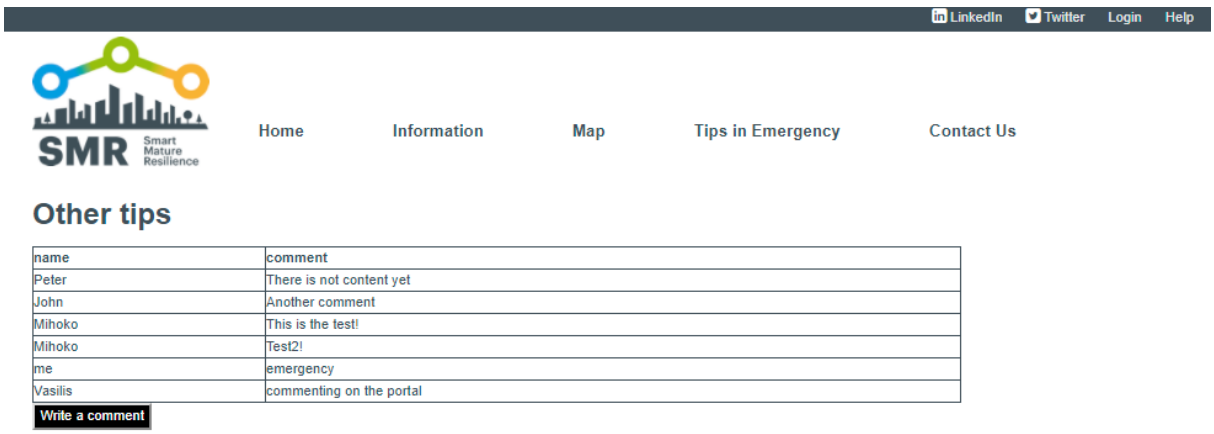
Cities, stakeholders and citizens can see related portals, data source, and media source as a reference.



Graph 38: *Example of the source list in Kristiansand (left) and Glasgow (right) Portal*

COMMENTING

Users can add comments directly through the portal as one means of two-way communication.



Graph 39: *Example of the commenting function*

TIPS IN EMERGENCY

Citizens can gain useful information how to prepare for an emergency. This is a part of *citizen engagement*.

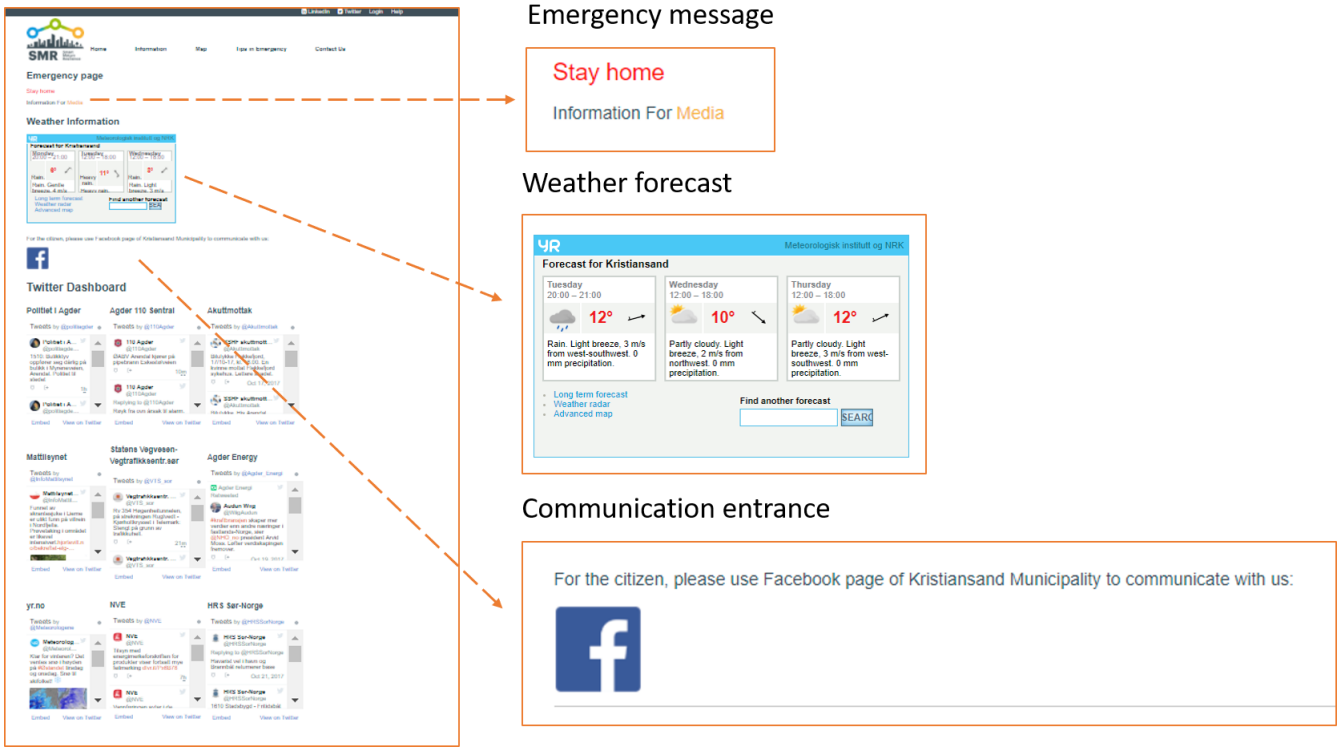
Graph 40: *Example of the Tips in Emergency in Donostia Portal which explains the meaning of alert level*

EMERGENCY MODE

The Emergency mode allows to the administrator to change the default page to a predefined (or created ad hoc) Emergency Page.

This page may offer functionality such as:

- Citizens can get a simple message to citizens on how to react once an emergency happens.
- Media can get a link for related information from cities.
- Citizens can contact cities through social media.
- All users can see twitter posts from disaster relief related organizations.



Graph 41: *Example of the Emergency mode page in Kristiansand Portal*

USING SOCIAL MEDIA

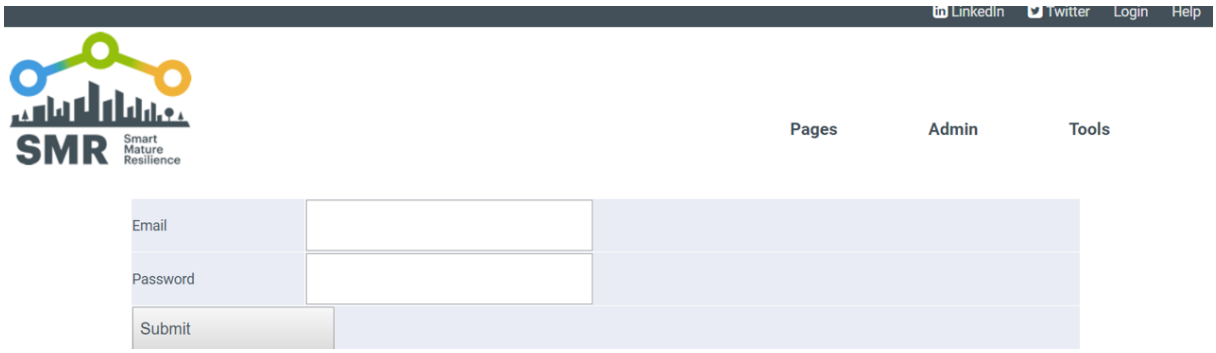
Social media on the portal is used in an integrative manner. The portal embeds existing social media services, as these are the ones that citizens typically use. The usage follows the established ways of the well-known services such as Facebook, Instagram, LinkedIn and Twitter as provided both on the Web sites of the services directly and on any other site that integrates content from them.

6.3.3. EDITOR PERSPECTIVE

LOGGING IN

To log in:

1. Click Login button
2. Registered user can directly type the email address and password in the available spaces
3. Press Submit button



Graph 42: *Example of log-in page*

GETTING AN OVERVIEW

The overview of the content of the webpages can be seen in the UserPage List.

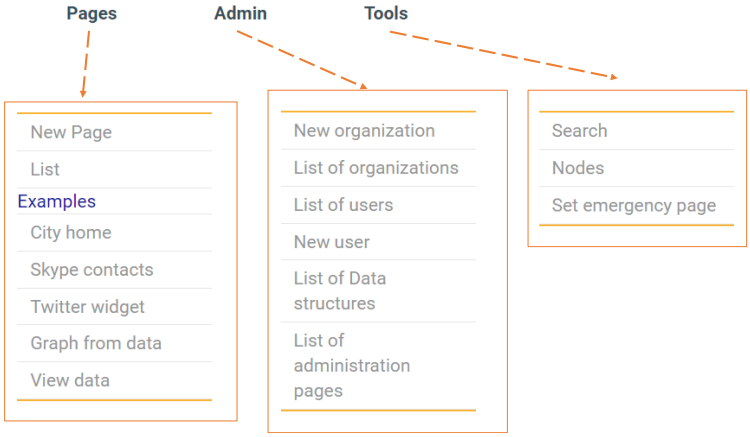
UserPage_List

New	GoToPage	name	logged
Detail	UserPage	City of Donostia	false
Detail	UserPage	City of Donostia (model1)	false
Detail	UserPage	City of Kristiansand	false
Detail	UserPage	Climate change	false
Detail	UserPage	Create user	true
Detail	UserPage	Digitalization	false
Detail	UserPage	Example of menu three levels	false
Detail	UserPage	Form data	false

Graph 43: *List of UserPage*

ADMINISTRATIVE MENU

The editor page has three menus, Pages, Admin, Tools. Each menu contains sub-menu which enables editors to create new page, new organization, set emergency page and the other administrative tasks.

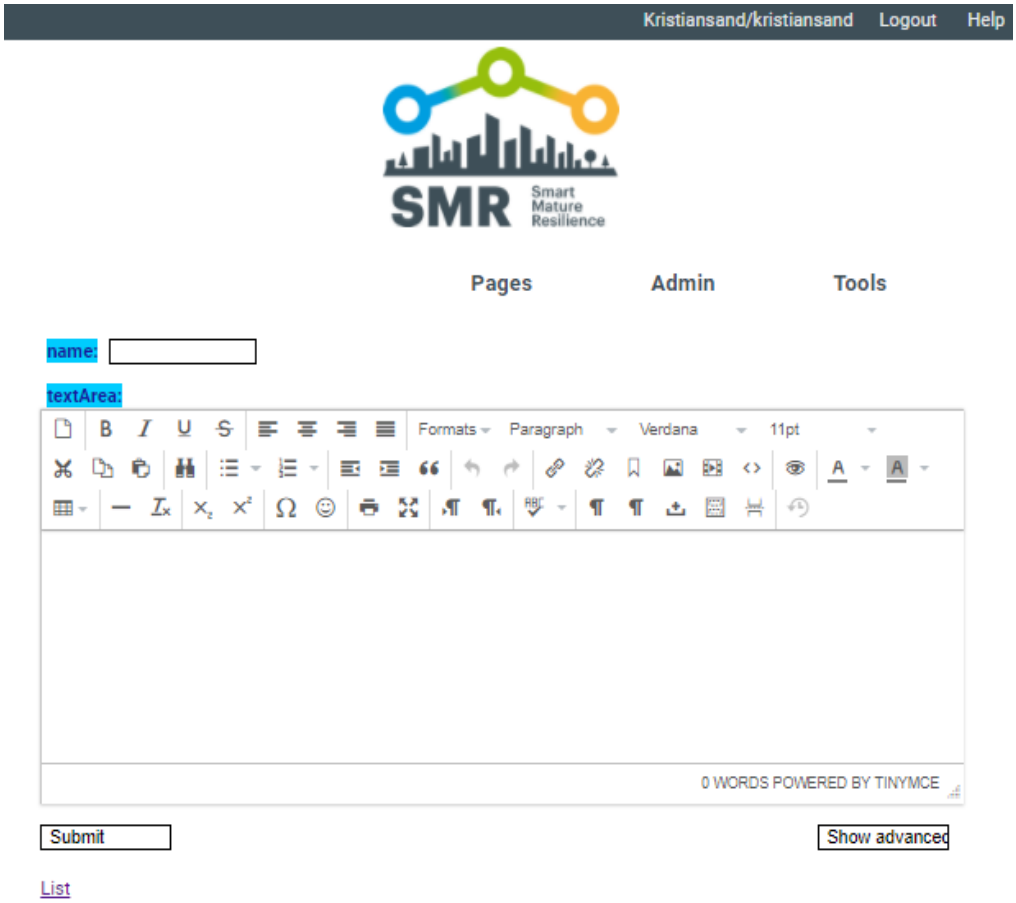


Graph 44: *Menu list of the administrative page*

CREATING A PAGE

To create a new page (also called a *User Page*):

1. Go to **Pages**
2. Click **New Page**, and the following interface will appear (See **Error! Reference source not ound.**)
3. Give the **name** of the page inside the space in the upper left.
4. Click Submit button. And then a new page will be created
5. Go to List, to see the newly created page. The names of the pages are alphabetically ordered in the list. See also **Error! Reference source not found.** that shows user page list.



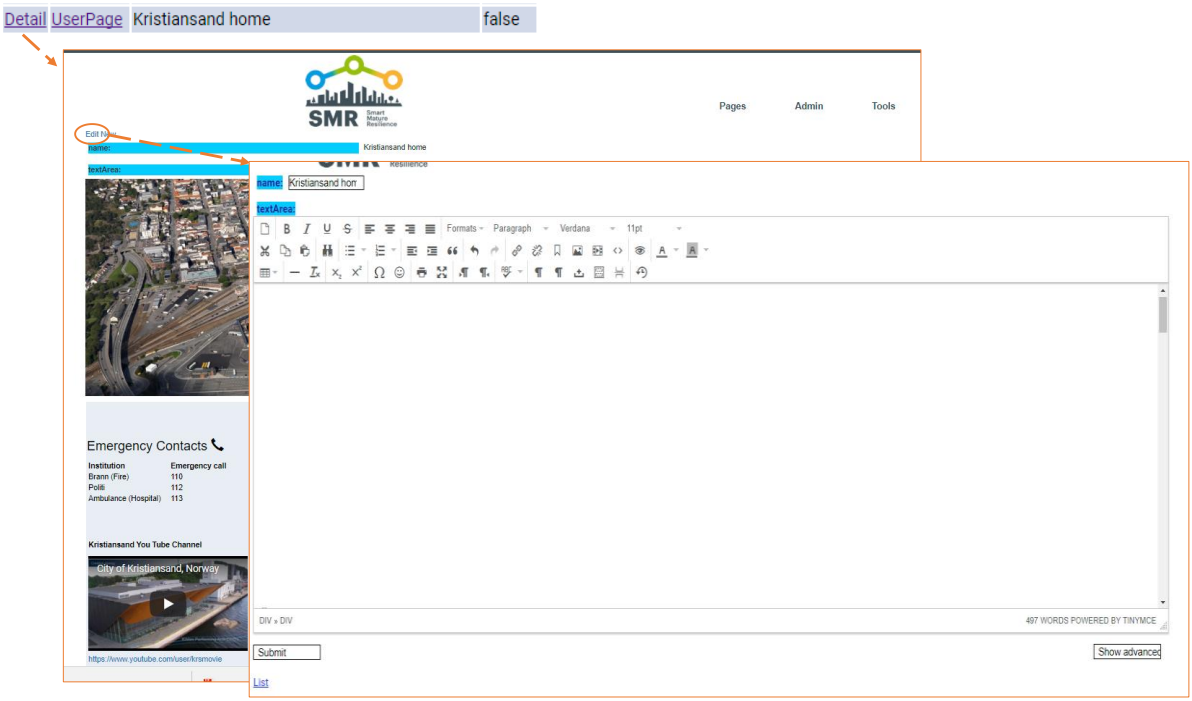
Graph 45: *Interface of new page creation*

EDITING A PAGE

To edit a page, the user can go to **List** and find the new created page in the **UserPage List**.

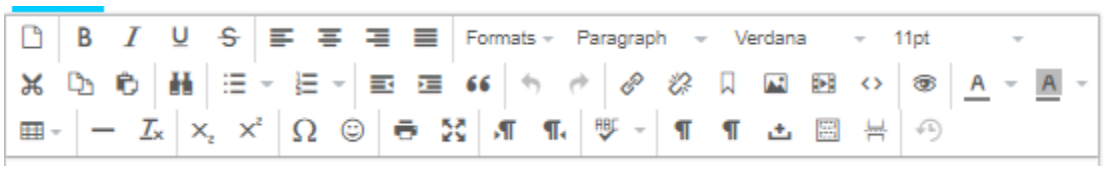
1. Click **Detail**
2. Click **Edit**
3. Start typing and formatting content **in the text area**
4. To finish and save the work, click **Submit**

The user can also insert the content in the process of creating a New page (0)



Graph 46: *Entrance to the editing page*

WEB EDITOR DETAILED FUNCTIONS



Graph 47: *Editing functions*

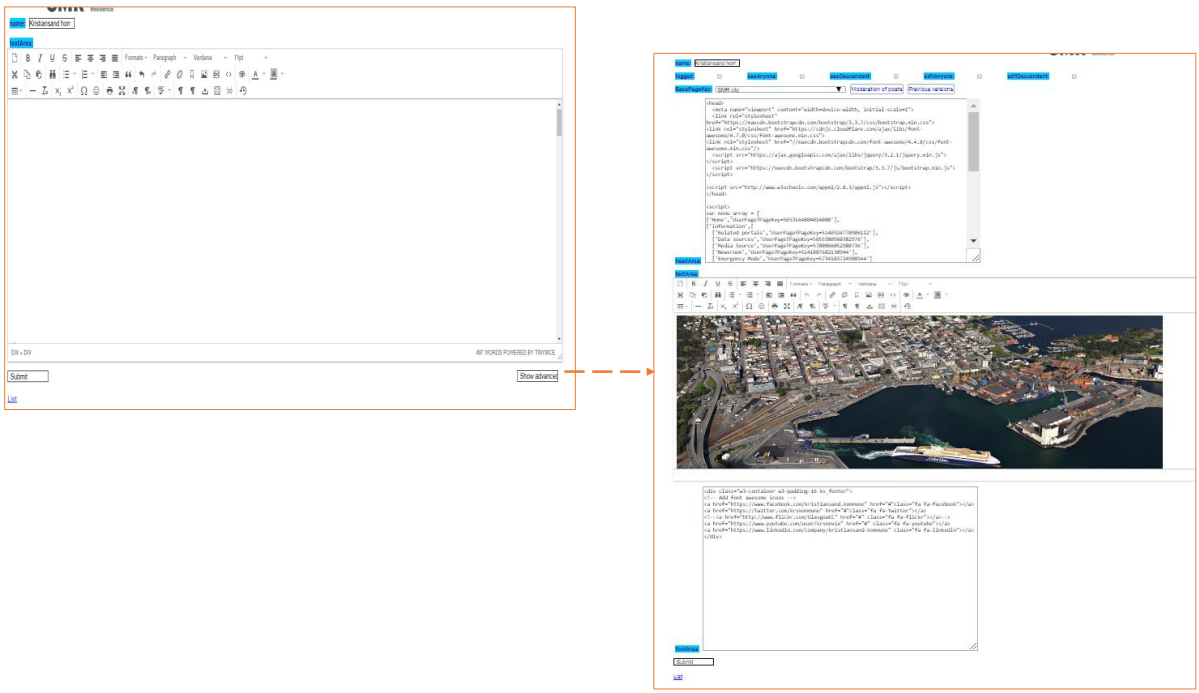
The Web Editor Detailed functions contain the following feature:

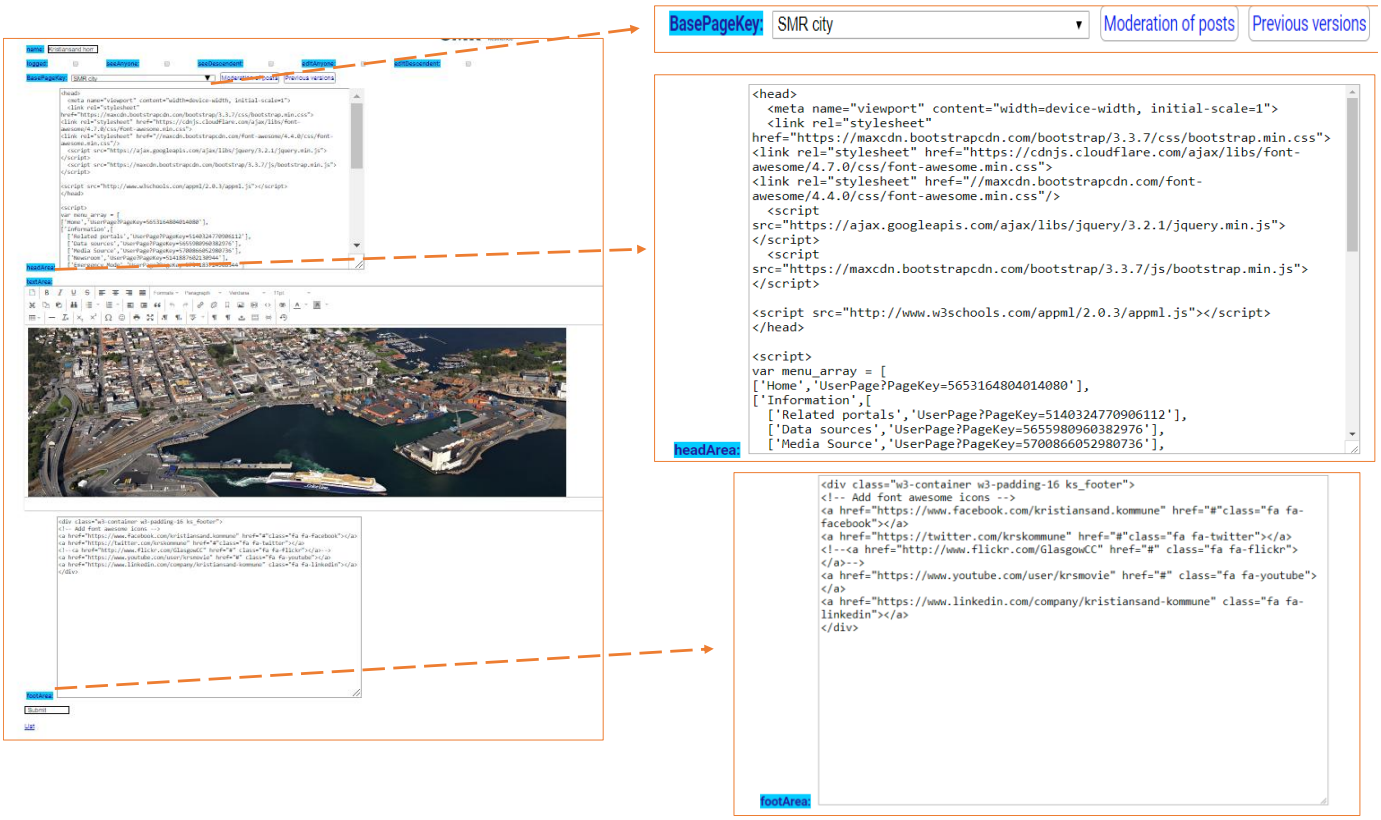
- Create a new document
- Format the text (Bold, Italic, Underline, Strikethrough
- Format paragraph (Align left, Align centre, Align right, Justify)
- Format Fonts (Overall text Headings, Paragraph, Font Family, Font Size, Text colour, background colour, subscript, superscript)

- Cut, Copy Paste, Find and Replace
- Make bullet or numbered list
- Increase-decrease indent
- Make block quote
- Undo-Redo button
- Insert/Remove external link, making anchor, insert figure and video and embed source code
- Insert table
- Clear formatting
- Insert line, special characters, emoticons, template
- Restore the last draft
- Print
- Full-screen
- Spell check
- Making text right to left or left to right,
- Show/hide invisible characters
- Page break

ADVANCED CONFIGURATION

When you click the "Show advanced" button in the bottom of the editing page, advanced configuration will appear.





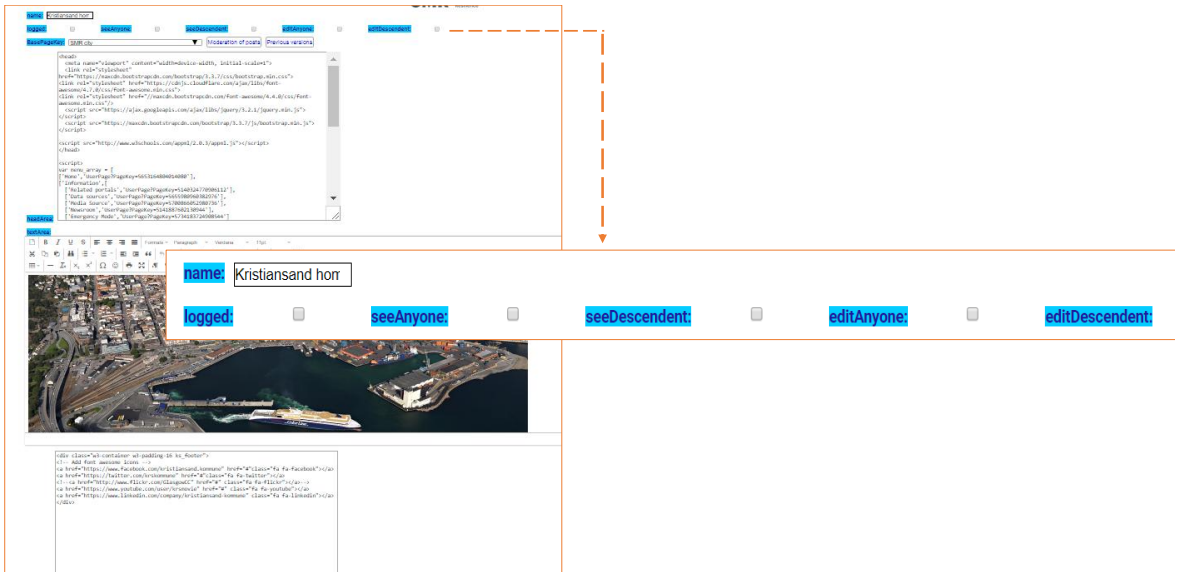
Graph 48: *Detail of advanced configuration*

Graph 49: *Advanced configuration page*

- *BasePageKey* (the top on the right): defines the page to be used as template. (technically: the page can use the head area and foot area of a previous page, usually defined for this purpose. It works in a recursive way.)
- *Head area* (the middle of the right): the code included in the web page, previous to your content (usually here is the style of the page or / and elements that appear in all the pages such as tool bars, menus, etc.)
- *Foot area* (the bottom of the right): the code included in the web page after your content (usually here is the elements that appear in all the pages at the bottom of the page)

PORTAL SECURITY

Every Page has its own security about who can see and edit these pages. This can be edited through the advanced configuration page.

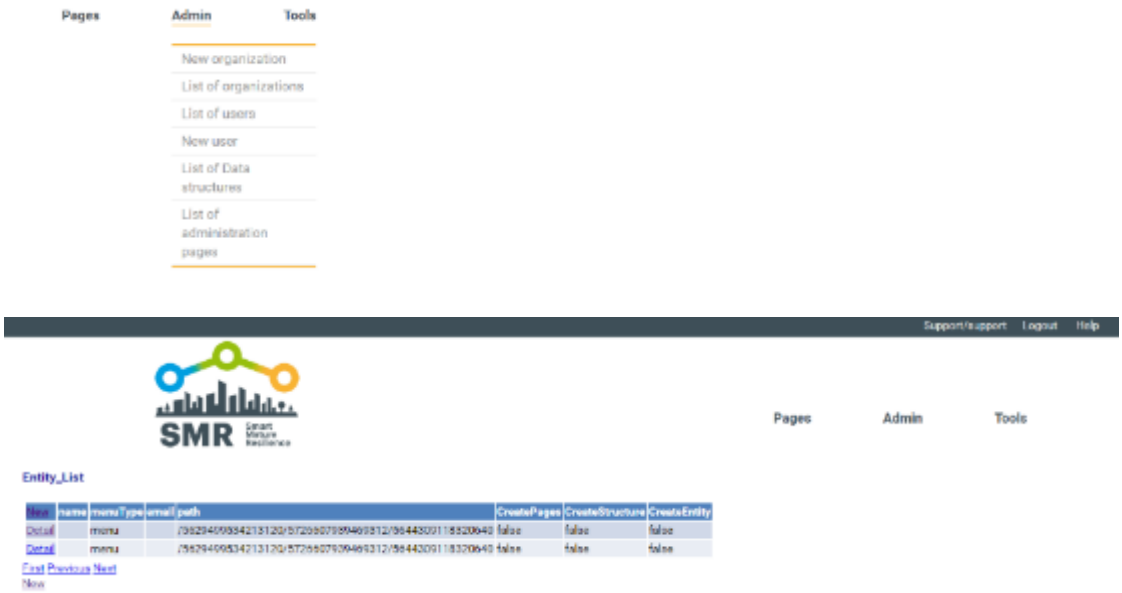


Graph 50: *Portal security selection*

- Logged: anyone logged can see the page
- See Anyone: anyone logged can see the page
- See descendent: Users of the pages below to this page (in the node tree) can see the page
- Edit Anyone: anyone logged can edit the page
- Edit descendent: Users of the pages below to this page (in the node tree) can edit the page

LIST OF ORGANIZATIONS

To show the List of Organizations, go to **Admin** menu and chose **List of Organizations.** The list will appear.



Graph 51: *The list of organization*

CREATING A NEW ORGANIZATION

To create a New Organization, go to **New organization.** Fill the fields (name and email) and select the permissions of organization (whether the users of this organization can create pages/structures/entities). Click submit bottom. The new organization will be created with the email as username and a default password.

Graph 52: *Page of new organization creation*

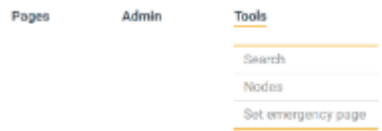
EDITING ORGANIZATIONS

To edit an existing Organization, go to **Detail** in the list of Organization. Then click **Edit.** Once a user has finished editing the Organization, they must click **submit** to save the changes**.**

Graph 53: Page of organization edits

HIERARCHY OF ORGANISATIONS

Users can see the hierarchy of organizations by clicking **Nodes** in the **Tool** menu.



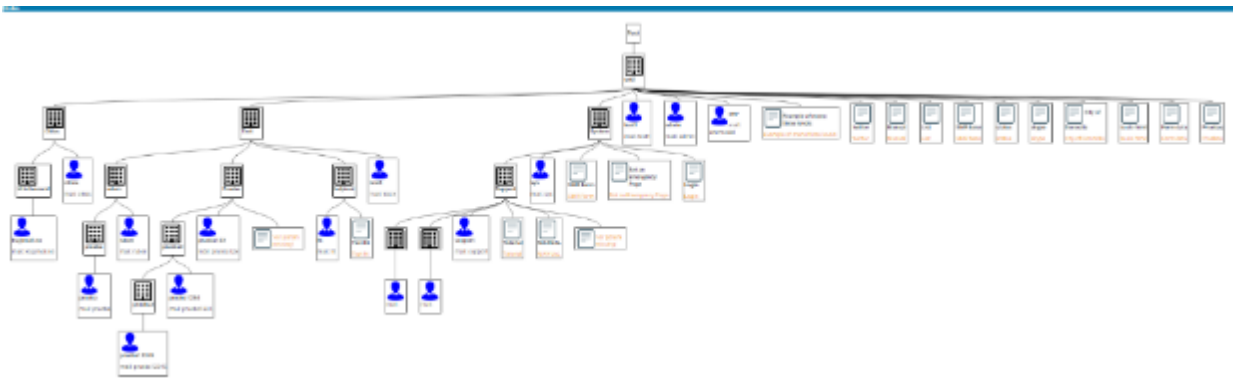
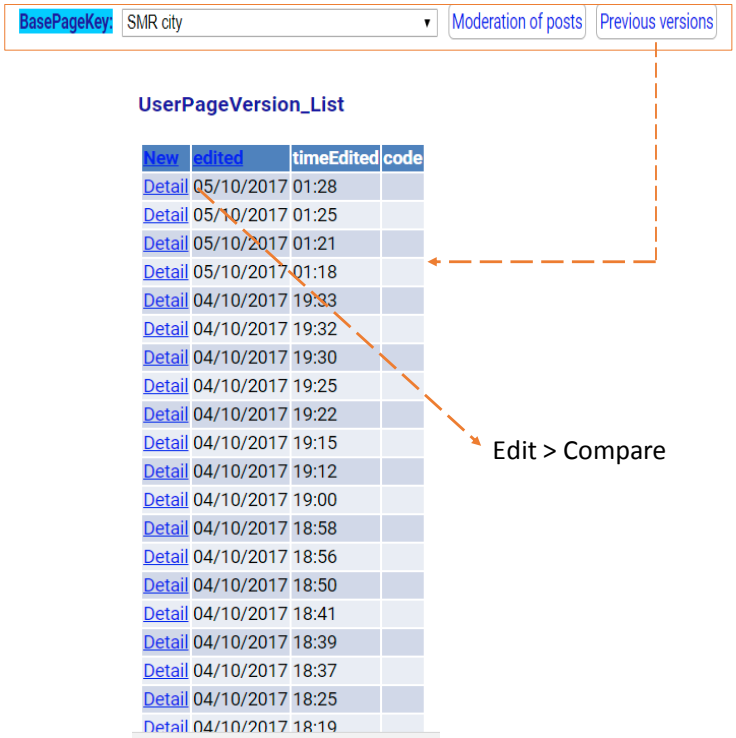


Figure 1 Structure of organization

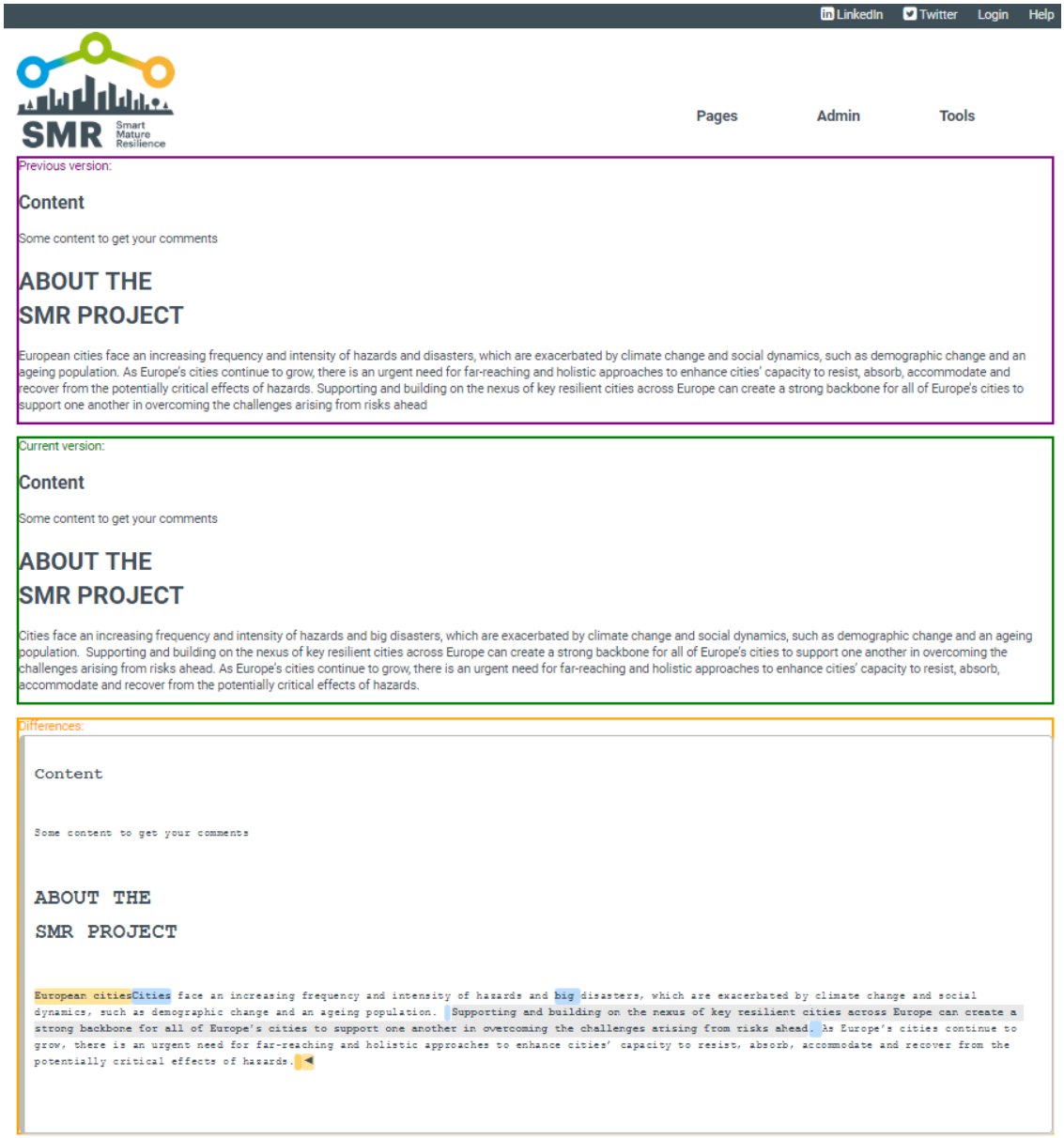
VIEWING AND USING PAST VERSIONS

Users can see the past editions and how it was changed by clicking **previous versions** in advanced configuration view. Then chose **Detail** > **Edit** > **Compare**.



Graph 54: *How to see the previous version*

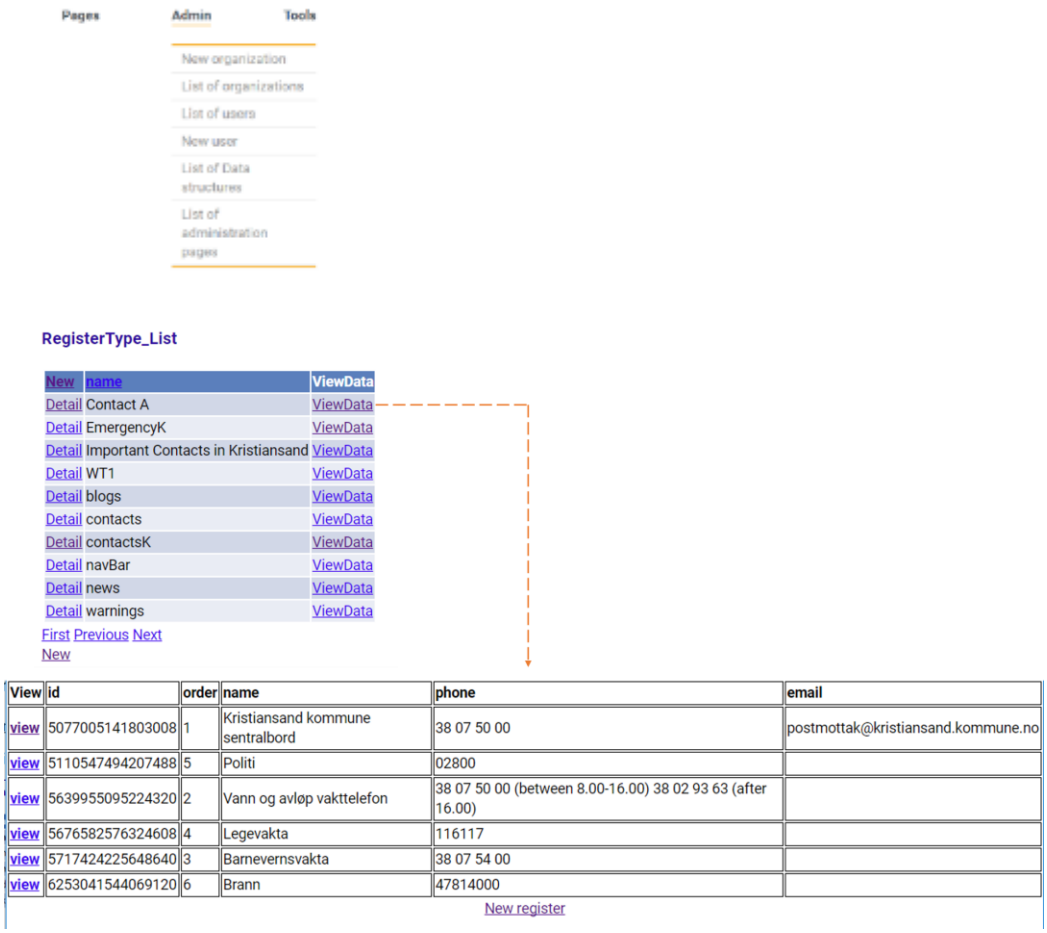
The user can see the previous version, the current version and its differences.



Graph 55: *Comparison of past edits*

LISTING AND SHOWING DATA STRUCTURES

To show the List of Data structures, go to **Admin** and chose **List of Data structures**. Users can see the structures of data, by clicking **ViewData.**



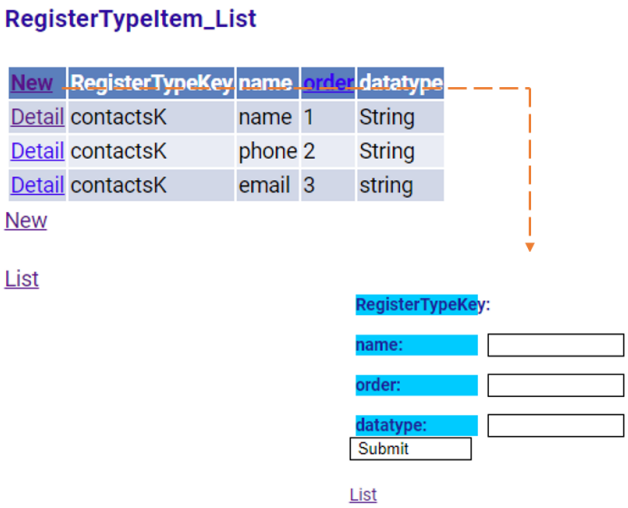
Graph 65: *Data structure list*

CREATING AND EDITING A DATA STRUCTURE

To create a new data structure, click **New** in the data structure list. To edit the name of an existing data structure, go to Detail in the list and click Edit. To finish, click **submit**.

Graph 57*: New data structure creation page*

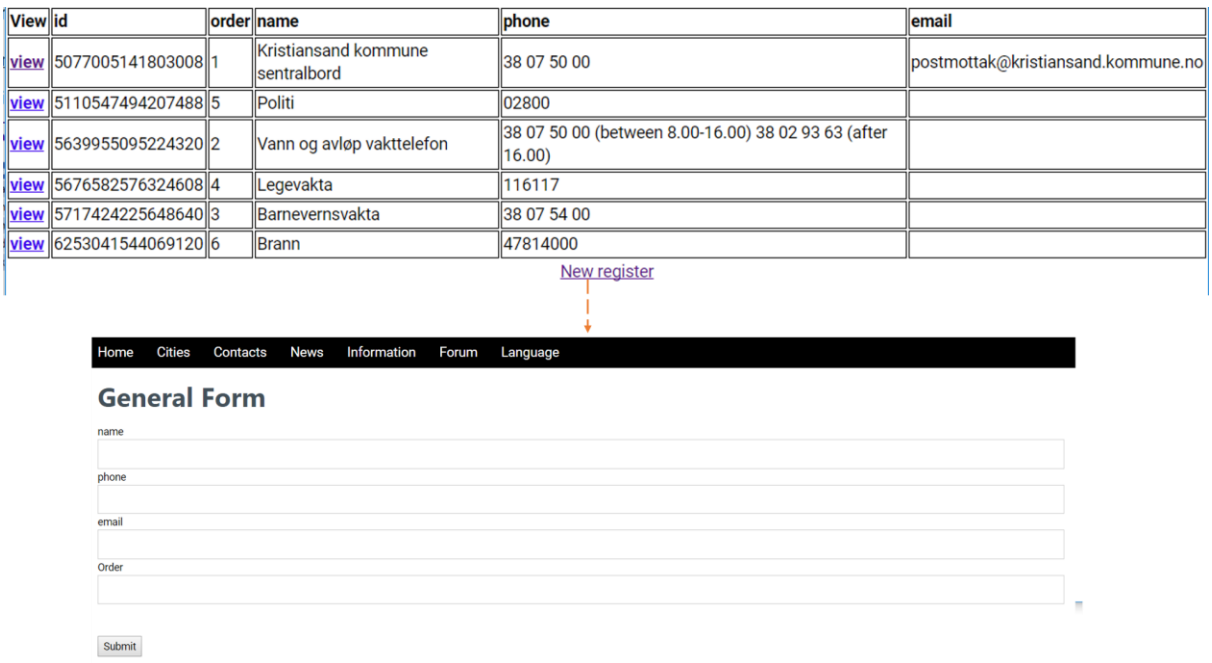
To edit the new data structure, back to the list and click **Detail**. When you click “New” button on the



left-top of the list, new item (name, phone, and email in **Error! Reference source not found.**) can be reated.

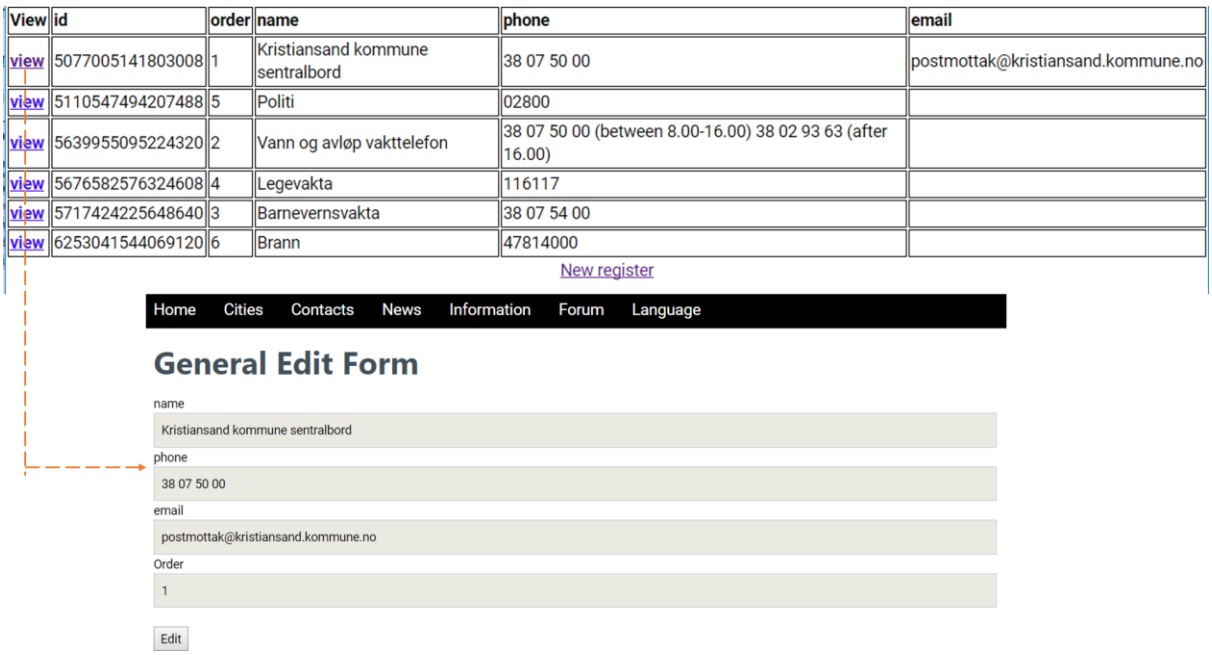
Graph 58: *New ítem creation to the existing data structure*

To create new register, back to the list and click “**ViewData**” and select **new register** in the bottom of the page. Fulfill the register form.



Graph 59*: New register creation*

To edit an existing data, click View and select Edit.

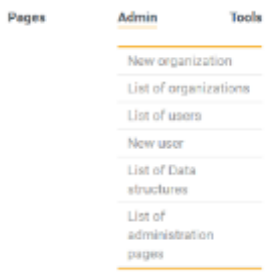


View	id	order	name	phone	email
view	5077005141803008	1	Kristiansand kommune sentralbord	38 07 50 00	postmottak@kristiansand.kommune.no
view	5110547494207488	5	Politi	02800	
view	5639955095224320	2	Vann og avløp vakttelefon	38 07 50 00 (between 8.00-16.00) 38 02 93 63 (after 16.00)	
view	5676582576324608	4	Legevakta	116117	
view	5717424225648640	3	Barnevernsvakta	38 07 54 00	
view	6253041544069120	6	Brann	47814000	

Graph 60: *Edit of existing data*

LISTING AND SHOWING ADMINISTRATIVE PAGES

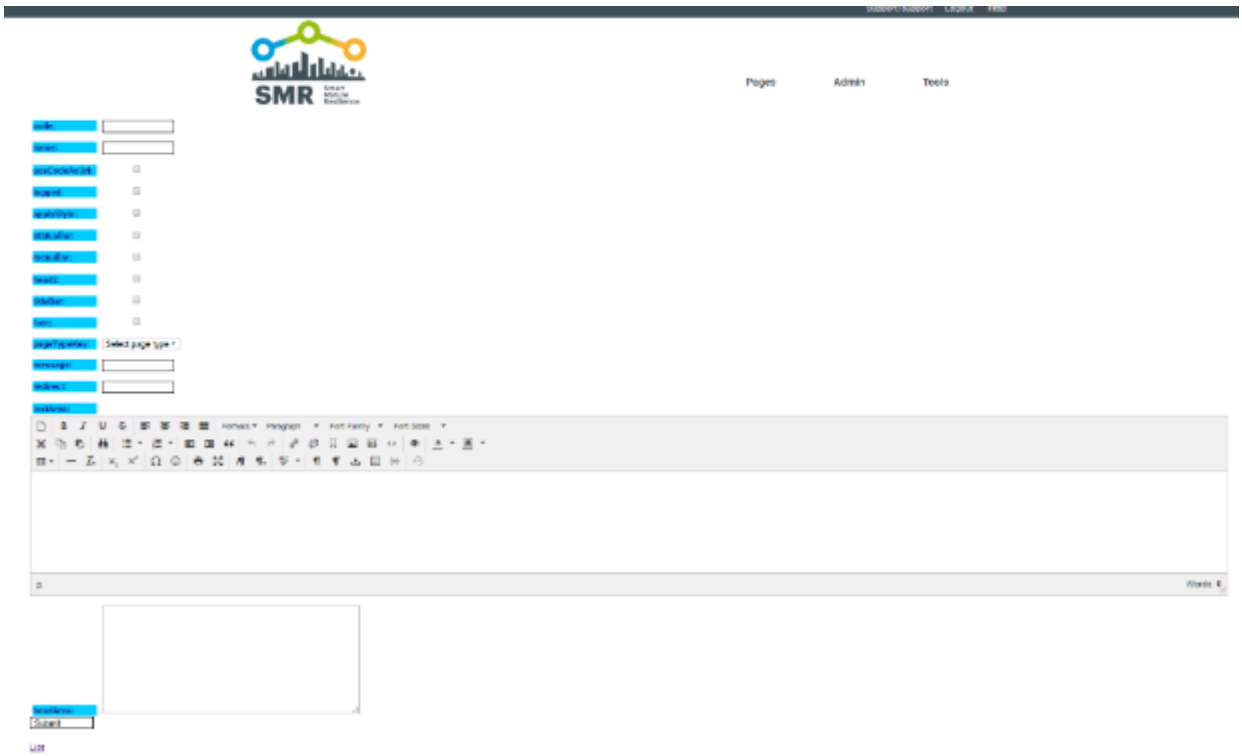
To show the List of Administration pages, go to **Admin** and chose **List of Administration pages**. Administrative Pages are similar in the way they are edited to User pages, but they have other features, like the option to use the code of the page as a friendly URL, or redirect the URL of an administrative Page to a specific User Page. Users can see the page by clicking **detail** bottom in the list.



Graph 61: *List of administration page*

CREATING AN ADMINISTRATIVE PAGE

To create a New Administration page, click **New** in the list of Administration pages. Fill the fields and click **submit**.



Graph 62: *New administration page creation*

- Code: The code allows to create links with this name.
- useCodeAsUrl: it allows to activate the code to create a link.
- useAsTemplate: the page can be used as template for other web pages.
- pageType: can be Message, Redirection or Text.

EDITING AN ADMINISTRATIVE PAGE

To edit an existing administration page, click **Detail** in the list of Administration pages and select **Edit** bottom**.**

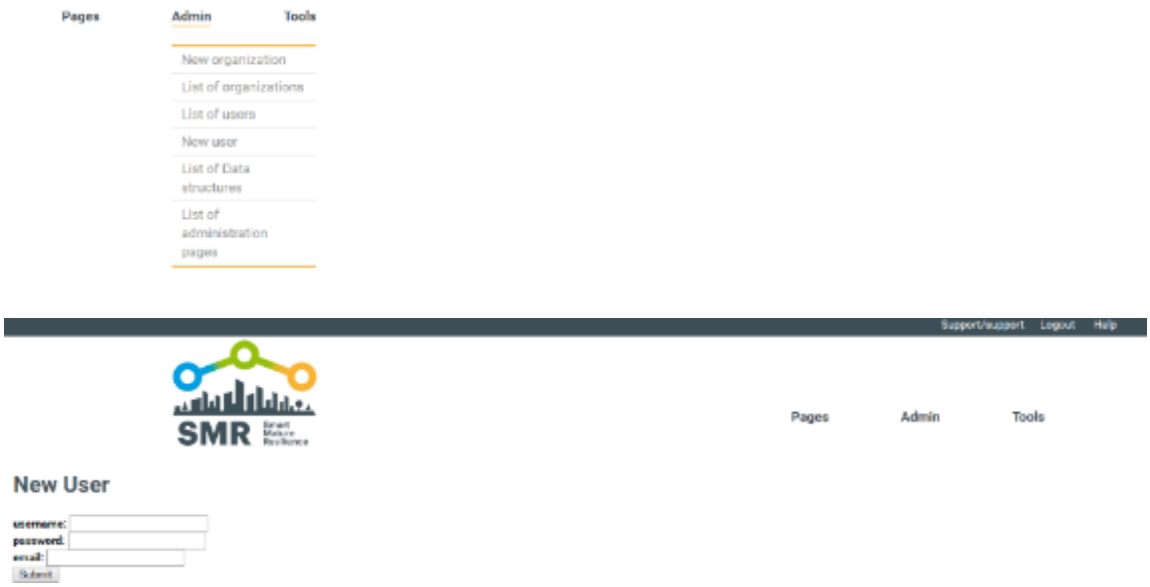
LISTING USERS

To show the List of Users, go to **Admin** and chose **List of Users**.

Graph 63: *User list*

CREATING A USER

To create a new user, go to **Admin** and chose **New Users**.



Graph 64: *New user creation page*

EDITING A USER

To Edit an already generated user, click **Detail** in the user list then chose **Edit.**

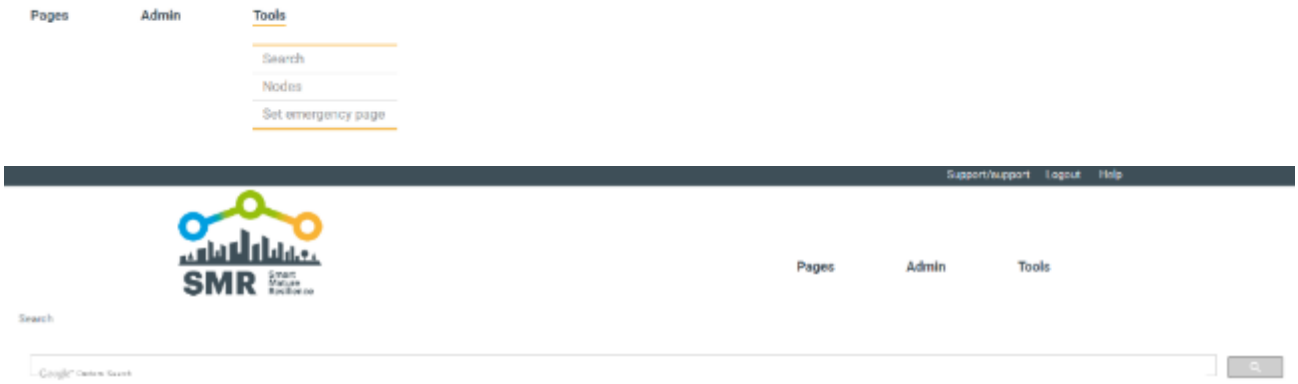
Graph 65: *User editing page*

IN-PORTAL HELP

By clicking **Help** on the top bar, users can see online tutorials of the portal.

SEARCHING

To search something in the Internet, go to **Tools** and chose **Search**.



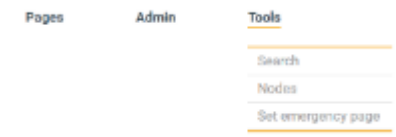
Graph 66: *Searching function*

SETTING THE EMERGENCY PAGE

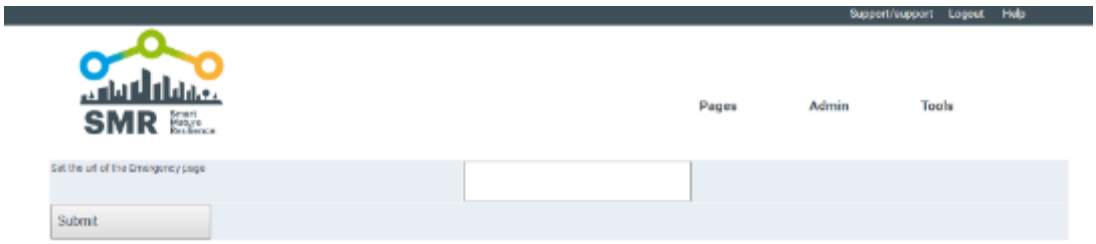
When there is an emergency, the administrator can set an emergency page.

The administrator must follow these steps:

- 1st in the menu go to **Tools**-> **Set emergency page**



- 2nd Copying the emergency page URL in the box and pushing the button -> **submit**



Graph 67: *Setting emergency page*

ENABLING COMMENTS

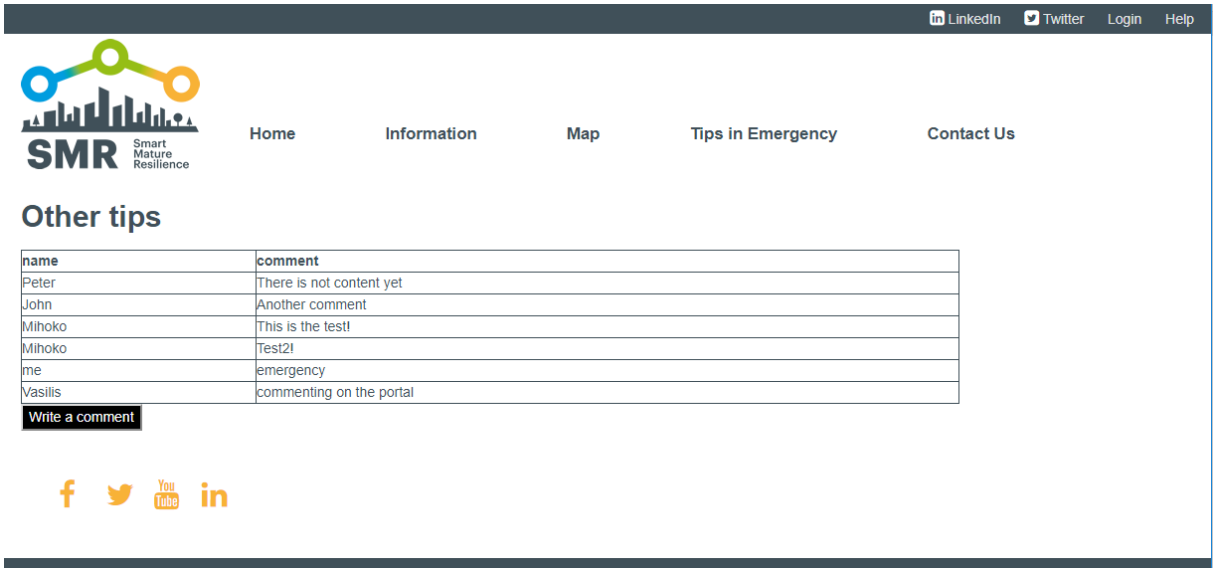
The advances features of Pages and Data Structures allow to users with Edit permissions to create new functionalities. For example, we have created the ability to include an area for comments in any page.

To add a comment section in a page, you can do it adding in the foot (0) of a page the following line:

<script src='PageComments.js.page'></script>

The behavior is: the user clicks the “Write a comment” button. A form is presented with the name and comments text boxes. The user enters the information and click submit. The comment is saved and shown after the existing comments. When the page is loaded again, the comments appear whit the previous comments.

This is done for example in the Portal of Kristiansand in **Tips in Emergency**-> **Other tips**.



Graph 68: *Example of the commenting function*

If you insert this code in a page that is base (*BasePageKey* in 0) for other pages, all the pages inherit this behaviour and each page has its own set of comments.

For advanced users that want to create similar functionalities, they can create similar code based in the present functionality and can access the code to see how it is implemented and build their own functionalities also inside the portal. The current functionality is accessible at:

http://smr-project-test.appspot.com/PageComments.js.page

Note that it's the line of configuration that the administrator has included in the foot area of their user page.

EDITING PUBLIC COMMENTS

When an administrator is logged in the application, it can administer the comments of a specific page.

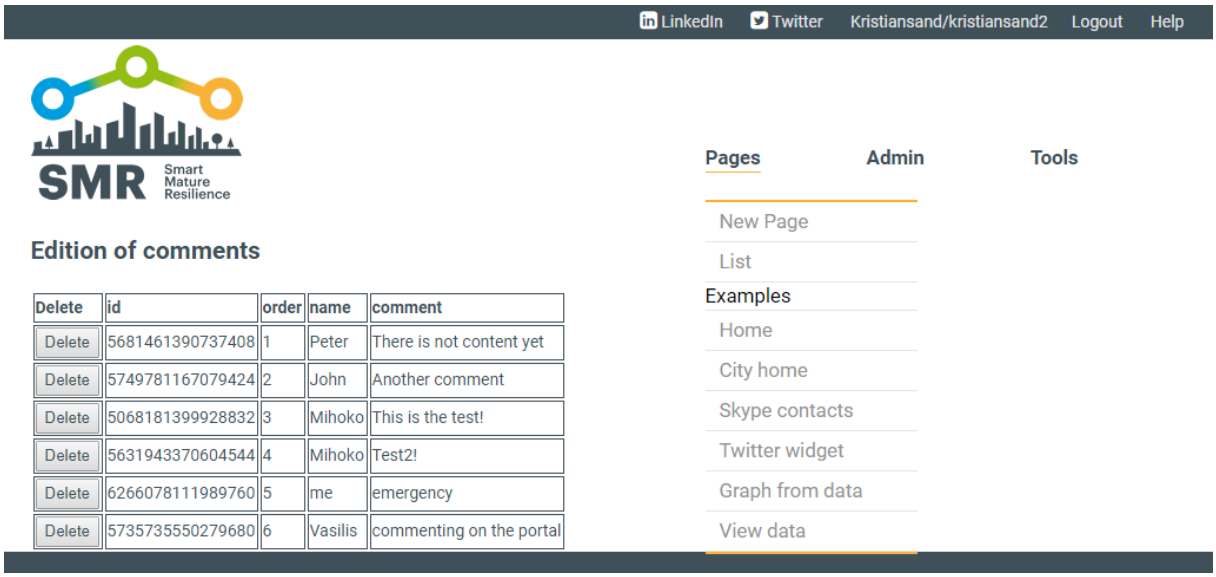
From the list of "**User pages**", the user selects a page to Edit. (Go to **Detail**, and from Detail, click the **Edit** link).

In the Edit window, the user can do the changes to the page.

To moderate comments, in the Edit window, click “Show advanced mode”, and the user can see the “Moderation of posts” button, besides the “Previous versions” button (They are located after the BasePageKey select).

Clicking in the button, the window shows the existing comments and the registered user can delete them.

In the figure the administrator of the portal of Kristiansand can moderate the comments in the previous shown page of “**Other tips**”.



Graph 69: *Edit comments*

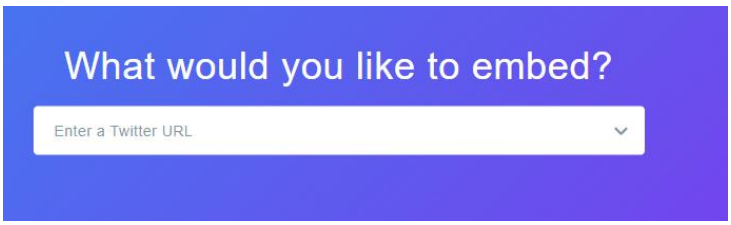
INCLUDING TWITTER FEEDS

User can embed Twitter in the Information Portal. Below is the example of Twitter Dashboard of Kristiansand’s Information Portal:

Graph 70: *Twitter Dashboard in Kristiansand's Information Portal*

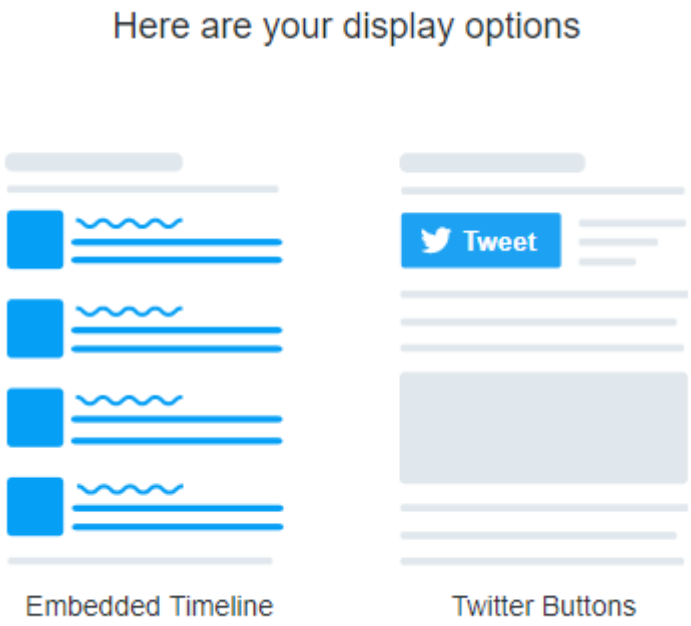
To embed Twitter message into the information portal, user can do the following steps:

1. Go to the following link: https://publish.twitter.com/#
2. Enter the Twitter URL to be embedded in the following field. We use https://twitter.com/SMR_Project_eu as an example.



Graph 71: *Enter the URL*

3. Choose the display option. We recommend to choose Embedded Timeline.



Graph 71: *Select display options*

4. Click set customization, especially if the user would like to adjust the colour (light or dark), adjust the colour link to be in line with the main theme colour of the website. The user also can

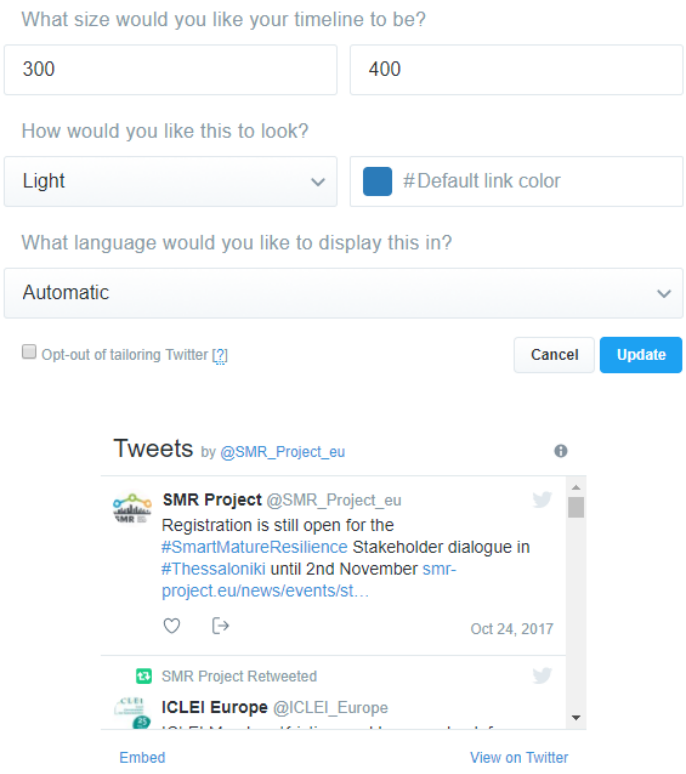
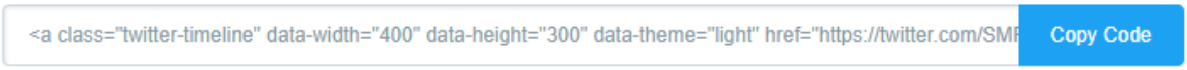


Figure 2 Customization

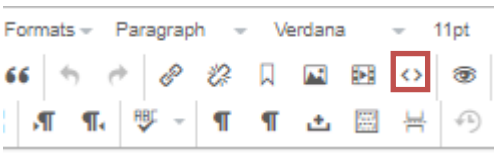
decide the height and the width of the Twitter feed.

5. Click *Update* button.
6. Click *Copy Code* button



Graph 72: *Click Copy Code*

7. The code is copied. It will look like the following:
   Tweets by SMR_Project_eu
   <script async src="https://platform.twitter.com/widgets.js" charset="utf-8"></script>
8. Click the source code, and paste the code in the intended location of the Information Portal. The Twitter feed will appear in the portal.



Graph 73: *Click source code sign*

CREATING MAP MASHUPS

To create custom Map Mashup, there are many alternative maps that can be used as a basis. For advanced user, there are many Maps APIs that can be used as a basis for the Mashups, such as:

- Google Maps APIs (https://developers.google.com/maps/documentation/javascript/)
- OpenStreetMap API (http://wiki.openstreetmap.org/wiki/API)
- Mapbox (https://www.mapbox.com/)
- ArcGIS API (https://developers.arcgis.com/javascript/)

The user can follow the documentations that are provided in each map's API. The choice of maps is depending upon the plan. Google Maps APIs, for example has usage limits, and one need to pay beyond this limit. Mapbox, for example, free up to 50,000 map views per month. To use this, some knowledge on JavaScript and HTML will be needed.

As an easier alternative, we can use, for example, regular Google Map.

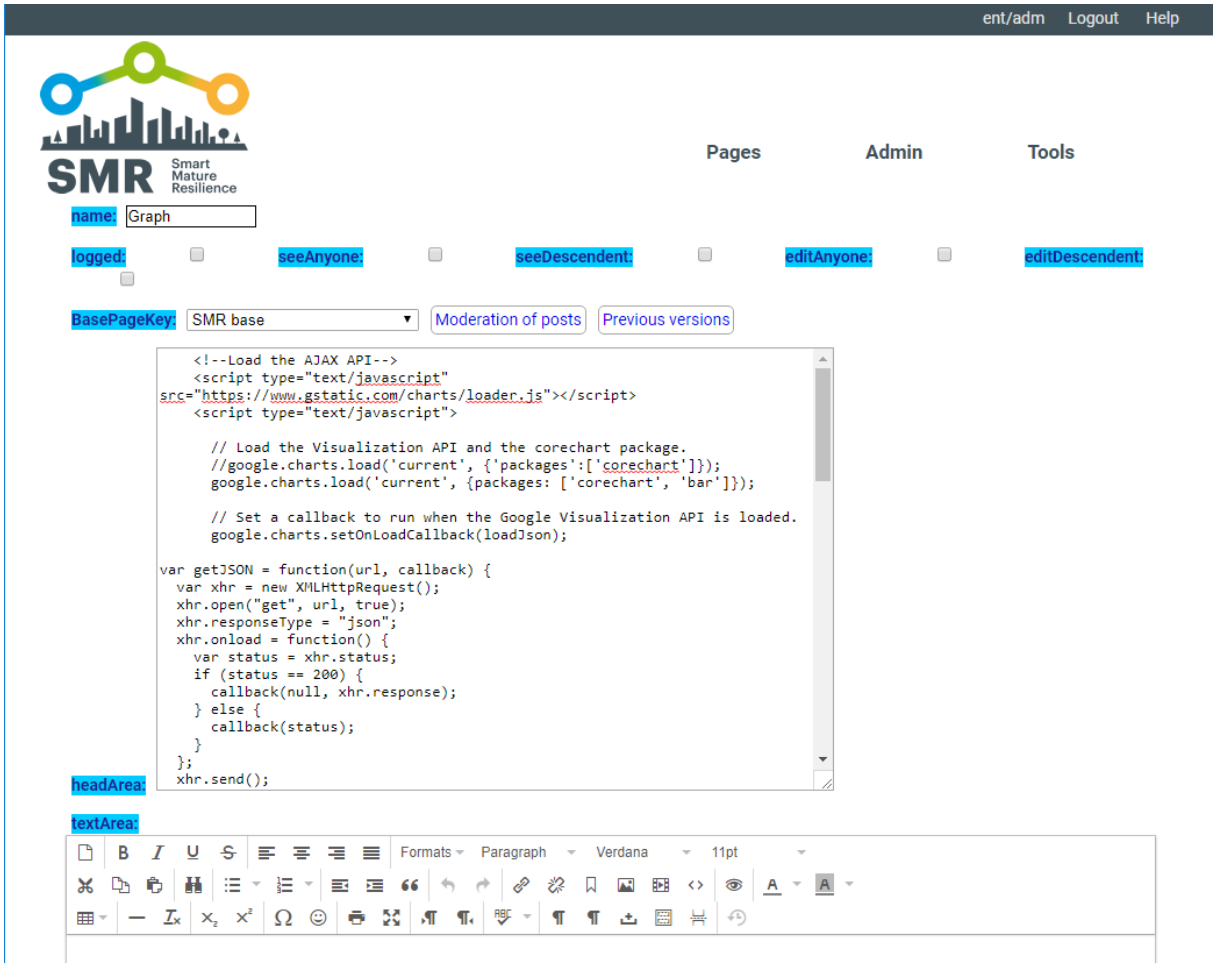
1. Go to Menu
2. Create Map
3. Add location by clicking the marker symbol
4. Add all locations that should be in the map
5. Click share button
6. Click embed on my site and copy the code
7. Click source code in the Information Portal, and paste the embed map code in the intended location.

Beware that in this option, the private identity will appear in the map.

REALIZING DATA VISUALISATION

Users that can create User Pages, can create advances features inside the portal. One example is the explained about inserting comments and editing them (0). Another example is to create Graphs like the example of 0. In this case, there are two steps. First one is to create a Data Structure (0). Second one is to use an API to show the results in a graphical way. In this case, we have used the Google Chart API (https://developers.google.com/chart/interactive/docs/quick_start).

We've created a page (http://smr-project-test.appspot.com/UserPage?PageKey=5677751478517760) that get the data from the Data Structure and render them in different charts using the Google Chart API. This Graph page has the code in JavaScript in the head area of the specified User Page. The user with the knowledge to use the API can create similar pages inside the portal.



Graph 74: *Data visualization function*

6.4. CITY RESILIENCE DYNAMICS TOOL – USER MANUAL

6.4.1. INTRODUCTION

The City Resilience Dynamics (CRD) tool is a training tool that helps cities explore different strategies regarding the implementation of resilience policies, simulate the results of each strategy and learn about the resilience building process that the cities need to follow to improve their resilience level in the most efficient way. The CRD encapsulates the most important aspects of the Resilience Maturity Model and it helps to better understand the functioning of the RMM as well as the dynamics of the resilience policies defined in the RMM. The tool supports and complements the RMM and provides a training arena for the users in order to make better decisions.

The CRD can help the cities to define the magnitude of the resilience building problem since it requires assessing the main parameters of the model. It also helps the cities in the resources allocation problem since the tool assesses the suitability of the used resources and provides the most efficient path towards the resilience building process. It also makes explicit the proper temporal order of the policies in order to use the resources in the most efficient way.

The City Resilience Dynamics Tool can:

- Be used as part of a strategic planning
- Help cities to identify suitable policies to implement to develop resilience based on diagnosis and assessment
- Provide a point of reference for self-assessing the effectiveness of resilience development
- Help cities assess their current resilience level
- Provide cities to justify the funding needed for specific measures related to resilience
- Help cities priorities policy implementation
- Provide a holistic point of view of the policy implementation process

- Support cities to train and learn about the resilience building process

WHO IS THE CRD FOR?

- Decision makers as part of 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
- Practitioners implementing policies: technical staff, desk officers and employees in public-private companies working with critical infrastructures and risk management
- Other city stakeholders such as citizen, volunteer, academic and scientific entities and media to raise awareness of the importance of resilience and engage them in the process

HOW CAN THE CRD BE USED?

- Parametrize the tool to your own city's characteristics: establish the main parameters of the model assessing the magnitude of the resilience building process.
- Plan, simulate and implement your resilience building strategy: define the strategy you are going to implement to improve the resilience level and re-evaluate the results obtained. Depending on how the budget is used and the implementation order of the policies the efficiency level of the resilience building process will vary.

WHEN THE CRD IS APPLIED DURING WITHIN THE OPERATIONAL GUIDELINE?

- STEP 4: Implementation and monitoring: the City Resilience Dynamics Tool is used to test and validate the relationships between the different policies that could, potentially, be included in the resilience strategy of a city and their impact in building local resilience.
- STEP 5: Evaluation and monitoring: the CRD is used to evaluate the effectiveness and performance of the implemented policies and to provide a simulation of the results to compare with those results observed in reality

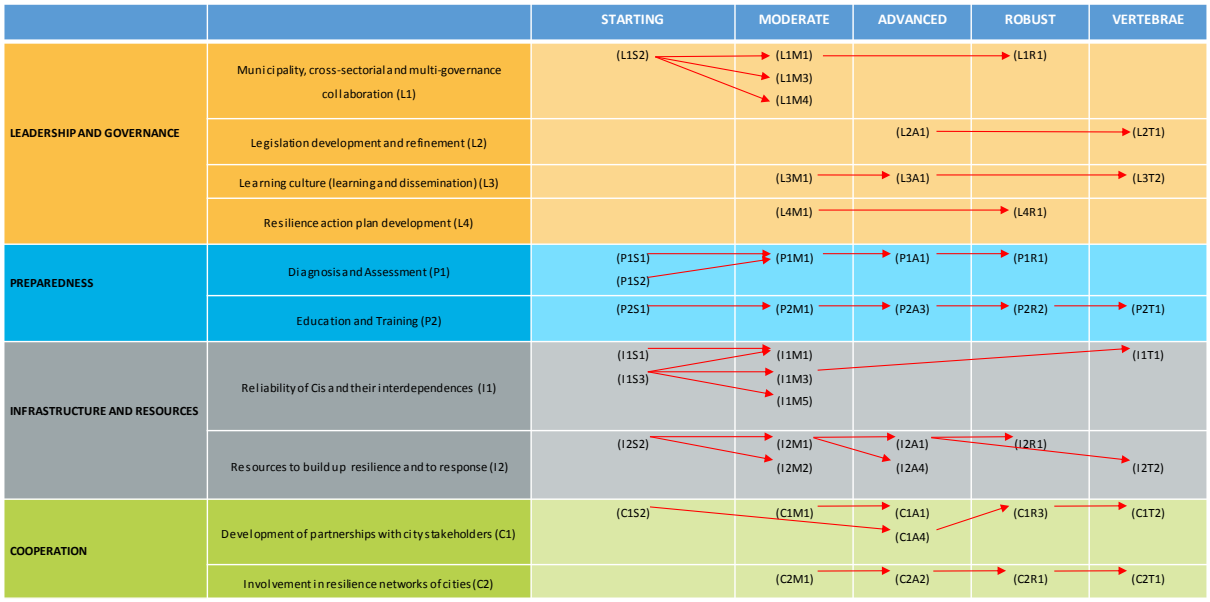
WHAT DO YOU NEED TO PROPERLY USE THE CRD?

- A computer with internet access
- Access to the CRD tool: http://smr-project.eu/tools/
- Tutorial video: https://www.youtube.com/watch?v=64YCYe2QU80&t=211s

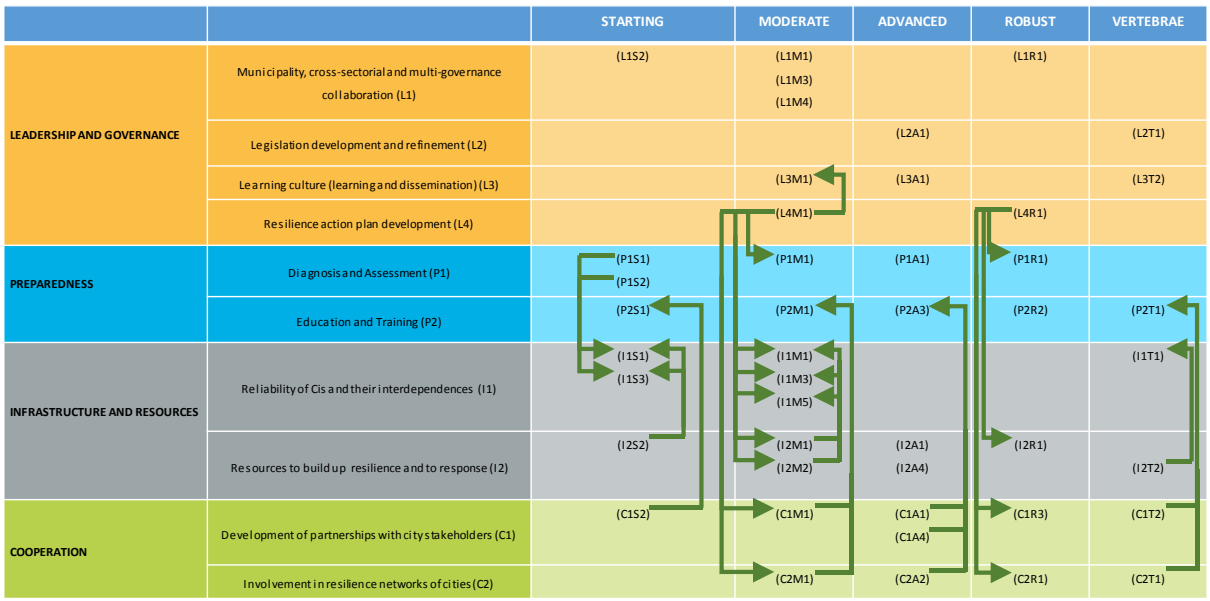
6.4.2. RELATIONSHIP WITH THE RESILIENCE MATURITY MODEL

The resilience policies defined in the Resilience Maturity Model are not independent each other, but they are related through precedence relationships. To improve the effectiveness of some policies it is necessary that others' have already been implemented previously. There are two types of precedence relationships:

- Linear relationships: within each sub-dimension, the policies in the higher stages are dependent towards the policies in the lower stages. (first figure)
- Transversal relationships: within each maturity stage, the policies in different sub-dimensions are related each other. (second figure)



Graph 75: *linear relationships between RMM policies*



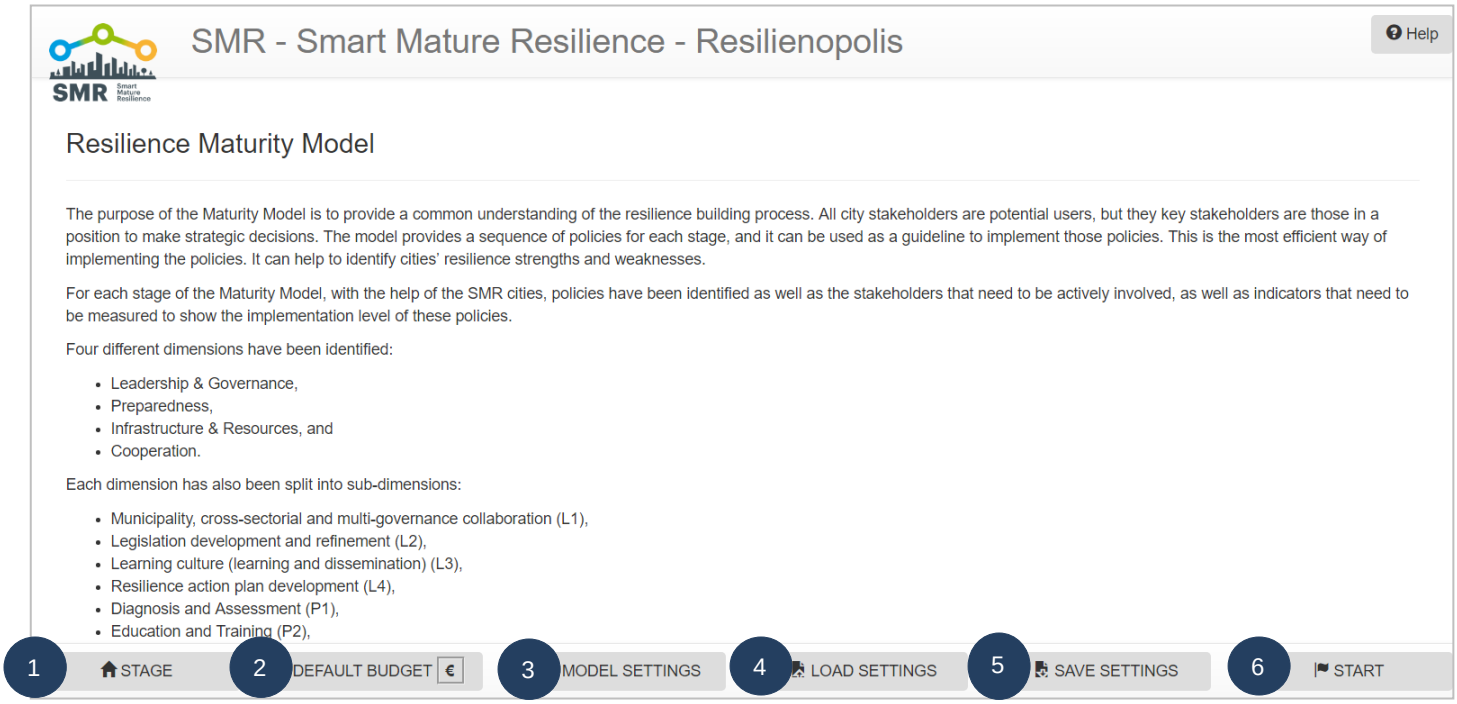
Graph 76: *transversal relationships between RMM policies*

6.4.3. USING THE CRD: QUICK USER GUIDE

In order to use the tool, you should access to the following web-page: http://smr-project.eu/tools/
Go to the City Resilience Dynamics Tool and click to the link “Go to Tool”. Immediately you will access the initialization page of the tool.

STEP1: INITIALISATION PAGE

When you access the tool, you are oriented towards this initialisation page. In this page we particularize the tool to our own city and adjust the main parameters to our city characteristics. Once you particularize the tool to your own city, you start the simulation by clicking the “START” button. Immediately you will access the simulation page of the tool

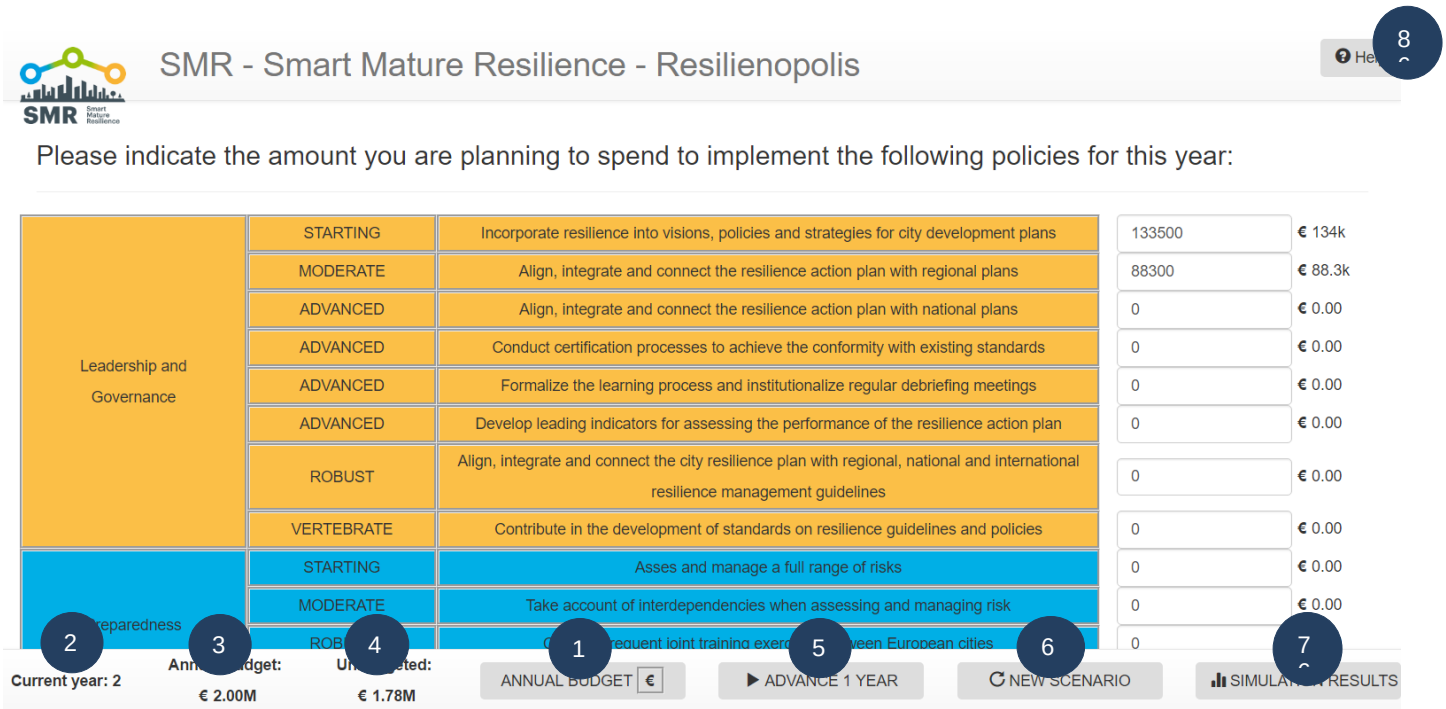


1) “STAGE” button to set your city’s stage in SMART model, or you can set individual policies initial implementation level via corresponding sliders.
2) “DEFAULT BUDGET” button to change initial annual budget
3) “MODEL SETTINGS” button, to change the city name and currency, time, and cost needed to implement certain policy
4) “LOAD SETTINGS” button, to load save setting file

5) "SAVE SETTINGS" button to save all initial settings in a file for later usage
6) "START" button, to start your simulations

STEP2: SIMULATION PAGE

In the simulation page you might introduce the policy implementation strategy. Based on the available budget you are going to decide where the resources are going to be invested in a time period of 1 year to improve the resilience level of the city. To begging the simulation, you need to introduce the values and press the button "ADVANCE ONE YEAR". To evaluate the impacts of the taken decision you need to press "SIMULATION RESULTS" that will take you the results page of the tool.



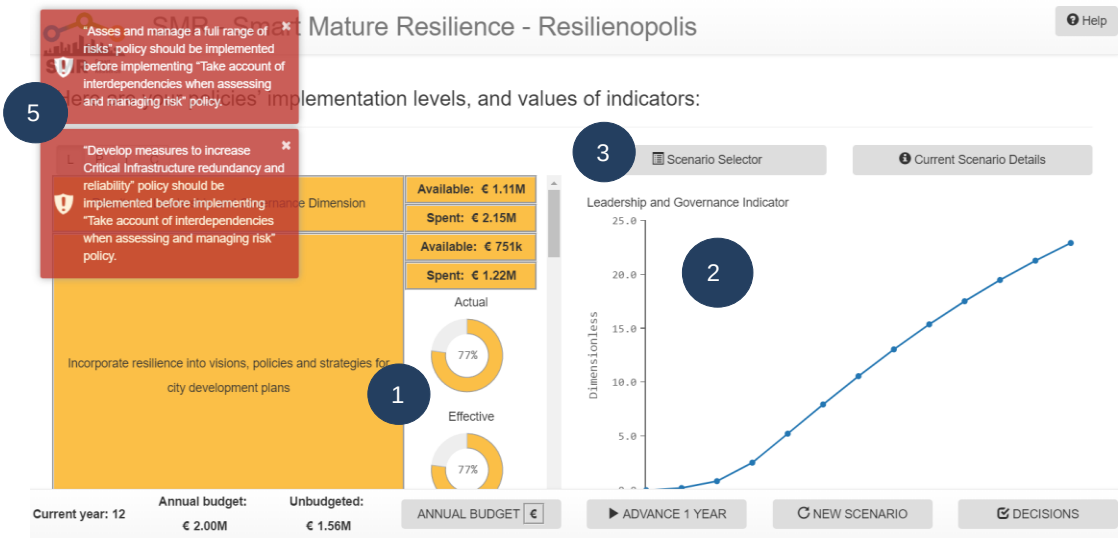
1) "Enter value for the devoted budget (for the current simulation year) for implementing the individual policies
2) Follow the simulation time through "Current Year"
3) Follow the available budget through "Annual budget"
4) Follow the budget remaining through "Unbudgeted"
5) Press "ADVANCE 1 YEAR" to progress simulation
6) "NEW SCENARIO" will stop the current simulation scenario, and start a new

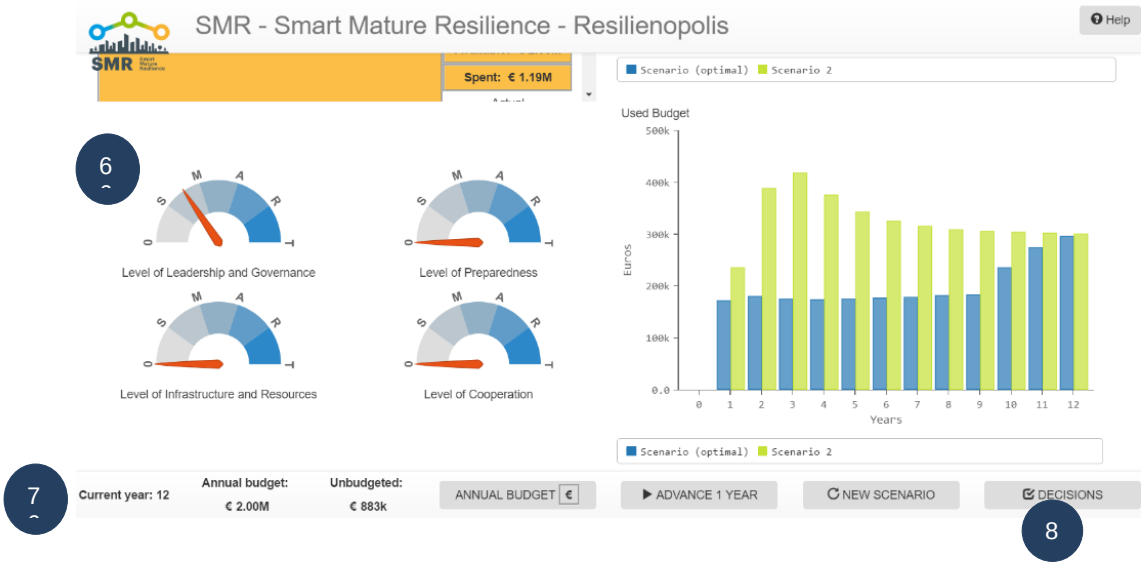
7) "SIMULATION RESULTS" takes you to the simulation results page.

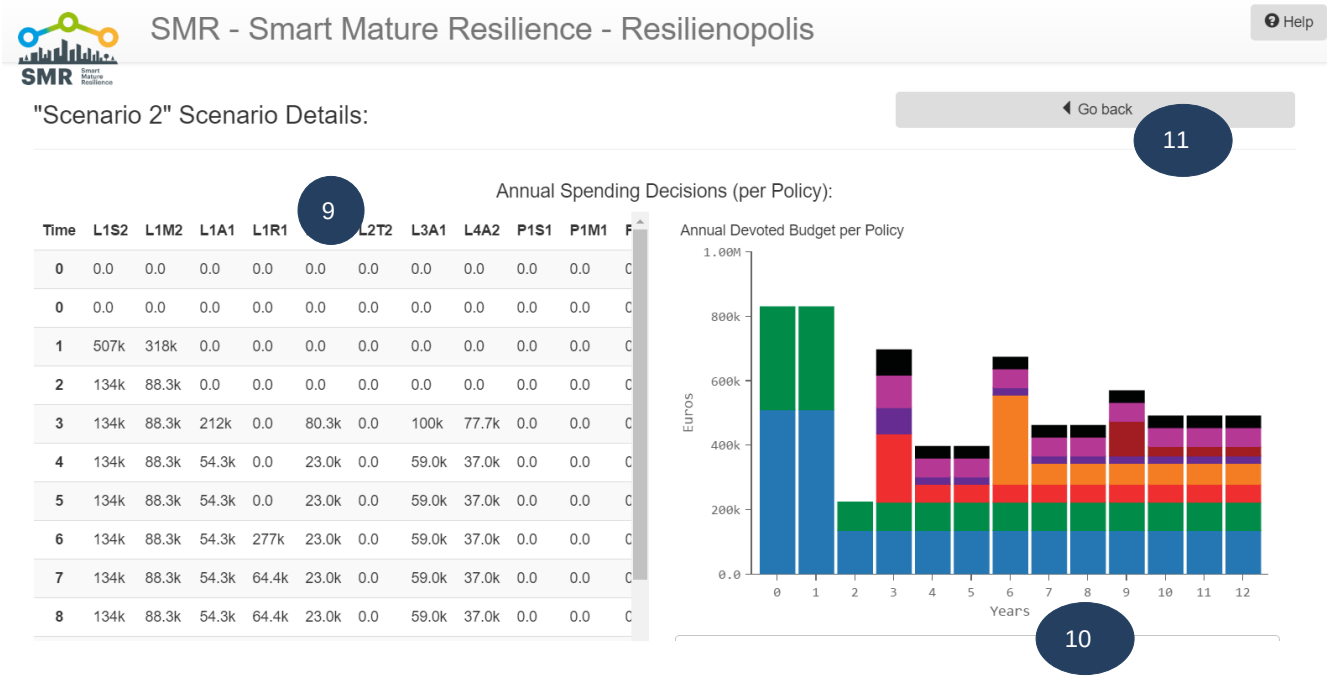
8) Click "Help" to access this Quick Guide. The button is available in all pages

STEP3: RESULT PAGE

The results of the made simulation will appear in this page. Different indicators have been defined to capture the impacts of the made decsissions. For instance, the implementation level achieved in each policy, the resilience level obtained after the simulation, and the evolution of the spent budget are some of the results presented in this page. For more detailed information, you should click on "CURRENT SCENARIO DETAILS". To keep making decisions you should click on "DECISSIONS" and you will go back to the simulation page (step2).







1) You can see the individual policies' current actual and effective implementation levels
2) You can see the time-behaviour graphs of SMR dimensions' indicators.
3) You will be able to see maximum of three different scenarios. "Scenario Selector" to select which scenarios to show, name them, and select their colours, via "Scenario Selector" dialogue-box.

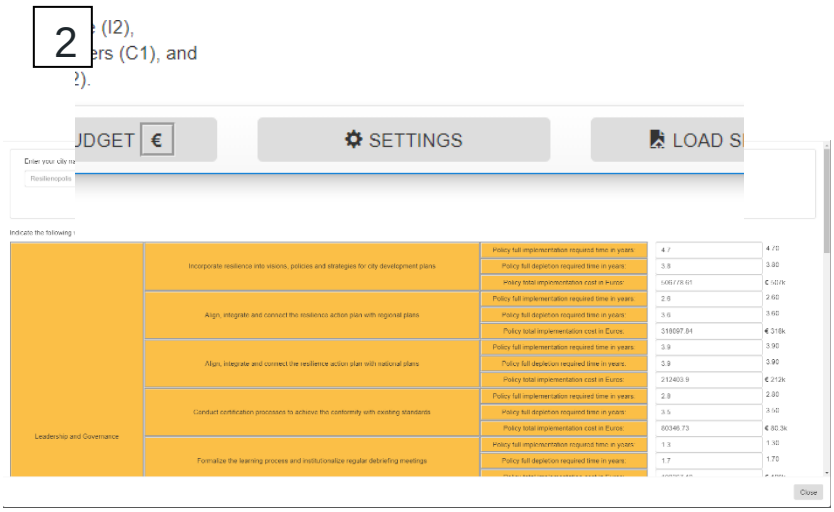
4) The graph only shows the scenarios with their respective selected checkbox. Overwrite the scenario name to change it. To change its color press on the small colored box and pick a new color.
5) Every 4 years, these messages appear, indicating any problems in the sequence of your decisions
6) The power gauge meters show your SMART stage per individual dimension at the current simulation time
7) The same buttons in simulation page (Step 2)
8) “DECISIONS” button takes you back the simulation page.
9) Current scenario and decisions history information, generated by clicking “Current Scenario Details” button in the right of the “Scenario Selector”
10) Used Budget time-behaviour graph find out how much you have spent each year
11) “GO BACK” takes you to the result page I

6.4.4. KEY POINTS WHILE USING THE CRD

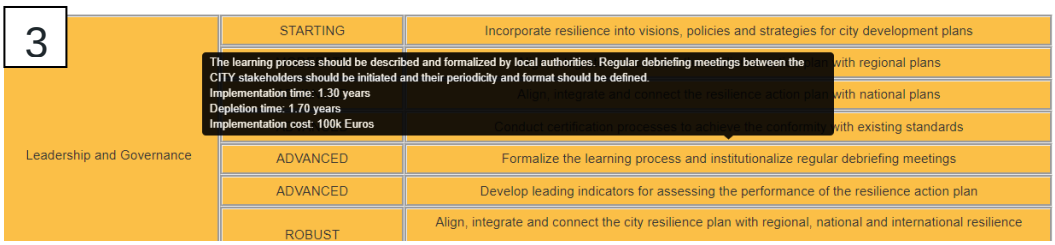
Following you will find 8 key points to take into account while you use the CRD tool:

1. You can adjust the annual budget every simulation year, both increase and decrease.

2. You can parametrise the main parameters of the model to the characteristics of your city: implementation time of the policies, the implementation cost of the policies and the obsolescence time of the policies.

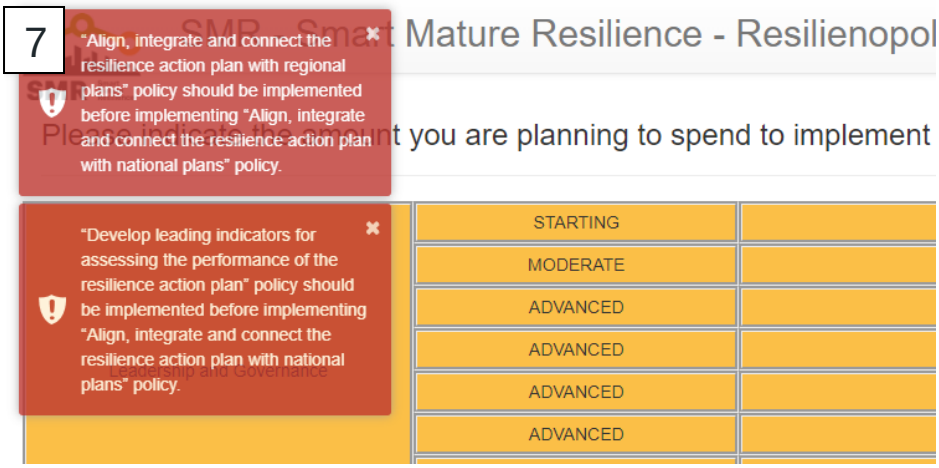


3. You can visualise constantly the values of the main parameters of the model when you put the mouse over the resilience policies.



4. While you are carrying out the simulation, you can analyze your results and improve your strategy.
5. In the results screen, the actual implementation level of the policies refer to how far the policy has been implemented based on the spent budget. The effective implementation level, however, represents how far the actual implementation level of the policy is effective which depends on whether the precedence policies have been implemented or not.

6. Iterative process: you should adjust your policy implementation decision and analyze the results going back and forward between screen 2 (Decision screen) and screen 3 (Results screen).
7. Take into account the pop-up messages appearing every 4 years of simulation. These messages will guide you during the resilience building process. If you do not get any message, it means you are doing well.



8. The tool only simulates for 40 years.

6.5. RESILIENCE BUILDING POLICES – USER MANUAL

The Resilience Building Policies (RBP) SMR tool has been developed as part of a H2020 funded project on Smart Mature Resilience that has created a range of tools to assess and develop cities' resilience. The definition of city resilience used by the SMR project is:

> "… The ability of a CITY or region to resist, absorb, adapt to and recover from acute shocks and chronic stresses to keep critical services functioning, and to monitor and learn from on-going processes through city and cross-regional collaboration, to increase adaptive abilities and strengthen preparedness by anticipating and appropriately responding to future challenges."

To support "learning from on-going processes through city and cross-regional collaboration", the purpose of the RBP tool is to offer a portfolio of case studies that provide detailed examples that demonstrate how cities have implemented initiatives to strengthen their city resilience. The examples have been chosen as they exemplify policies included in the associated SMR Resilience Maturity Model (RMM) tool. The RBP is intended to be used together with the RMM and the case studies included in the RBP illustrate, in a practical way, the formulation and implementation of the policies included in the RMM. The practicality of these case studies is ensured by providing cases grounded in cities' real experiences that describe relevant city context, goals, challenges faced by cities, resources required, and the achieved outcomes. The cases included have been gathered from city partners of the SMR project as well as other cities across the world as reported in the literature.

The aim of this manual is to explain how to use the RBP. This document is structured according to the following sections:

Section	*Title*	*Purpose*

1	*Web-based interface of the RBP*	How the RBP can be accessed and navigated on the SMR project website.
2	*Structure of the RBP*	The structure of the case studies included in the RBP.
3	*Future case studies*	Information how cities and any other interested organisations can submit new case studies to the RBP.
4	*Example case study included in the Resilience Building Policies*	An example of a case study which has been included in the RBP.

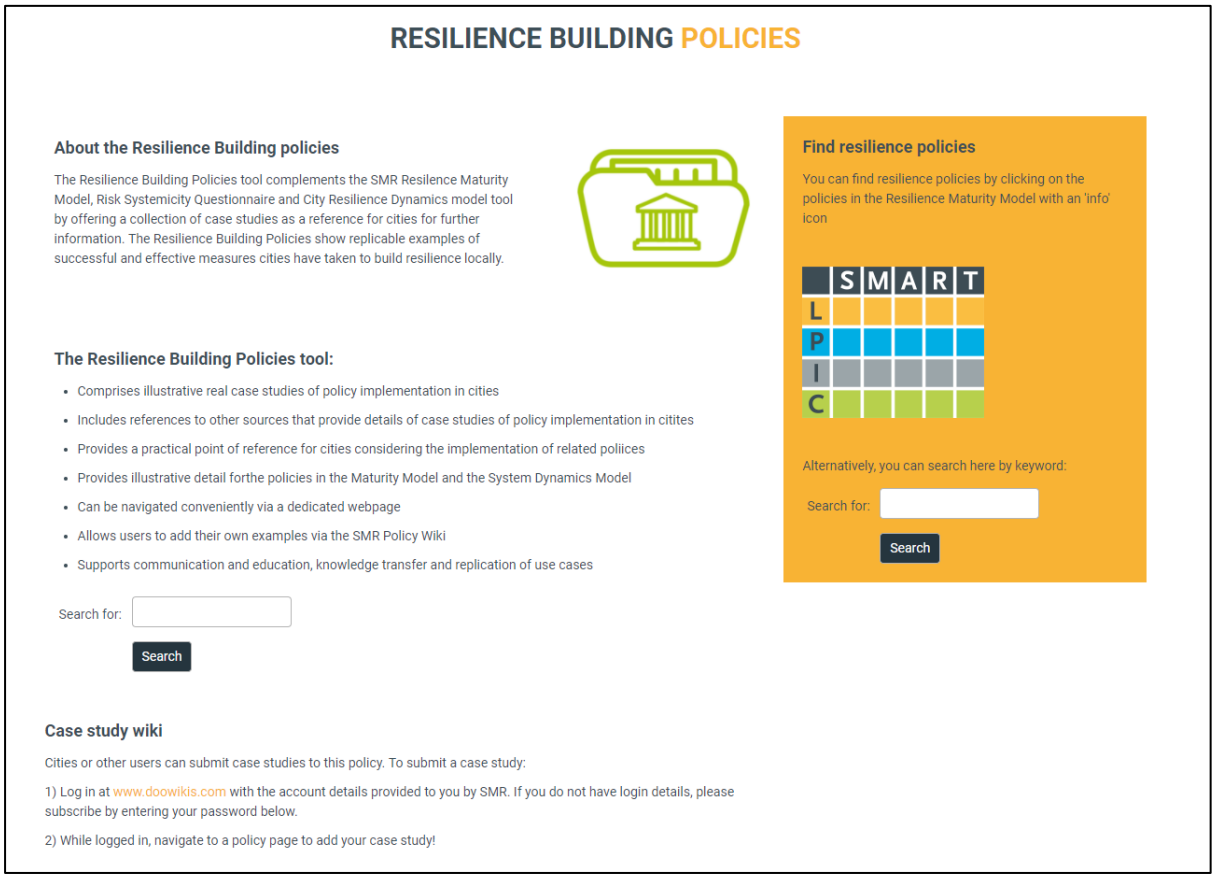
6.5.1. WEB-BASED INTERFACE OF THE RESILIENCE BUILDING POLICIES

The RBP can be accessed on the SMR website (the address is provided in the footnote on the previous page), and it is fully integrated with the online version of the RMM – this means that the RBP is designed to be used together with the RMM as it is an extension of the RMM. To access the RBP the user should go to 'Resilience Building Policies' sub-heading which can be accessed under the 'Tools' heading in the SMR website (see Graph 77).

Graph 77: *Accessing the Resilience Building Policies on the SMR website*

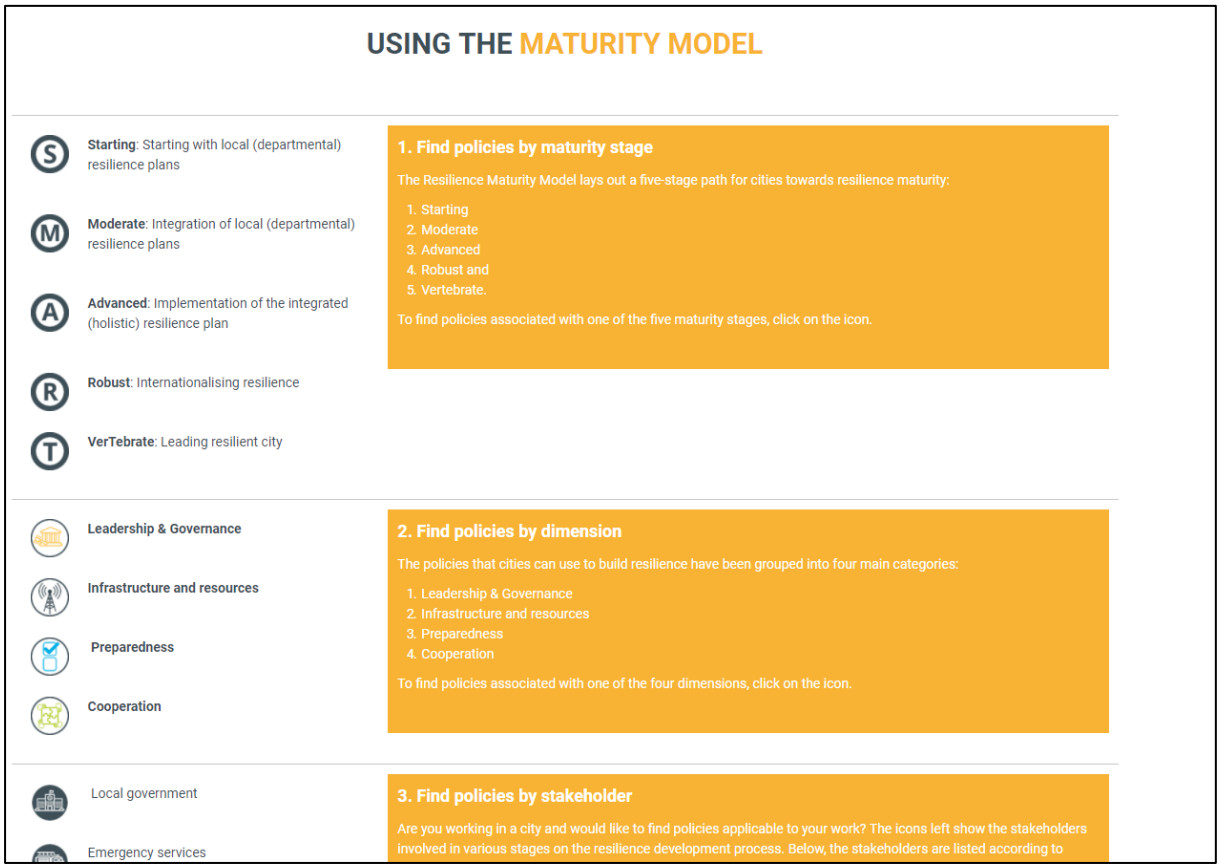
On the introduction page to the RBP (**Error! Reference source not found.** 78), the user is resented with the following information and options. Thus on that page the user can:

- Read about the general purpose of the tool and a summary of its features.
- Search the RBP for key words in the case studies, for example: ‘flooding’.
- Submit new cases to the RBP (but see section 3 of this document for more information).
- Access the RMM from where you can navigate the cases belonging to the RBP according to the different available categories of polices.

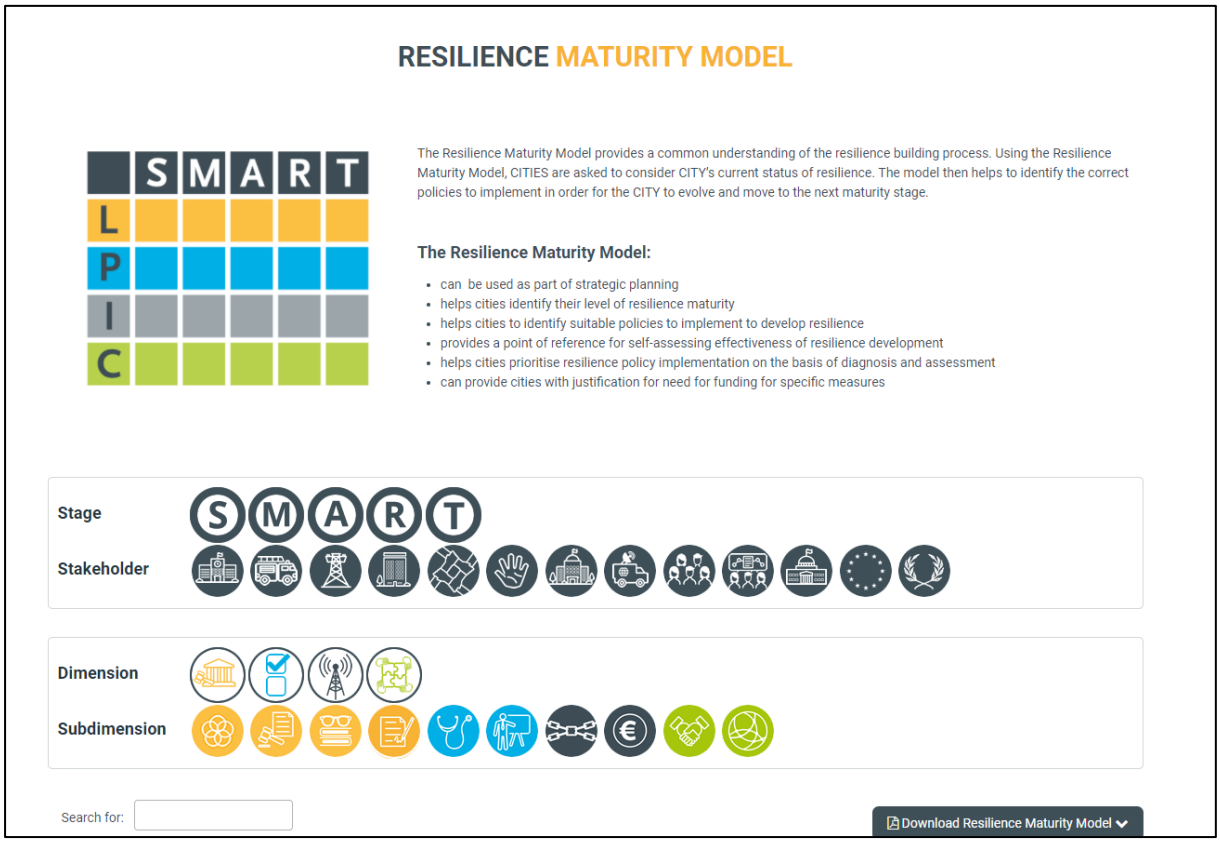


Graph 78*: Introduction page for the Resilience Building Policies*

As the RMM and the RBP are closely interlinked, it may also be worth reading the 'Maturity Model guide' instructions about how to access policies contained in both tools is shown if you scroll down this page (Graph 79). To access the 'Maturity Model guide' the user should go to the sub-heading of the same name which can be accessed under the 'Tools' heading in the SMR website. These instructions explain that the online RMM can be browsed according to different criteria: i) the maturity stage of the RMM (e.g. Starting, Mature etc.), ii) the dimension and the sub-dimension of the RMM (e.g. Leadership & Governance, Infrastructure & Resources), and iii) by the relevant stakeholders to the given policy. The user can click on any element of these criteria at the top of this page in order to access the content of the RBP for that policy (**Error! Reference source not found.** 80).

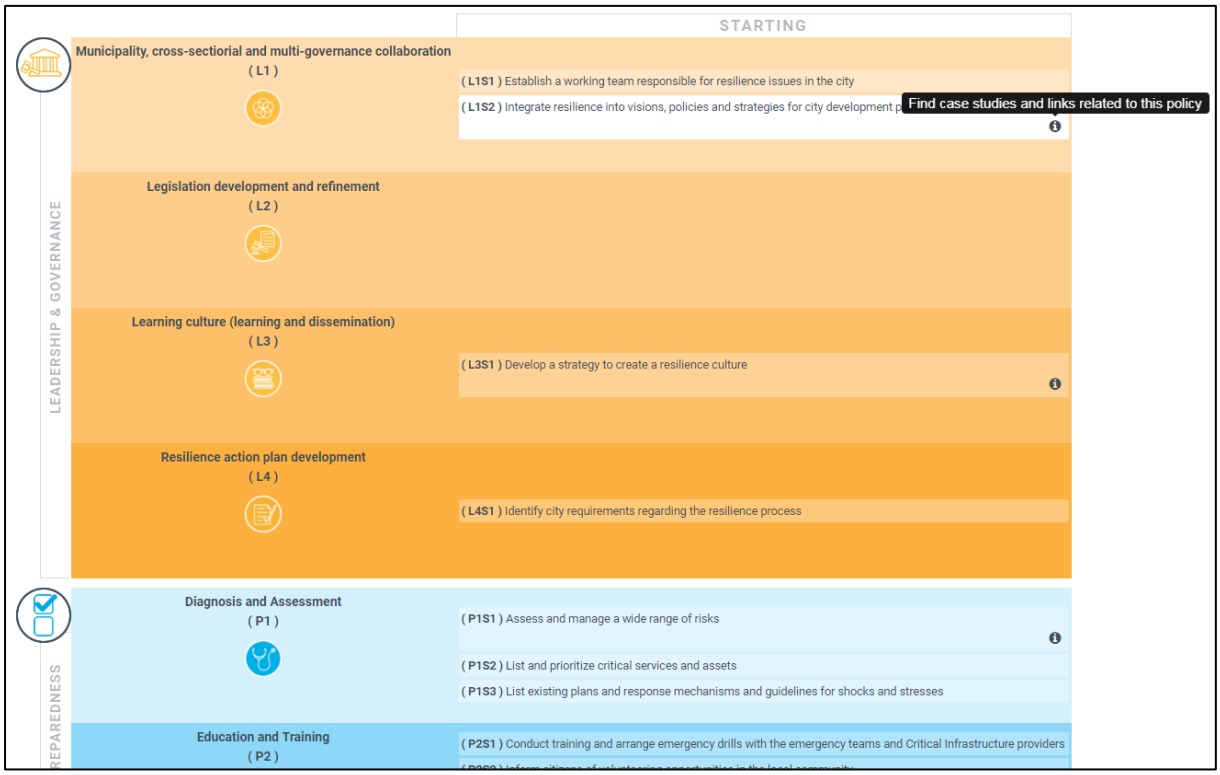


Graph 79: *Using the Resilience Maturity Model and the Resilience Building Policies*



Graph 80: *Navigating the Resilience Maturity Model and the Resilience Building Policies*

For example, as can be seen in Graph 81, upon clicking on the 'Starting' stage, the user can view all of the RMM policies under that stage. Those policies which contain corresponding RBP content have an 'i' icon in their bottom right corner - by clicking on the policy, the user is shown the relevant case study with the supporting information. Each case study follows a standard structure, albeit, some of the case studies were collected from partner cities, whilst other case studies were gathered from secondary sources.



Graph 81: *Accessing the content of the Resilience Building Policies*

6.5.2. STRUCTURE OF THE RESILIENCE BUILDING POLICIES

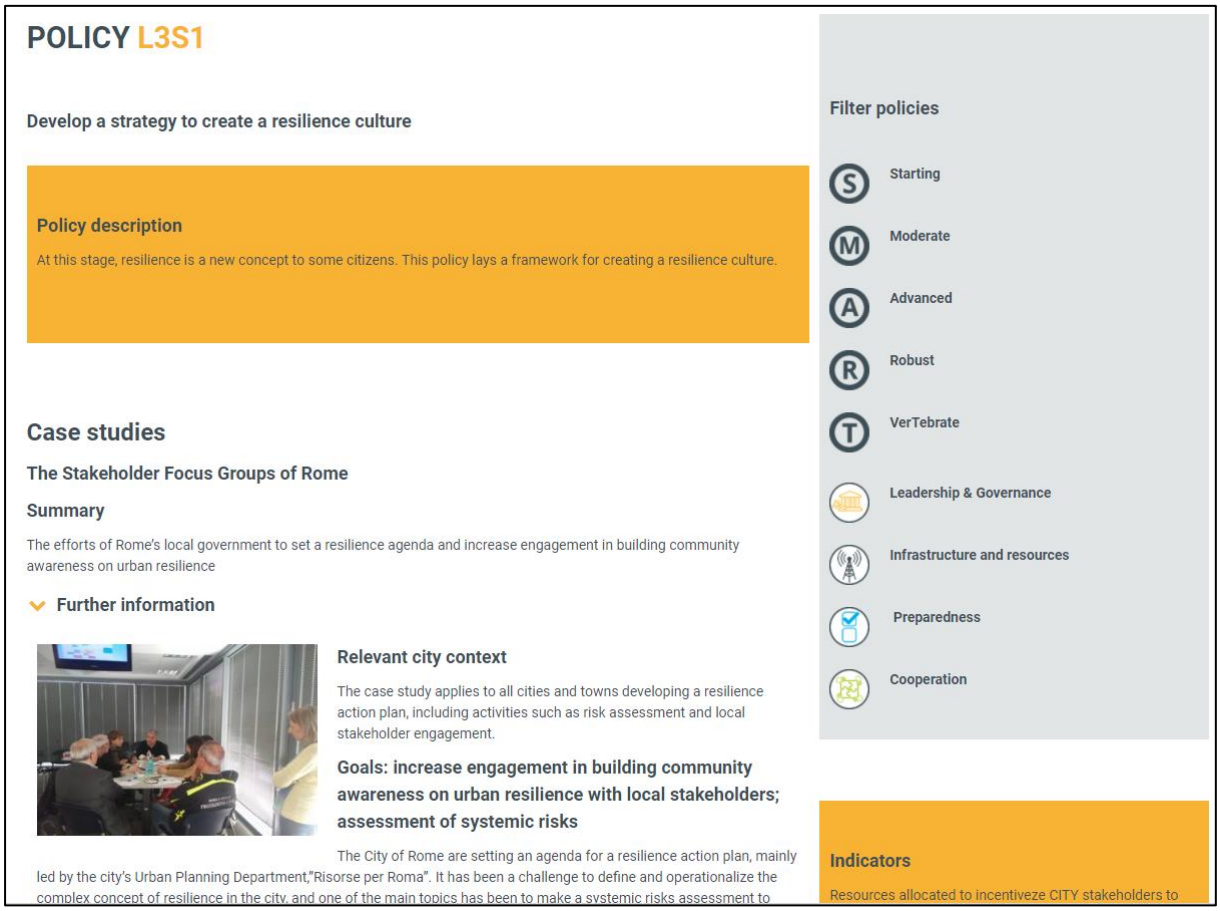
As Graph 82 demonstrates, the case studies in the RBP follow the same structure:

- Policy description – describes the RMM policy, for example 'L3S1: At this stage, resilience is a new concept to some citizens. This policy lays a framework for creating a resilience culture.' The label 'L3S1' can be understood as 'the Leadership dimension, sub-dimension 3, Starting stage, policy number 1 within that sub-dimension' – for more information about reading the RMM please consult the RMM handbook.
- Case studies – lists relevant case studies from SMR partner cities assigned to that RMM policy.

- Additional case studies – provides a summary of case studies from secondary sources

For each case study that has been written based on the experience of a SMR partner city, the following information is provided:

- Summary of the case study.
- Further information:
    - Relevant City context – what kind of cities may find this policy of interest.
    - A picture illustrating the case study.
    - Goals – what goals the initiative in question was intended to achieve and how these may link to other policies within the RMM
    - Cooperation between stakeholders – how different stakeholders worked together to implement the resilience project in question.
    - Outcomes – what was achieved with the resilience project discussed in the case study.
    - Resources – what resources were required to implement the project. However, not all cases contain this information.
    - Other links – links to other resources which can be relevant to the case study.
- Indicators which can be used for evaluating the progress of the implementation of the policy.



Graph 82: *Structure of a policy in the Resilience Building Policies tool*

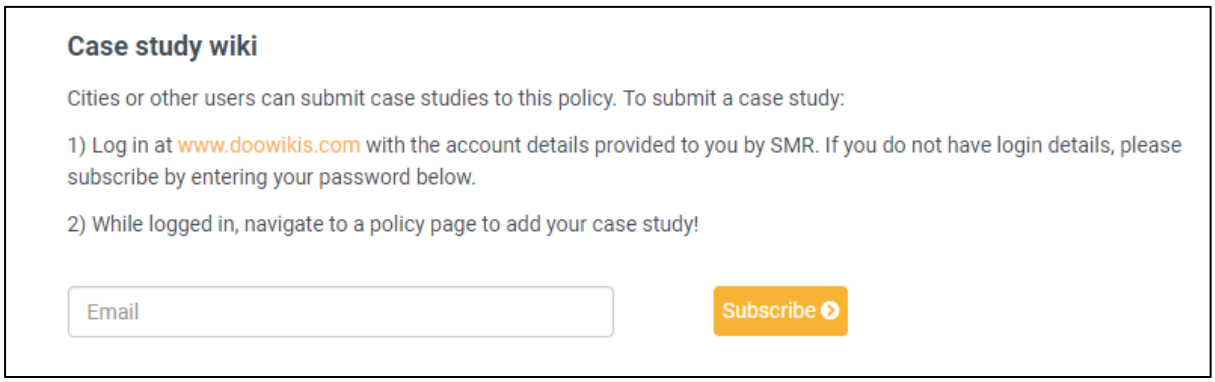
6.5.3. FUTURE CASE STUDIES

As it important for cities to be able to add new case studies to the RBP, this feature is available through the introduction page of the RBP (as explained above). As it is shown in Graph 83, cities or other users can submit case studies by subscribing to the SMR website. Users can then login to the SMR Wiki where they can upload their cases. Joining the group is also an opportunity for cities to develop partnerships and collaboration, and to learn from one another's experiences of using the SMR tools.

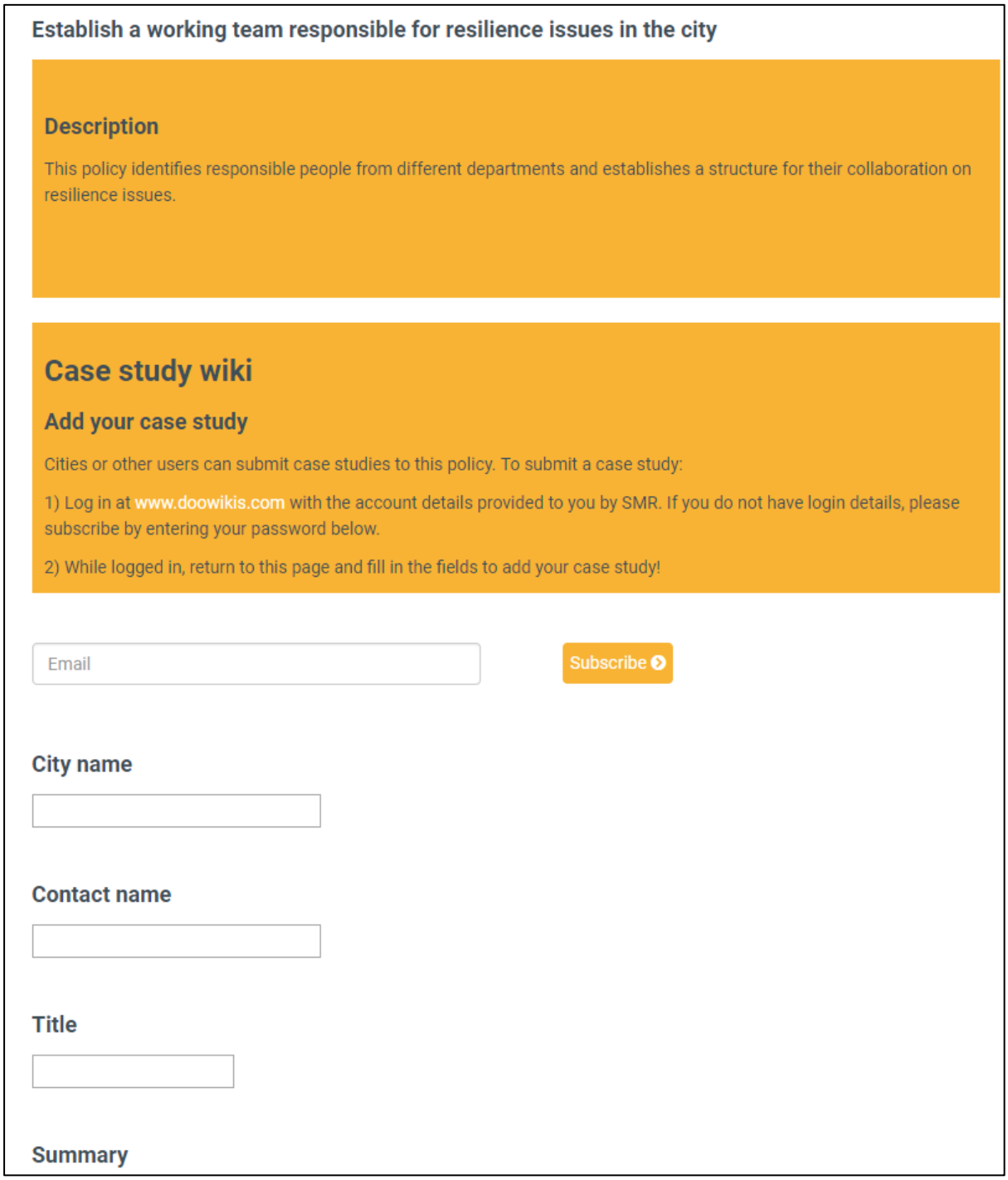
In addition to this, new case studies can also be added when navigating the RMM, and when accessing the policies which currently do not have any existing case studies. As seen in **Error! Reference source not found.** 84, the user is then asked to provide the following

nformation regarding the new case study:

- City name
- Contact name
- Title of the case study
- Summary of the case study (no more than 200 words)
- Attach optional photos or video clips
- Add a relevant Internet link



Graph 83: *Adding new cases to the Resilience Building Policies*



Graph 84: *Submitting case studies to the policies without existing examples of cases*

6.5.4. EXAMPLE OF A CASE STUDY INCLUDED IN THE RESILIENCE BUILDING POLICIES

For illustration, one of the case studies included as part of the RBP is presented below.

Policy P2A3: Developing education programs in schools about resilience

Case Study; City of Glasgow: Community Resilience Development Officer

Summary

A national role was created for a Community Resilience Development Officer. The role was intended to help ensure resilience thinking reaches schools and children. The Officer was to encourage a consistent approach across teachers across the country in this area and to share best practice by getting teachers together and to let them know about all the tools and approaches that are available to them.

Relevant City Context

This case study is of interest to all cities whether they wish to consider the full case study or to adopt something on a smaller scale. Although the work was funded at a national level by the Scottish Government, a city could undertake something similar on a smaller level by having a reduced resource but still focuses on liaising with the City Education service. Children are the future of the city, so getting them engaged at an early age is important. Children can also be a key route in engaging parents.

Goal: Help with promoting a culture of resilience through increasing citizens awareness of resilience by (L3M1) developing education programs in schools about resilience (P2A3)

In Glasgow there is a great diversity of understanding of the term “resilience”, ranging from very simple conceptualisations to those which are extremely complex. The project

was designed to create better understanding nationally (Scotland) across school age children (age 11-17) about issues of community preparedness as well as to prompt teaching staff to design exercises to build skills in relation to community resilience and action.

The plan was to liaise nationally with schools and produce a defined outcome around resilience. This depended upon enhancing teachers understanding of resilience and so encouraging their schoolchildren to do activities around resilience. The focus was mainly on being prepared in case of emergencies as it was felt there was not sufficient prominence placed on this through the national Curriculum for Excellence in schools. However the scope did touch on wider resilience issues such as self-esteem, community empowerment and mental health.

A full-time position was created, the Educational Officer, to encourage a consistent approach across teachers across the country in this area and to share best practice by getting teachers together and to let them know about all the tools and approaches that are available to them.

Evaluation of outcome

The impact of that Community Resilience Development Officer role on adult stakeholders was evaluated in 2017 by an independent organisation - The James Hutton Institute - using qualitative and quantitative data. The full project has been evaluated:

http://www.readyscotland.org/media/1390/crew_community-resilience-officer-evaluation-final.pdf

It was felt that schools were engaged with the process and thus wanted to keep this momentum up and not lose the initial enthusiasm. Therefore recommendations included keeping the post going beyond the two years and also focussing on how children can be proactive as well as reactive.

Resources

The Scottish Government funded full-time two year Community Resilience

Development Officer position based in Education Scotland to co-ordinate communications and actions on a national level. The role was intended to help embed resilience thinking and online resources within the Curriculum for Excellence, i.e.to ensure resilience thinking reaches schools and children. A reduced role could be considered on a smaller scale to start the process.

Graph 85: *Picture illustrating Policy P2A3 as part of the Resilience Building Policies*

7. SUMMARY AND CONCLUSIONS

The European Resilience Management Guideline defines an operational framework that provides guidance and aims at training and supporting municipalities and relevant stakeholders in enhancing city resilience.

But, what are the benefits for cities that have in place and use an integrated management system to monitor their resilience building activities?

The European Resilience Management Guideline contributes to the Sustainable Development Goals and mainly to the following two:

- SDG11: Make cities and human settlements inclusive, safe, resilient and sustainable and
- SDG13: Take urgent action to combat climate change and its impacts.

SDG11 aims at making cities safe and sustainable means ensuring access to safe and affordable housing, and upgrading slum settlements. It also involves investment in public transport, creating green public spaces, and improving urban planning and management in a way that is both participatory and inclusive.

SDG13 aims at mitigating climate-related disasters in developing countries and by helping more vulnerable regions, such as land locked countries and island states, adapt to climate change and integrate disaster risk measures into national strategies (UNDP, 2017).

The use of an integrated management approach to be applied at city level and to support the resilience building process provides the cities that receive training on how to use it and implement it in their local context with a variety of benefits, that only some of them are listed here:

- increased awareness on climate change adaptation, resilience and sustainability;
- improved quality of management at local level and across the various municipal departments;
- enhanced transparency and advanced monitoring action;
- increased trust in local governance; 4) increased number of engaged citizens through co-creation activities;
- contribution to a sustainable and resilient economy and, last but not least,

- provision of better perspectives for a bottom-up inclusive EU, something that cities nowadays tend to promote and seek, especially in the outset of austerity measures and increasingly limited resources

The European Resilience Management Guideline comes in the form of a toolbox, and includes guidance throughout the various operational steps; therefore it is easy for a city to adapt it in existing mechanisms and established practices and perform the activities included in each step when needed and when the circumstances demand it. By using an integrated management system for resilience development, the effort lost in running parallel management systems and several processes that require different understanding and performance, can be turned into sustainability.

The collective feedback from all tiers of cities showed that informing thoroughly stakeholders and city representatives is important and necessary in order to secure their active participation and involvement. There is need for further focus on stakeholders that are mostly affected by or interested in an issue or challenge. Especially the stakeholder training workshops were used as a direct knowledge transfer platform that enabled the project partners to take stock of the co-creation activities. During the pilot implementation and especially during the stakeholder training workshops, it became evident that most cities are already working on resilience building activities, as resilience is becoming a buzzword and provides new forms of urban governance, planning and strategy development. Although cross-sector collaboration is not the single solution to tackle all challenges that cities are facing, we believe that it can have much impact on the resilience of municipalities and that the alignment of municipal strategies will be very beneficial in this regard.

In this document, the European Resilience Management Guideline has been introduced as an integrated management system developed within the Smart Mature Resilience project and insights have been reported from its implementation with partner cities. Based on this, and within the project, we have proposed an extension of a framework to better understand cross-sector collaboration in the context of urban resilience and to bring all available resources and human capital into an approach that European commitment to climate change action continues to be strong and steady.

However, integrating social capital into environmental initiatives – a key component of building meaningful resilience and implementing projects and actions that matter for cities – needs still work to do and integrate in existing structures and political processes that facilitate mainstreaming for climate adaptation and resilience.

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