



SMART MATURE RESILIENCE

D1.4: DELPHI ANALYSIS REPORT

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Author (s)	Maider Sainz (Tecnun), Josune Hernantes (Tecnun), Leire Labaka (Tecnun) Patricia Maraña (Tecnun) Iker Zubizarreta (Tecnun) and Jose Mari Sarriegi (Tecnun)
Co-author(s)	
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Revision Date	2016/11/21
Revision Authors	Leire Labaka (Tecnun), Raquel Gimenez (Tecnun)
Revision Co-Authors and reviewed by	Josune Hernantes (Tecnun), Patricia Maraña (Tecnun)

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EXECUTIVE SUMMARY

Increasing resilience to crises and disasters is a topic of highest political concern worldwide. Cities and communities need methods and tools to prevent and manage the effects of natural hazards such as floods, storms, earthquakes, volcanoes and tsunamis as well as man-made threats such as accidents and terrorism. The aim of the Smart Mature Resilience project is to deliver a Resilience Management Guideline to support city decision-makers in developing and implementing resilience measures in their cities in order for the cities to form an emerging resilience backbone for Europe. The overall objective of WP1 is to obtain an overview of current practice in urban resilience and EU sectorial resilience approaches, to identify, synthesize and assess the main challenges and best practice of today.

This report is the result of the work carried out in the fourth task in WP1 of SMR. The findings of the previous three tasks have been processed by a Delphi method process involving experts, including selected participants from relevant EU FP7 projects

The general outcome of this report is an expert assessment of resilience implementation approaches and elements that can be adapted to relevant critical infrastructures and the role of the population, rescuers and the media with a view to derive a resilience maturity model (WP2). The resilience maturity model will be further refined in WP3. An early version of a general maturity model is an output of this task, and serves as a vehicle for transfer of outcome together with workshops in WP2. Delphi is a systematic and iterative process for structuring a group communication process in order to obtain a consensus about a complex problem. The Delphi method consists of multiple rounds of questionnaires providing feedback among informants.



TABLE OF CONTENTS

Executive Summary	3
1 Introduction.....	5
2 Methodology	7
2.1 BACKGROUND.....	7
2.2 PARTICIPANTS	8
2.3 PROCESS.....	10
3 Results.....	13
3.1 FIRST ROUND RESULTS.....	13
3.2 SECOND ROUND RESULTS.....	26
4 Summary and Conclusions	43
5 References	45
Annex I. First Questionnaire.....	46
ANNEX II. Second Questionnaire	60
Annex III. Expert's comments in the first questionnaire	81
Annex IV List of stakeholders	100



1 INTRODUCTION

The overall objective of WP1 is to obtain a general overview of the existing current practices in urban resilience and the existing EU sectoral resilience approaches, with the aim to identify, synthesize and assess the current main challenges and best practices regarding resilience in Europe. In order to achieve this objective, a worldwide survey of approaches and a literature overview of state-of-the-art on resilience research to synthesize and ensure common ground of the concept, the methods and the approaches were considered throughout the whole SMR project.

The worldwide survey was conducted as part of WP1. It includes challenges and best practices from individual resilient cities as well as EU-sectoral approaches and a literature overview of resilience concepts and methods. The results obtained from each of the review surveys were presented in the corresponding deliverables D1.1, D1.2 and D1.3 and they serve as a stepping stone for continued work in the next WPs and as an initial platform for developing European resilience management guideline.

In order to guide cities in the resilience building process, the SMR project aims to develop a Maturity Model with a number of well-defined stages that guide cities through the ideal path of building resilience. A CITY will start from stage one, and from there move on to a more advanced stage, passing through a number of intermediate stages. The CITIES will define specific resilience building policies for each of the maturity stages, taking into consideration the descriptions and requirements of the maturity stages. The implementation of these policies included at each stage of the maturity model will allow the CITY to move forward from one stage onto the next. The SMR Maturity Model uses the following five stages (see deliverable D2.6): **Starting, Moderate, Advanced, Robust, and verTebrate** (SMART). So, for a CITY that starts the resilience building process in the first stage (Starting) it will be necessary to implement all the policies specified in the Maturity Model for that stage in order to move on to the second stage (Moderate). The same process will continue until achieving the requirements specified in the fifth stage (VerTebrate).

Based on the results presented in the deliverables D1.1, D1.2 and D1.3 and the information gathered from experts during the four workshops conducted in WP2, the SMR project has developed its own definition of City Resilience in addition to a preliminary version of the Maturity Model. These results have been validated using a Delphi methodology involving multidisciplinary experts with experience in different areas of resilience (Critical Infrastructure, Climate Change, Social Issues) and different levels (City representatives/governance and the European Dimension of resilience). The Delphi methodology



was selected since it suits well for consensus-building process using a set of questionnaires to collect data from a panel of selected experts.

The Delphi methodology used in SMR project consisted of two rounds. Each round consisted on sending a different questionnaire to experts to obtain useful results for the project. The purpose of the first round was to validate the City Resilience definition as well as the description of the five stages defined in the preliminary version of the Maturity Model. In addition to this, experts were asked to identify to what extent stakeholders should be involved in each of these five stages of the Maturity Model. In the second round of the Delphi process, participants were asked to re-evaluate the experts' answers from the first questionnaire where experts did not reach a consensus, and to classify the resilience building policies, which will allow the CITY to move forward from one stage onto the next considering at which stage of the Maturity Model should it be started to be implemented. Finally, at the end of second round of the study, experts were provided with an anonymous summary of the opinions gathered in the first and second rounds so they could review this summary of results and see their own answers with regards to other participants' answers.



2 METHODOLOGY

The Delphi method is a systematic and iterative process for structuring a group communication process in order to obtain a consensus, and divergent perspectives, about a complex problem (Dalkey, 1969; Linstone and Turoff, 1975; Okoli and Pawlowski, 2004). The reason of using a Delphi method is to validate the results obtained from the literature review carried out in D1.1, D1.2 and D1.3 about the worldwide and European approaches about resilience and information gathered from experts during the four workshops conducted in WP2.

2.1 BACKGROUND

The Delphi method was originally designed to reduce the confrontation and inhibiting effects within interacting groups, while at the same time retaining the power of combined knowledge of a group of experts (Dalkey, 1969; Linstone and Turoff, 1975). Rowe and Wright (1999) describe four key features of the original Delphi method:

- *Anonymity of participants:* experts express their opinion freely without the pressure or fear not to agree with others.
- *Interaction:* experts can refine their answers based on the results of the group from in each round.
- *Controlled feedback:* the process informs the participants of other participant's opinion and provides the opportunity to justify or change their answers.
- *Statistical aggregation of group response:* the Delphi method allows for a quantitative analysis and aggregation of data.

The Delphi method consists of multiple rounds of questionnaires and feedback among experts. In the first round, a questionnaire is sent to all experts. After all the answers are collected, a new round starts. The first questionnaire is supplemented with each expert's previous answers and the mean of all participants' results (Skulmoski et al., 2007). The expectation is that each expert may reflect on his or her earlier answer and, over time, some convergence, and also divergent perspectives about problems, is obtained. The process is anonymous and is repeated until the 'stopping criterion' is reached: for example, a fixed number of rounds have been completed or a consensus has been achieved. Delbecq et al. (1975) propose that two or three rounds are typically sufficient for most studies.

The advantage of the Delphi method is that it saves time and costs for both participants and researchers, as the questionnaire can be completed remotely (Delbecq et al., 1975). Furthermore, the iterative character of the study helps refine the answers given by participants. However, on the downside, the



Delphi approach does not provide opportunities for interaction and clarification of ideas with other experts (Nelms and Porter, 1985).

Concerning the number of participants that should take part in the process, Delbecq et al. (1975) propose that the sample should be between ten and fifteen people in case the sample is homogeneous. If participants are disparate Linstone and Murray (1975) propose that four to five experts from each field are needed to perform the process.

The Delphi participants are characterized by the following four “expertise” requirements (Skulmoski et al., 2007):

- They should have knowledge and experience of the issue under investigation.
- They should be willing to participate.
- They should have sufficient time to participate in the process.
- They should have effective communication skills.

2.2 PARTICIPANTS

Multidisciplinary experts from different sectors (Critical Infrastructure, Climate Change, Social Issues) and different levels (City representatives and European Dimension) took part in this Delphi process.

Before sending out the questionnaires, a number of teleconferences were arranged among the SMR Scientific committee to design the structure and the content of the Delphi questionnaire as well as to identify the adequate experts who would be interested and willing to participate. After ensuring that questionnaires were well designed for gathering as many relevant information as possible, an invitation to participate in the Delphi process was sent to 71 experts, all whom were closely related to the field of city resilience.

In the first round of the Delphi process 41 experts (57.75%) agreed to collaborate and finally 32 experts completed the entire process. The experts that participated in the Delphi process had not been involved in the project before. They had not participated in the previous workshops held in WP2, so they were new in the project. Therefore, the panel of experts (see Table 1) was composed of 41 multidisciplinary external experts from five domains: Critical Infrastructure, Climate Change, Social Issues, City representatives and European Dimension.

Table 1: Experts that took part in the Delphi process.

City	Position	Field
Bristol	Technical expert	Critical Infrastructure
Bristol	Technical expert	Climate Change
Bristol	Middle Manager	Social issues
Bristol	Technical expert	Social issues
Bristol	Senior manager	City representatives
Bristol	Senior manager	European dimension
Roma	Natural risk assessment expert	Climate Change
Roma	Climate and health expert, Italian heat health warning system	Climate Change
Roma	Head, Laboratory for the Analysis and Protection of Critical Infrastructures ENEA Casaccia Research Centre	Critical Infrastructure
Roma	Director of Urban Quality and Energy/Environmental Certification Unit	City representatives
Roma	Immigration's processes and crisis expert	European dimension
Kristiansand	Energy supply. Safety, preparedness and crisis manager	Critical Infrastructure
Kristiansand	Norwegian Communication Authority. Senior adviser	Critical Infrastructure
Kristiansand	Adviser public health	Social issues
Kristiansand	Adviser public health	Social issues
Kristiansand	Technical	Social issues
Kristiansand	Preparedness and safety manager	City representatives
Kristiansand	Project manager	City representatives
Kristiansand	Senior Researcher	European dimension
Kristiansand	Adviser, Urban development and international relations	European dimension
Vejle	Medium manager	Climate Change
Vejle	Medium Manager	Social issues

Vejle	Medium Manager	Critical Infrastructure
Vejle	Medium manager	European dimension
Glasgow	Technical - Roads	Critical Infrastructure
Glasgow	Technical - Climate Change Officer	Climate Change
Glasgow	Senior Manager - Programme Director, Glasgow Centre for Population Health (GCPH)	Social issues
Glasgow	Technical - Project Officer	Social issues
Glasgow	Technical	City representatives
Glasgow	Sustainability officer	City representatives
Glasgow	Researcher	Climate Change
Riga	Technical	Critical Infrastructure
Riga	Technical	Critical Infrastructure
Riga	Medium Manager	Social issues
Riga	Technical	Climate Change
Donostia	Technical, Prevention Department	Critical Infrastructure
Donostia	Technical, Environmental Department	Climate Change
Donostia	Senior Manager, Strategy Office	City representatives
Donostia	Expert on social problems	Social issues
	Market Manager, Financial Services.	European dimension

2.3 PROCESS

Our particular Delphi process consisted on two rounds (Figure 2) in which two different questionnaires with different aims and content were used (see Annex I and II).

In this first questionnaire, the experts were asked to assess the description of the maturity stages and the proposed involvement of the relevant stakeholders at each stage. Thus, experts had to review the description of each maturity stage and indicate to what extent they agreed with the statements used to describe each maturity stage using a five level likert scale to measure levels of agreement/disagreement from extremely disagree to extremely agree (see Figure 1). Finally, experts were asked to indicate which stakeholders should be involved at each stage using a scale from 'not relevant' to 'extremely relevant'.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. The city is not part of a larger resilience network.						

Figure 1. Example of the Delphi questionnaire

In the first round, the experts were given two weeks to answer the questionnaires (see Figure 2). Then, after receiving the answers, the SMR research team spent another two weeks analysing the results and preparing the material for the next round.

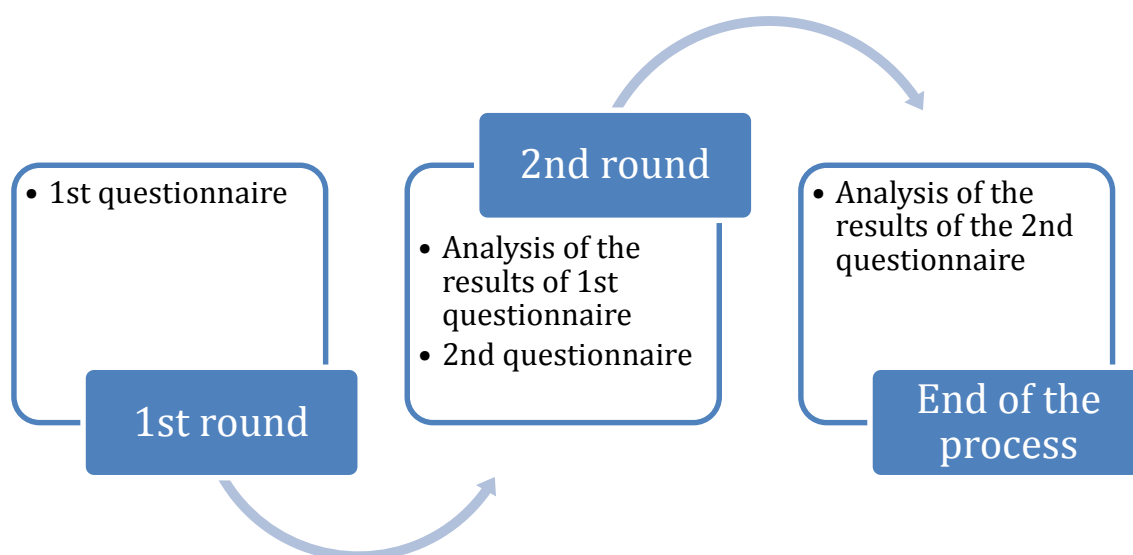


Figure 2. Delphi process

The second round of the Delphi process aimed at classifying a set of resilience building policies based on the maturity stage. Questions were proposed in order to classify a set of resilience building policies based on the maturity stage where they should be implemented. These policies offer guidance to the CITIES to achieve the objectives of each of the maturity stages. This way, CITIES are informed about the steps they should take to achieve the objectives of each stage in the maturity model. A specific CITY needs to implement all the policies defined at the given maturity stage in order to progress to the next maturity stage. So, for a CITY that starts the resilience building process in the first stage (Starting) it will be necessary to implement all the policies specified in the Maturity Model for that starting stage in order to move on to the second stage (Moderate). The same process will continue until all requirements specified in the fifth stage are achieved (VerTebrate). Therefore, the fulfillment of the policies included

in each maturity stage will allow the CITY to move forward from one stage to the next, and consequently improve its local resilience level, as well as enhance the European resilience level.

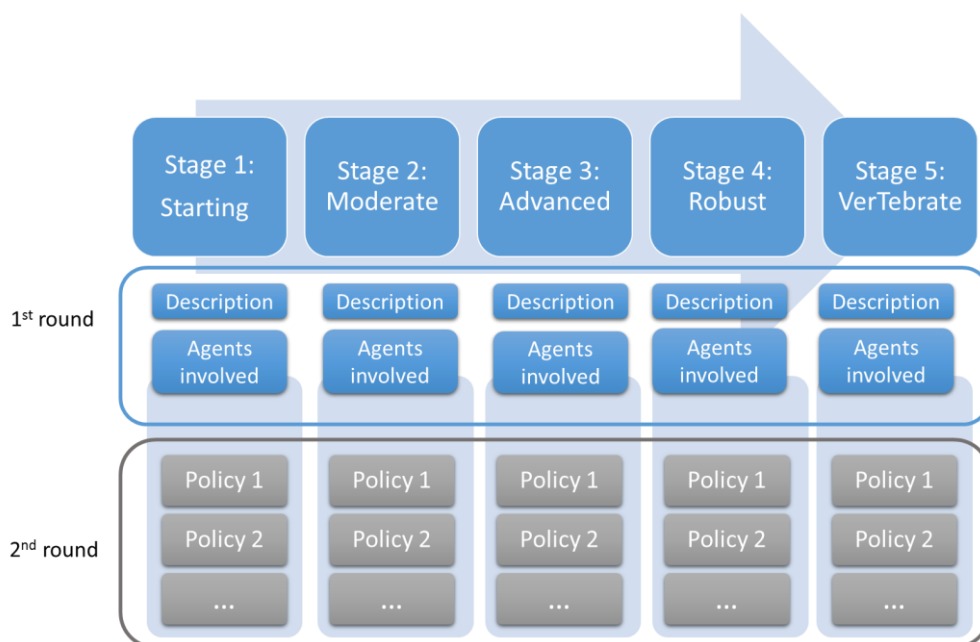


Figure 3. Delphi process- 1st and 2nd rounds

The second round had two different sections; the first section was focused on re-evaluating the experts' answers from the first questionnaire where experts did not reach a consensus. The criteria used to decide if there is a consensus among experts and consequently to accept or reject a statement has been the following: Firstly, the consensus among the answers is analysed to see where the majority of the answers are located. Then, to analyse the score, the answers were grouped in pairs based on the values used in the five-level Likert scale: strongly disagree & disagree, disagree & moderately agree, moderately agree & agree, and finally, agree & strongly agree. The criterion selected to validate each statement, and ensure that a consensus between experts has been achieved, is to obtain more than 70% of answers in the strongly agree & agree range or more than 70% of the experts agree & moderately agree on the statement. Therefore, those statements for which the opinion of experts did not meet this criterion were not considered valid and they were re-written and included in the second round of the Delphi process.

In this second round, the experts were given a week to answer the questionnaire and finally, two weeks were needed for analysing the final results and preparing the summary of the Delphi process (see Figure 3).

3 RESULTS

Bellow, the results of the two rounds carried out in the Delphi process are presented.

3.1 FIRST ROUND RESULTS

This section analyses the results obtained after concluding the first round of the Delphi survey. 41 experts of 71 (participation rate of 57.74%) have participated in this survey. It is important to note that more than 75% of the experts have more than four years of experience (Figure 4) with regards to the topics related to resilience; therefore, their background enables them to give useful answers to the questions asked in the Delphi questionnaire. Below, the results of the different sections of this first round are presented:

Expert's work experience

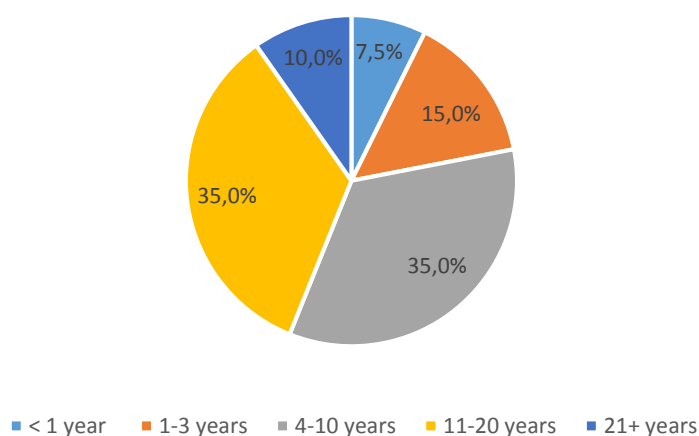


Figure 4. Expert's work experience

The purpose of the first round was to validate the City Resilience (section 1) definition as well as the description of the five stages (section 2) defined in the preliminary version of the Maturity Model. In addition to this, experts were asked to identify to what extent stakeholders (section 3) should be involved in each of these five stages of the Maturity Model.

SECTION 1: Validation of "City Resilience" definition



The first section of the Delphi presented the final version of the “City Resilience” definition developed in the SMR project. The main outcome of the SMR project is to develop a Resilience Management Guideline which will help European CITIES operationalising the resilience building process, and to effectively support CITIES in increasing their resilience level. Therefore, the validations of the “City Resilience” definition is key for the development of the Resilience Management Guideline.

The SMR project has developed the following definition of City Resilience:

City Resilience “is the ability of an urban system or community to resist, absorb, adapt and recover from shocks and long-term stresses to keep the city functioning as a functional unit (vertebra) of society’s resilience backbone, and to learn from on-going processes through city and cross-regional collaboration to anticipate future demands and strengthen the general preparedness, through an understanding of the risk landscape and developing appropriate risk mitigation strategies”.

In this section, experts were asked to contribute with comments and suggestions to improve the latest version of the “City Resilience” definition. After the analysis of the answers, in general, the comments received regarding the definition were positive as most of the experts agreed on the “City Resilience” definition provided. As a participant of the process commented, *“I think it’s a good definition. I see the picture of a robust and intelligent city in my mind when I read it”* (see Annex III for further information). However, one of the main conclusions obtained was that experts consider the definition too long and too complex. In their opinion, the definition should be shortened so that it is more understandable and easier to read. As a participant commented *“Does it need to be that long? Can it be divided in to shorter sentences? It’s difficult to read”*. For instance, some of the experts suggested removing the last point *“I agree with the general definition, but it feels a bit wordy, could you drop the last point? Through an understanding of the risk landscape and developing appropriate risk mitigation strategies”* because it mixes the risk management approach with the resilience approach.

Finally, taking into account all the suggestions the definition was shortened and improved as follows:

City Resilience “is the ability of an urban system or community to resist, absorb, adapt and recover from shocks and long-term stresses to keep the city functioning as a functional unit (vertebra) of European resilience backbone, and to learn from on-going processes through city and cross-regional collaboration to anticipate future demands, to understand the risk environment and strengthen the general preparedness”.



SECTION 2: Maturity Model: Stages description

The second section of the Delphi survey focuses on the validation of the descriptions of the maturity stages. Each maturity stage is defined using a set of statements (Table 2, Table 4 and Table 6) and the experts were asked to answer to what extent they agree with each of these statements.

These statements were defined based on the results obtained from the literature review carried out in WP1 and from the workshops carried out in WP2. In D1.1, D1.2 and D1.3 several resilience policies, indicators and challenges were defined based from the analysed worldwide and European approaches. The statements have been defined based on the four resilience dimensions defined in the D1.3: Resources and Robustness-infrastructure, Leadership and Governance, Preparedness, and Cooperation. The dimension of learning had been included within the rest of the dimensions as explained in D1.3. Furthermore, in order to introduce the dynamic approach, the statements have been classified in the five stages of the maturity model, showing the temporal order in which the statements have to be developed. This information was mainly obtained from WP2 workshops, where the experts were asked to define the different activities and milestones carried out in their city to improve resilience, always defining the temporal order in which these activities should be implemented.

The consensus of experts with respect to these statements is presented in this section. In figures 4, 5, 6, 7 and 8 the results obtained for each of the statements that define each maturity stage are shown. All those statements in which none of the bars in grey and yellow (that refers to consensus moderately agree -agree or consensus agree-strongly agree) reaches the 70% line plotted in red are the statements that need to be reformulated and asked again. The non-validated statements were reformulated based on the comments and suggestions made by experts and included in the second round of the Delphi questionnaire.

Starting Stage

In Table 2, the statements used to describe the Starting Stage are shown.

Table 2. Statements of the Starting Stage

STARTING STAGE	Resilience dimension
1. So far, the crisis management is based on risk assessment without having an integrated approach towards multi-hazard approach; therefore, any risk assessment is still fragmented and incomplete regarding hazards.	Preparedness

2. The local government recognizes the need to develop an integrated action plan, so that the resilience approach is included in the city's agenda.	Leadership and Governance
3. The city has programmed policies regarding resilience building, but any efforts to take on this resilience approach are incipient and individual, since there is no collaboration among the relevant stakeholders that are active in the city.	Cooperation
4. The city has developed a risk assessment to anticipate failures and mitigate risks as an input for the resilience action plan.	Resources and Robustness-Infrastructure
5. The approach is limited within the city's borders, sub-urban and regional interlinkages are not considered. There is lack of collaboration with sub - urban or regional stakeholders and networks.	Cooperation
6. A multi-governance approach with a global dimension is dormant.	Leadership and Governance
7. The city is not part of a larger resilience network.	Cooperation

In the Table 3, the answers for each statement are shown. The results show that the majority of the answers for the first and second statement are placed between Moderately Agree, Agree and Strongly Agree. However, for the other five statements the answers are very scattered.

Table 3. Answers for the Starting Stage

STARTING	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	1	5	5	22	8	0
2.	0	3	5	22	11	0
3.	1	10	8	16	6	0
4.	0	10	13	13	4	1
5.	3	5	5	22	6	0
6.	3	3	11	16	7	1
7.	5	7	8	13	8	0

As shown in Figure 5, statements 3, 4, 5, 6, 7 of the starting stage do not meet the consensus criteria and therefore, they were reformulated and included in the second round of the Delphi questionnaire. Regarding the statement 4, there were several comments stating that this statement should have not been included in this stage but in a previous stage (i.e. stage 0) (see Annex III). They considered that risk management is carried out before starting to develop resilience. Therefore, we decided to remove

it from this stage. Finally, statements 1 and 2 seems to define correctly the starting stage according to the consensus reached by the experts.

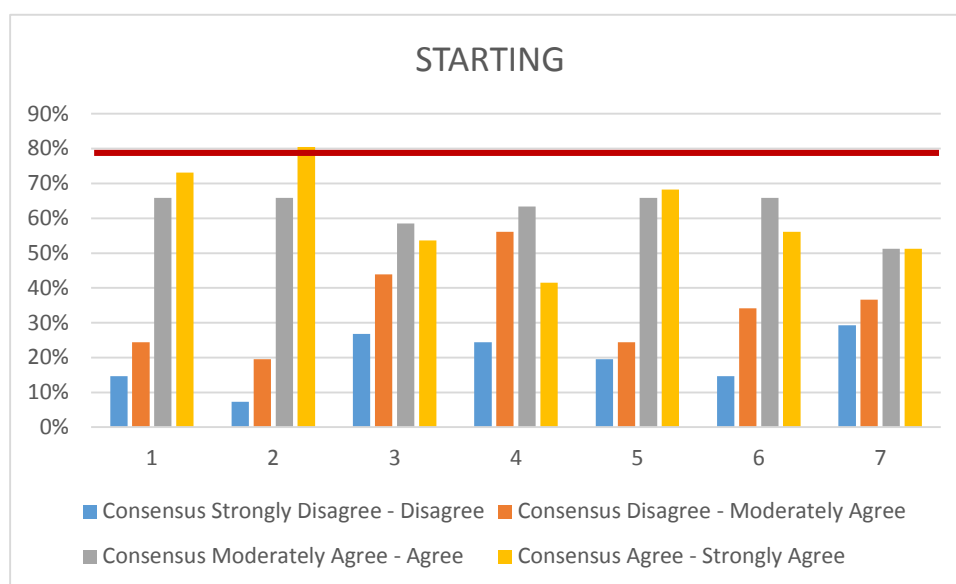


Figure 5. Expert consensus percentage on the Statements of the Starting Stage

Moderate Stage

In the Table 4, the statements that defined the Moderate Stage of the Maturity Model are shown.

Table 4. Statements of the Moderate Stage

MODERATE STAGE	Resilience dimension
1. The city sets up the organizational structure to manage the resilience action plan.	Leadership and Governance
2. At the same time, a communication strategy is set up that will scale up resilience building efforts.	Leadership and Governance
3. The risk assessment with regard to hazards affecting critical infrastructures and man-made threats is operationalized in cooperation with critical infrastructure providers.	Resources and Robustness-Infrastructure
4. The resilience action plan includes a risk assessment for expected events (e.g., floods, power outages etc.) that defines measures to rapidly bounce back getting everything working again.	Preparedness
5. The resilience action plan includes policies to be prepared and respond to unexpected events using a holistic approach	Preparedness

6. Plans have been developed to involve all stakeholders, develop private-public cooperation, include volunteers and organizations and foster a resilience culture among the stakeholders.	Cooperation
7. The city recognizes the relevance of a multi-governance approach with a global dimension and acts to strengthen the approach, although the resilience management is still fragmented and siloed.	Leadership and Governance
8. The city monitors the implementation of resilience development policies, using control measures, although there is a lack of a formalized resilience management process.	Preparedness
9. The city has started planning for networking with other global cities with regard to resilience and sustainability.	Cooperation

In Table 5, the answers for each statement are shown. It can be seen that for all the statements except 6 and 7, the majority of the answers are placed between Moderately Agree, Agree and Strongly Agree.

Table 5 answers for the Moderate Stage

MODERATE	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	1	2	2	21	15	0
2.	1	2	4	20	14	0
3.	1	3	5	21	11	0
4.	2	1	8	15	14	1
5.	1	6	3	17	13	1
6.	1	6	5	18	10	1
7.	3	4	5	20	9	0
8.	2	3	11	20	5	0
9.	0	5	10	20	6	0

For the statements that define the moderate stage, in Figure 6, it can be seen that the 6th and 7th statements do not meet the consensus criteria however, the other seven statements seem to define correctly the moderate stage.

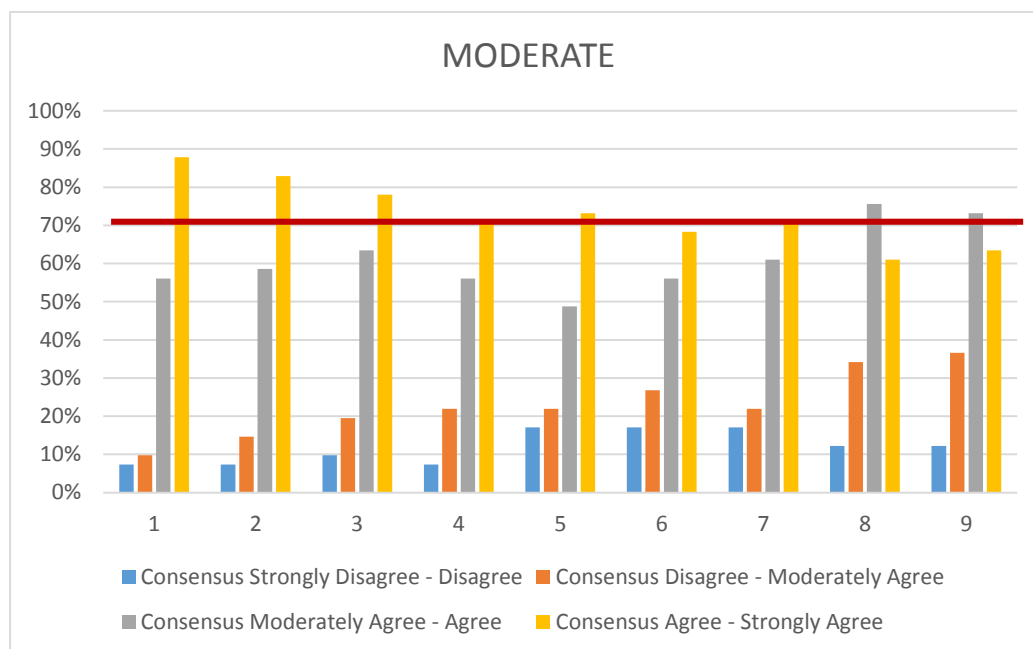


Figure 6. Expert consensus percentage on the Statements of the Moderate Stage

Advanced, Robust and Vertebrate Stages

In Table 6, Table 7 and Table 8, the statements defined for the Advanced, Robust and Vertebrate Stages respectively are shown.

Table 6. Statements of the Advanced Stage

ADVANCED STAGE	Resilience dimension
1. The city has developed an operational and holistic resilience strategy that integrates all sectors.	Leadership and Governance
2. The resilience action plan implements a risk assessment that includes measures to rapidly bounce back (getting everything working again) and 'bounce forward' (taking opportunities as they come along to thrive under change).	Preparedness
3. The resilience action plan defines measures to increase the flexibility of city infrastructures to deal with unexpected events and to adapt to on-going circumstances	Resources and Robustness-Infrastructure
4. The progress of the city resilience action plan is monitored using leading and lagging indicators in order to gather information on the progress and effectiveness/impacts of the implemented policies.	Preparedness
5. Fostering community resilience and public & private cooperation is part of the approach.	Cooperation

6. The multi-governance approach with a European dimension is included in the plans, but not yet fully operationalized.	Leadership and Governance
7. The city is member of a major network of European cities with regard to resilience and sustainability.	Cooperation
8. The resilience learning process is formalized through regular debrief meetings to identify the resilience best practices.	Preparedness
9. The public-private cooperation is operationalized	Cooperation

Table 7. Statements of the Robust Stage

ROBUST STAGE	Resilience dimension
1. The city has identified all the stakeholders and has engaged the majority of them to its resilience holistic approach, so in this stage we can speak of a CITY. Stakeholders are proactive and perceive value added by resilience on their quality of life and economy.	Cooperation
2. The resilience action plan is evaluated based on regularly collected information and the successes and possible draw-backs of the process are reported, giving feedback for the resilience action plan revision process.	Preparedness
3. The CITY is capable of 'bouncing back', 'bouncing forward', and ensuring protection from impacts for expected and unexpected events	Preparedness
4. The city resilience action plan is improved and updated based on the feedback and suggestions received from the city stakeholders through consultation processes and participatory platforms.	Cooperation
5. The multi-governance approach with a global dimension is well developed and operationalized.	Leadership and Governance
6. The city is participating in a variety of important city networks with regard to resilience and sustainability, with a proactive posture and continuous learning transferring knowledge and best practices to be prepared for any unknown events.	Cooperation

Table 8. Statements of the Vertebrate Stage

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

D1.4: DELPHI ANALYSIS REPORT.



2. The CITY acts as a vertebra in the European resilience backbone and has an internalized resilience culture.	Leadership and Governance
3. The resilience action plan is continuously improved based on lessons learned from past events.	Preparedness
4. 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 can self-organize to help in case a crisis occurs.	Cooperation
5. The CITY acts as a leader in global networks and participates in the definition of resilience standards.	Cooperation

In Table 9, Table 10 and Table 11, the individual answers for each statements are shown. From analysing these tables, it can be seen that for all the statements the majority of the answers are placed between Moderately Agree, Agree and Strongly Agree with any answer or one answer in Strongly disagree and disagree scales.

Table 9 Individual answers for the Advanced Stage

ADVANCED	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	0	1	1	23	15	1
2.	1	1	4	22	11	2
3.	0	0	3	25	12	1
4.	0	0	7	24	8	2
5.	0	0	3	25	12	1
6.	0	0	8	28	3	2
7.	0	1	5	27	7	1
8.	0	0	6	23	10	2
9.	0	1	9	22	8	1

Table 10. Individual answers for the Robust Stage

ROBUST	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	0	0	4	16	20	1
2.	1	0	3	22	14	1
3.	1	1	5	17	17	0
4.	0	0	4	16	21	0

5.	0	0	7	18	13	3
6.	0	0	4	24	13	0

Table 11. Individual answers for the VerTebrate Stage

VERTEBRATE	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	0	1	1	17	21	1
2.	0	0	3	18	19	1
3.	1	0	4	14	21	1
4.	0	0	2	15	23	1
5.	0	0	2	4	7	0

Finally, for the Advanced, Robust and VerTebrate stages, in Figure 7, Figure 8 and Figure 9 all of the statements proposed meet the criteria and therefore all of the statements can be used to describe those last maturity stages.

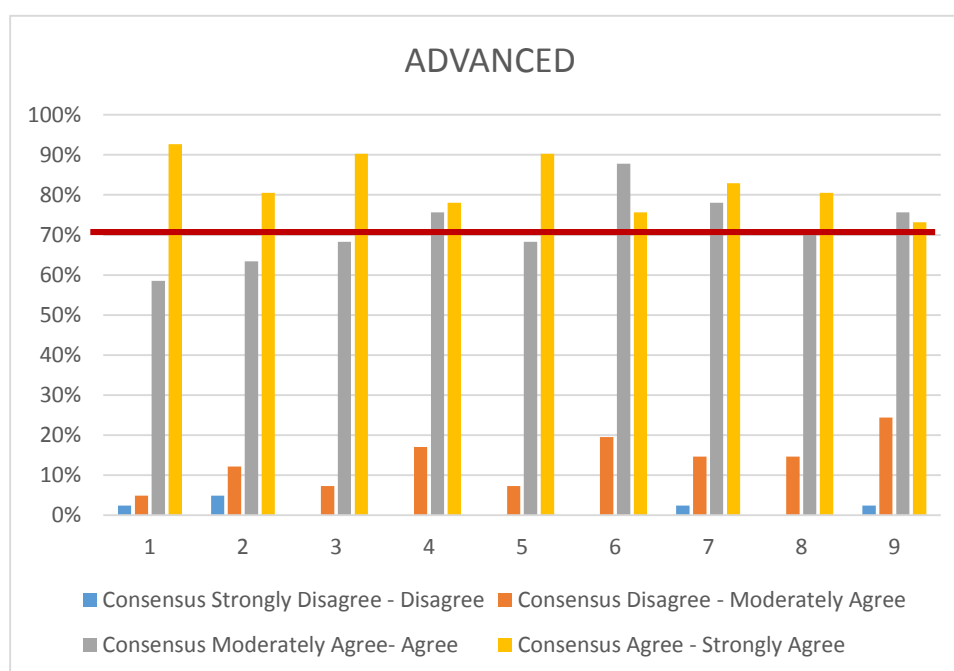


Figure 7. Expert consensus percentage on the Statements of the Advanced stage.

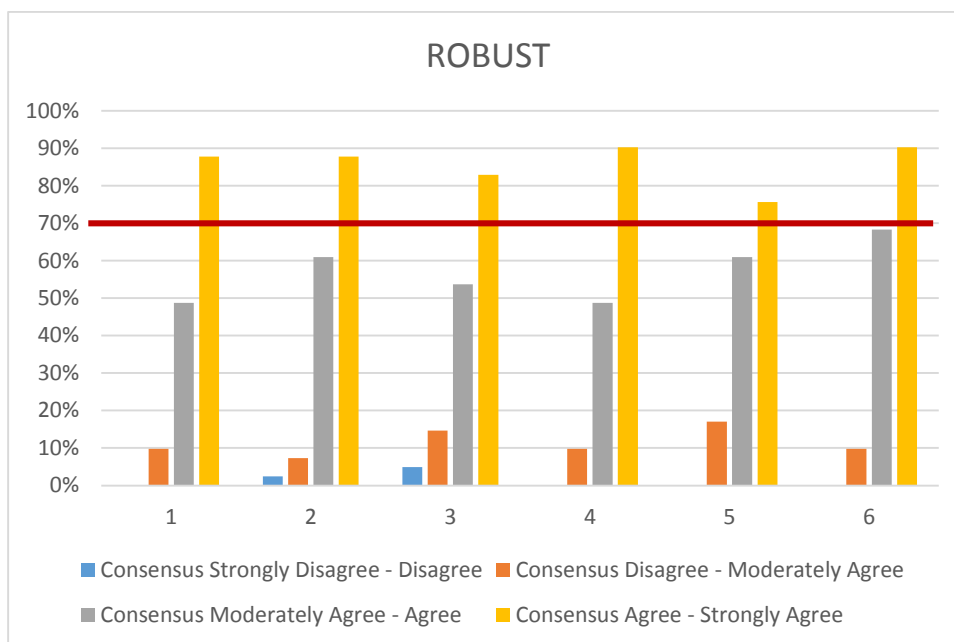


Figure 8. Expert consensus percentage on the statements of the Robust Stage

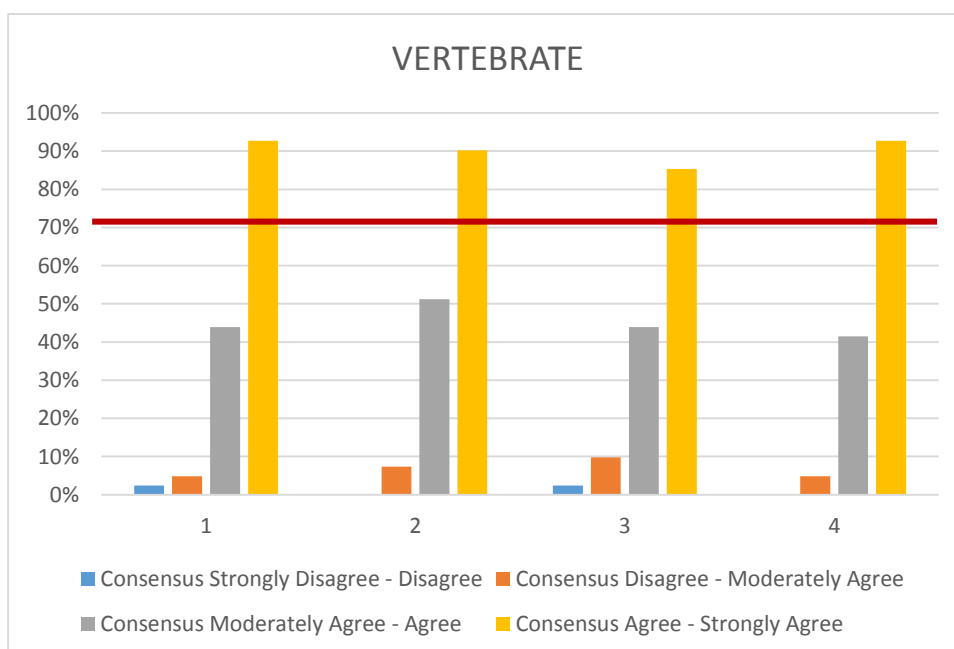


Figure 9. Expert consensus percentage on the statements of the Vertebrate Stage

One of the main conclusions that came out from the results obtained in this section is that less consensus is found at the early stages of the Maturity Model (Starting and Moderate). Some experts argue that there is a need to define a 0 stage prior to the Starting stage, which implies that the early



stages could be too advanced to be the first stages of the Maturity Model. Further, comments from couple of experts is that the difference between the last two stages (Robust and verTebrate) is small and that this should be considered in the further validation.

SECTION 3: Maturity Model: Stakeholders

The third section of the Delphi survey consists of a set of questions about the involvement of different city stakeholders at each of the maturity stages. The stakeholders presented in this section are (Annex IV):

- Local government
- Regional government
- National government
- European Legislative Body
- Emergency services
- Critical Infrastructures providers (CIs)
- Public & Private companies
- Media
- NGOs
- Academic and scientific entities
- Volunteers
- Citizens

Experts were asked to consider the role of each stakeholder group at each stage of the Maturity Model and whether they found the role of each stakeholder relevant or not. The SMR hypothesis about the involvement of the stakeholders in the different maturity stages is that not all stakeholders need to be involved from the very beginning of the resilience development processes, but that it is a dynamic process where different stakeholders join progressively at different stages.

The results show that the level of stakeholder involvement increases progressively through the maturity stages. Local government is the stakeholder group that more actively participates through the whole process. Critical Infrastructure providers and emergency services have also an important role from the early stages of the Maturity Model.

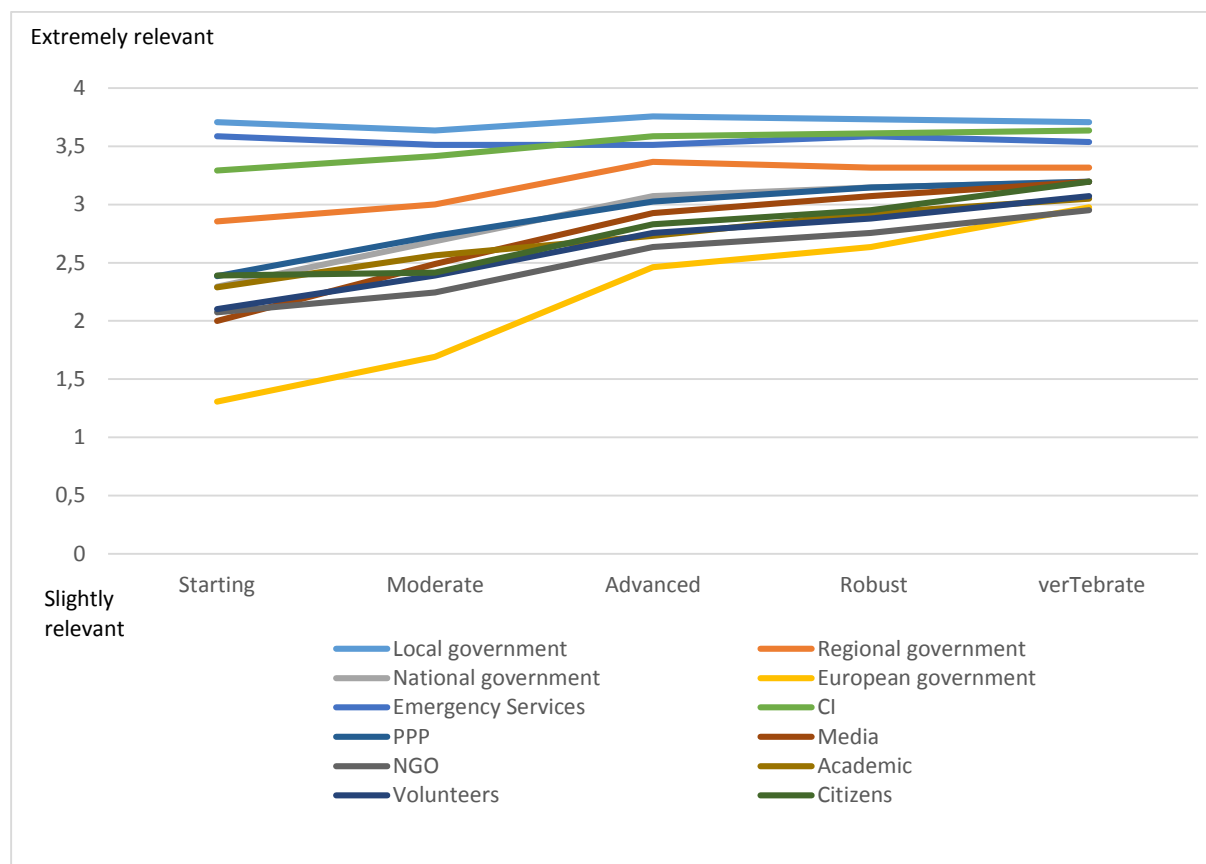


Figure 10. Evolution of each stakeholder group throughout the Maturity Stages

As can be seen in Figure 10, apart from the stakeholders already mentioned, the regional government also has an important role especially starting from the moderate stage. All of the other stakeholders more or less follow the same tendency regarding their involvement in resilience activities throughout the whole resilience building process. The involvement of the stakeholders is more important from the advanced stage to the end of the maturity stages. However, the role of European government is incipient in the beginning of the path towards resilience and gets more important as the CITY moves forward in the maturity stages; its role is secondary as all the other stakeholders have a more active role in the resilience building process in all the stages. This could be because the Maturity Model starts with a centralized resilience vision and ends with a global resilience vision.

The graph below (Figure 11) plots five different lines and each line is plotted linking different points. Each of the points refers to the percentage of experts that found a specific stakeholder very relevant or relevant in one particular maturity stage. Therefore, each line links all the different points referring to the same maturity level. The line plotted in light blue links all the points referring to the starting stage and

logically its area is smaller than the area plotted in dark blue that refers to the points referring to the vertebrate stage. The increase of the area simulates the amount of stakeholder groups participating in the resilience building process. The bigger the area, the more participation of stakeholders there is. As would be expected, the number of stakeholders increases as the Maturity Model progresses through the stages.

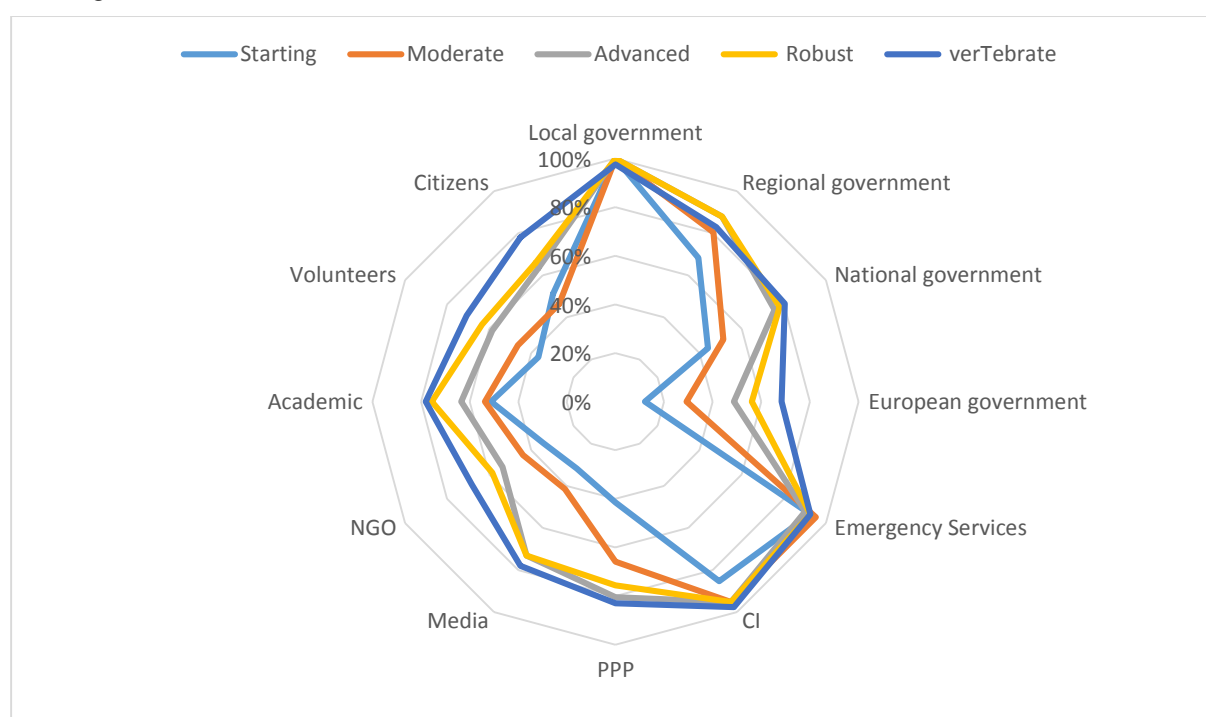


Figure 11. Consensus degree in each stage

3.2 SECOND ROUND RESULTS

This section analyses the results obtained after concluding the second round of the Delphi survey. 32 experts of 41 (participation rate of 78%) have participated in this survey.

The aim of this second round was to re-evaluate the experts' answers from the first questionnaire where experts did not reach a consensus (section 1), and to classify the resilience building policies (section 2), which will allow the CITY to move forward from one stage onto the next considering at which stage of the Maturity Model should it be started to be implemented.

SECTION 1: Maturity Model: Statements re-validation



The first section of the second round of the Delphi survey focuses on the validation of statements that were not validated in the first round of this study. Those statements were updated because of comments and suggestions made by the participating experts.

The degree of consensus of experts with respect to these statements is presented in this section.

Table 12 and Table 13 present statements for the Starting and Moderate Stages that were not validated during the first round

Table 12. Reformulated statements for the Starting Stage

Starting Stage	Resilience dimensions
1. Different city departments have started developing policies regarding resilience building; however, a common strategy is still missing. The relevant stakeholders and sectors work independently from others	Cooperation
2. The local authority adopts a local governance approach. The need for a multi-governance ¹ approach is still not recognized.	Leadership and Governance
3. The participation of the local municipality in resilience networks is incipient.	Cooperation
4. The approach is limited within the city's borders. There is no coordination between the different activities conducted by different departments. Moreover, there is a lack of collaboration with sub urban or regional stakeholders and networks.	Cooperation

Table 13 Reformulated statements for the Moderate Stage

Moderate Stage	Resilience dimensions
1. Initiatives to increase the awareness level of the different municipal departments to foster a resilience culture among them.	Leadership and Governance

¹ The concept of multi-level governance refers to take into account and integrate all levels of governance within the city. This approach includes understanding the dynamic inter-relationship within and between different levels of governance and government.

2. The local authority recognizes the relevance of a multi-governance approach and acts accordingly to strengthen this approach.	Leadership and Governance
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In Table 14 and Table 15, the individual responses for each statement are shown. From analysing these tables, it can be seen that for all the statements the majority of the responses are placed between Moderately Agree, Agree and Strongly Agree.

Table 14. Individual answers for the Starting Stage

STARTING	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	0	0	11	14	17	0
2.	0	4	12	14	2	0
3.	0	3	5	19	5	0
4.	0	3	6	18	5	0

Table 15. Individual answers for the Moderate Stage

MODERATE	Strongly disagree	Disagree	Moderately Agree	Agree	Strongly Agree	N/A
1.	0	0	10	18	4	0
2.	0	2	8	17	5	0

Finally, for the Starting and Moderate stages, in Figure 12 and Figure 13 all of the proposed reformulated statements meet the defined criteria for consensus amongst experts and therefore can be used to describe the respective maturity stages.



Figure 12. Expert consensus percentage on the statements of the Starting Stage

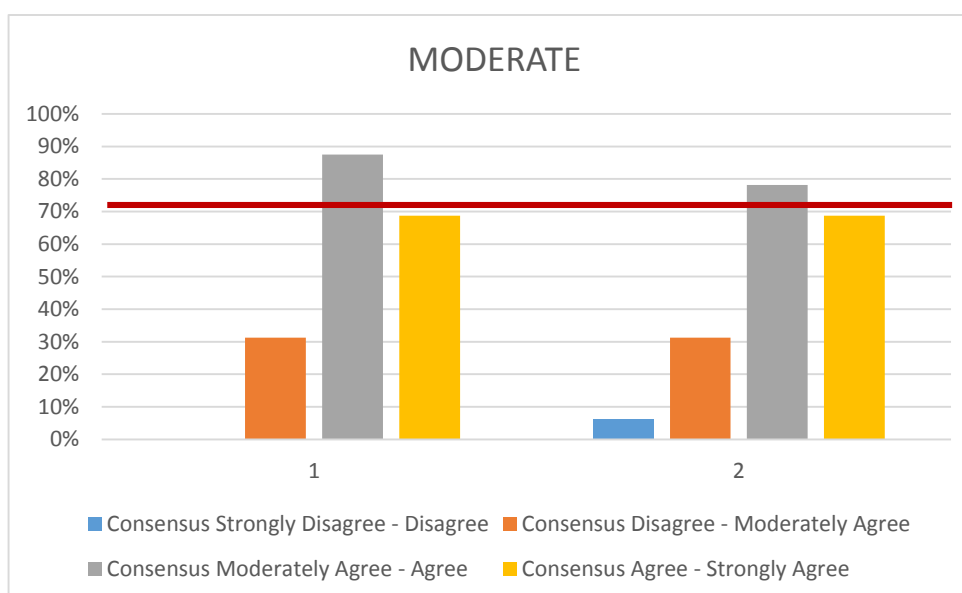


Figure 13. Expert consensus percentage on the statements of the Moderate Stage

Section 2: Policies classification

In addition to the description of the maturity stages and the agents involved in each of these stages, the maturity model also includes a set of policies that cities should follow to progress towards each of the maturity stages. Therefore, in the second round of the Delphi survey, experts were asked to:

- Select at which stage each policy **should start its development**
- Select at which stage each policy **should be fully developed**

- c) Estimate the **number of years** you consider this policy needs to be completely developed.

Figure 14 explains the methodology and the timeline followed in order to define the policies and the relationship among the deliverables from WP1 and WP2.

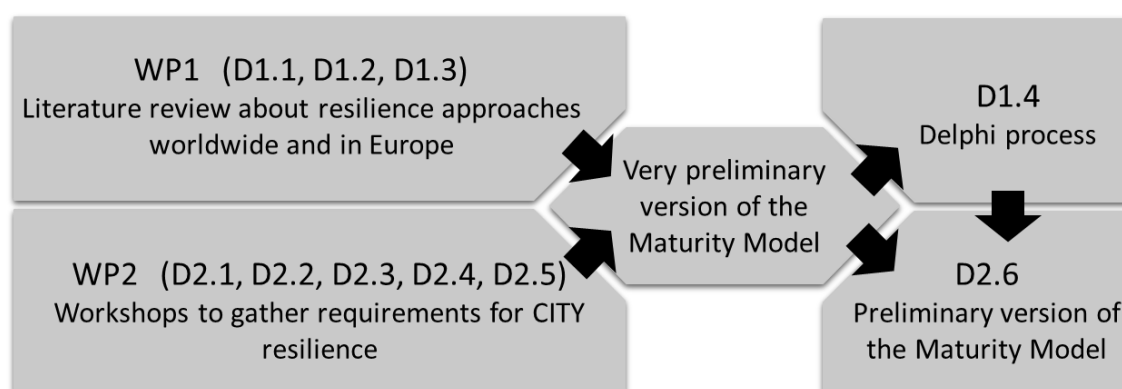


Figure 14: The timeline and the relationships among the different deliverables of WP1 and WP2.

Based on the literature review carried out in D1.1, D1.2 and D1.3, worldwide and European approaches to improve resilience were defined. Policies, indicators and challenges defined in the scientific literature were extracted in order to gather information for the Maturity Model. Furthermore, information from the workshops carried out in WP2 was also gathered in order to identify CITY requirements for building resilience. Taking all this, a very preliminary version of the Maturity Model was developed.

The aim of the Delphi process was to validate this very preliminary version of the maturity model with the external experts (the ones that did not participate in the WP2 workshops). The policies selected for the Delphi process were taken from the preliminary version of the maturity model. However, in order to facilitate the data analysis and obtain more coherent results due to the large number of policies in the Maturity Model (MM), the SMR team decided to include the most important and essential ones. Furthermore, it was taken into account that the policies that were selected were the more general ones and represented policies that were more specific. Hence, the policies included in the second questionnaire of the Delphi process are therefore general policies, which include the most important policies of the very preliminary version of the maturity model. In addition, the policies were presented in four groups (Table 16) based on the resilience dimensions defined in D1.3 (Resources and Robustness-Infrastructure, Preparedness, Cooperation and Leadership and Governance). The learning dimension is included within the other four dimensions as suggested in D1.3.

Table 16. Policies of the MM included in the second round of the Delphi process



POLICY GROUP 1 (Resources and Robustness-Infrastructure)

1. Develop measures to increase Critical Infrastructures' (CIs) redundancy
2. Develop measures to increase CIs flexibility
3. Develop periodical maintenance procedures to guarantee the correct level of performance of CI
4. Develop a contingency plan aimed at keeping CIs functioning at minimal level in case of disaster
5. Develop early warning, monitoring systems to alert for potential arising risks
6. Develop an incentive system for public and private sectors to promote the investment in measures that increase the resilience and penalties to those who increase the risk and vulnerabilities
7. Set up a disaster relief fund for emergencies

POLICY GROUP 2 (Leadership and Governance)

1. Develop a resilience action plan with short term perspective to prevent and respond to shocks
2. Develop a resilience action plan with long term perspective to prevent and respond to shocks and stresses
3. Include the resilience action plan into the local government budget to increase the resilience of the city
4. Develop resilience policies with respect to high risk areas.
5. Develop a list of key assets relevant to cope with known variations and disturbances.
6. Develop a list of organizational abilities to re-organise structures in response to threat scenarios to fit the needs of the current context (on-going crisis).
7. Creation of a resilience department or committee to steer and coordinate the city's resilience action plan
8. Develop a resilience building programme whose aim is to support citizens' initiatives that contribute to increase resilience
9. Develop a legislation framework identifying obligations and constraints to ensure the implementation of resilience action plans
10. Scout and assess current initiatives, projects and funding opportunities such as EU-Projects/Programmes to eventually create joint alliances
11. Develop a strategy for multi-governance approach
12. Embedding standards on resilience guidelines, tools and policies
13. Integrate the municipal resilience action plan with regional plans
14. Integrate the municipal resilience action plan with national plans
15. Integrate the municipal resilience action plan with international plans

POLICY GROUP 3 (Preparedness)

1. Develop a list of best practices regarding resilience used in different sectors to include them in the resilience action plan
2. Make resilience policies and activities available in a platform so that they can be replicated by other CITIES

3. Arrange public debriefing sessions to facilitate a shared understanding, reflection and discussion on the resilience building process

4. Develop a local government resilience website/communication platform that offers secure online space for sharing information to other stakeholders

5. Develop partnerships (like research projects) with academic and scientific entities to incorporate technologies, methodologies and tools for developing resilience.

6. Develop and maintain an updated internal database of past shocks and current risks for learning purposes, only for local authorities, emergency services and CIs

7. Integrate lessons learned from past emergencies in the resilience action plan

POLICY GROUP 4 (Cooperation)

1. Develop technical training and emergency drills

2. Develop training drills for citizens and companies regarding resilience based on their specific needs

3. Develop a culture of resilience by organizing resilience awareness activities, such as campaigns, events and training activities

4. Develop procedures for cross departmental coordination assigning responsibilities, duties and resources regarding the resilience action plan

5. Develop a communication strategy to inform the stakeholders about the resilience action plan (gaps, problems, achievements and opportunities)

6. Develop a stakeholder engagement plan

7. Develop platforms (i.e. databases) that enable the sharing of resilience lessons learned and best practices among CITY stakeholders.

8. Develop public consultations for the development of resilience action-plans to support their implementation and receive continuous feedback by citizens and stakeholders.

9. Develop wider collaborative networks with representatives from the emergency services, CIs, public and private companies, academic entities, media, citizens, and volunteer organizations to ensure the performance of duties, to reflect on and make decisions about the progress of the city's resilience.

10. Develop and conduct technical resilience assessment meetings prior to and after emergencies, disasters and crisis

11. Formalize the learning process, institutionalizing regular debriefing meetings

12. Develop participation in regional networks to promote initiatives, exchange experiences and increase cooperation

13. Develop participation in national networks to promote initiatives, exchange experiences and increase cooperation

14. Develop participation in international networks to promote initiatives, exchange experiences and increase cooperation

Table 17, Table 19 and Table 20 summarize the results obtained from the questionnaire. The percentages represent how many times each policy has been placed at each stage of the maturity model

by the experts. For each policy a two colour scale has been used depending on the number of answers at each stage. A colour scale is a visual guide that helps to understand data distribution and variation. A two colour scale helps to compare a range of cells by using a gradation of two colours. The shade of the colour represents higher or lower values. In the next tables, the higher values (mode values) have been specified with red colour and lower values have lighter red colours until the lowest value that has white colour. It must be noted that if a policy has very distributed answers the cell colours are very similar due to the lack of consensus. Furthermore, the last column represents the mean stage for each policy. The mean stage is the average stage for each policy and it has been calculated based on the following equation:

$$\text{Mean stage} = \frac{1 * \text{percentage stage 1} + 2 * \text{percentage stage 2} + \dots}{\text{percentage stage 1} + \text{percentage stage 2} + \dots}$$

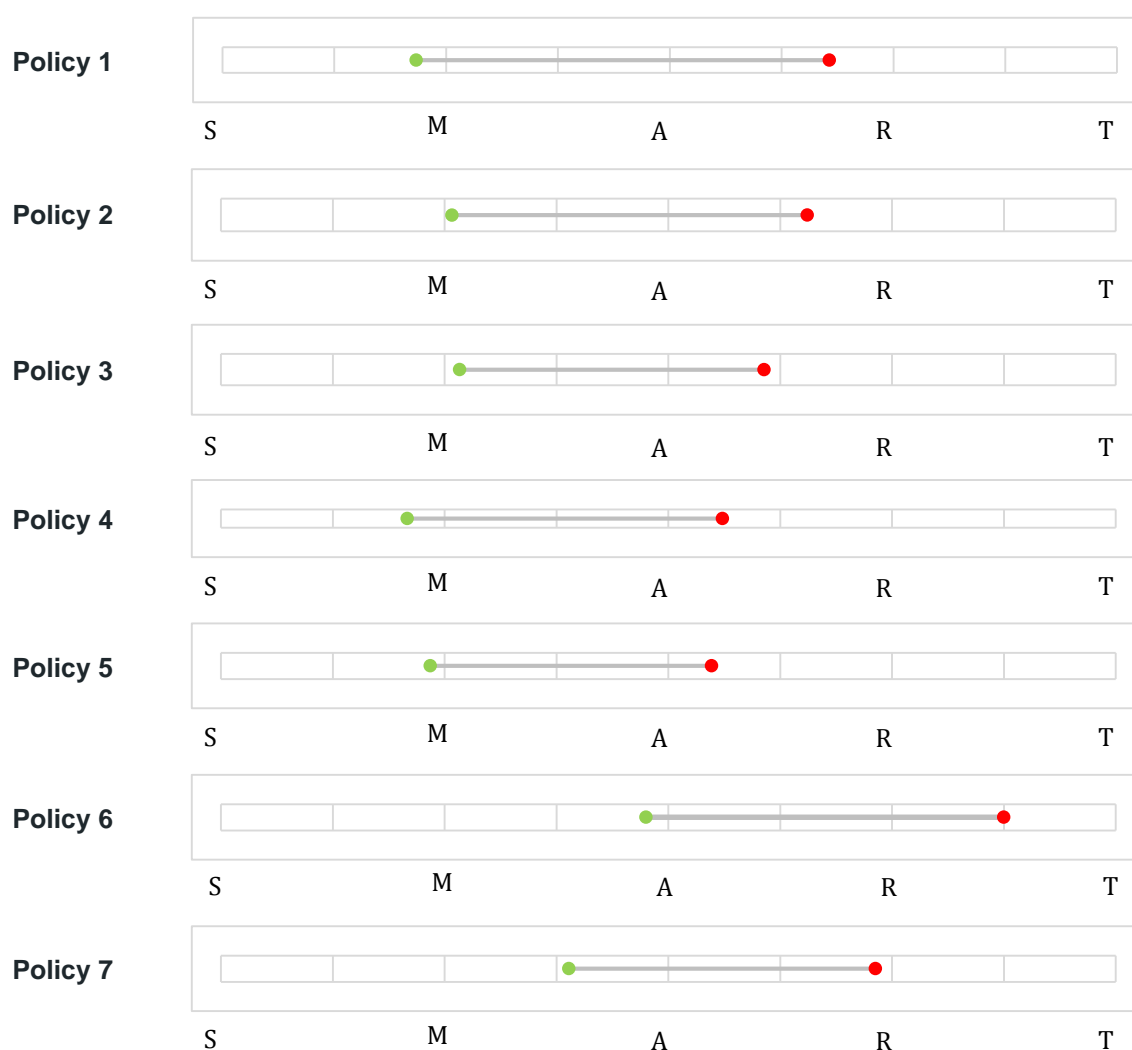
The policies have been ordered based on the mean stage (placing at the first position the one with the lowest value and in the last position the one with the highest value).

The Table 17 shows the results of the classification of the policies included in the first group. All the policies are represented with the numbers presented in Table 16.

Table 17. Results of the first policy group

		S	M	A	R	T	N/A	Average Stage (1-5)
1	Start	28.1 %	50 %	15.6 %	0 %	0 %	6.2 %	1.86
	End	0 %	12.5 %	21.8 %	31.2 %	21.8 %	12.5 %	3.71
2	Start	15.6 %	62.5 %	18.7 %	0 %	0 %	3.1 %	2.03
	End	0 %	15.6 %	25 %	28.1 %	21.8 %	9.3 %	3.62
3	Start	31.2 %	28.1 %	31.2 %	3.1 %	0 %	6.2 %	2.06
	End	3.1 %	12.5 %	34.3 %	18.7 %	18.7 %	12.5 %	3.42
4	Start	40.6 %	34.3 %	12.5 %	6.2 %	0 %	6.2 %	1.83
	End	6.2 %	15.6 %	34.3 %	18.7 %	15.6 %	9.3 %	3.24
5	Start	31.2 %	46.8 %	12.5 %	6.25 %	0 %	3.1 %	1.93
	End	3.1 %	25 %	28.1 %	31.2 %	9.3 %	3.1 %	3.19
6	Start	0 %	31.2 %	46.8 %	9.3 %	6.2 %	6.2 %	2.9
	End	0 %	3.1 %	6.25 %	25 %	59.3 %	6.2 %	4.5
7	Start	15.6 %	25 %	28.1 %	12.5 %	3.1 %	15.6 %	2.55
	End	6.25 %	6.25 %	12.5 %	21.8 %	37.5 %	15.6 %	3.92

The following graphs represents in which stage should each policy of the first group starts, based on the expert's answers:



Based on the results, in order to allocate the policies to a stage, in most of the cases the mode stage corresponds to the stage where the policy was placed by the SMR team in the MM validating them.

However, there is a specific case where the results highlight a lack of agreement amongst experts with some of the experts believing that Policy 7 on “Set up a disaster relief fund for emergencies” should be implemented in the earlier stage whereas others believe that they should be implemented in the later ones.

The mean stage of this policy, however, corresponds to the second stage (see Table 17). Therefore, this policy have been placed in the second and third stages as the Delphi results suggested.

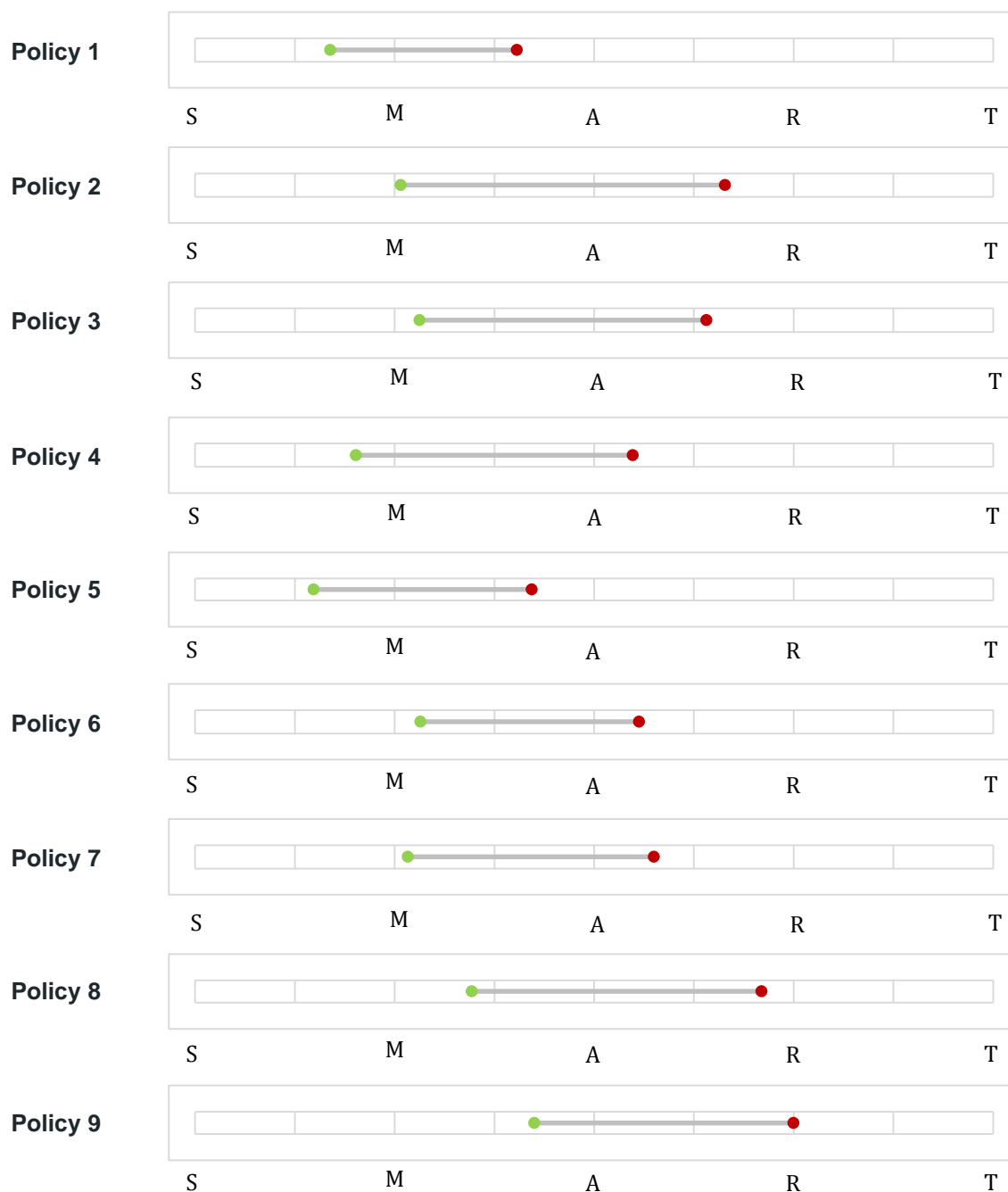
The Table 18 shows the results of the classification of the policies included in the second group. All the policies are represented with the numbers presented in Table 16.

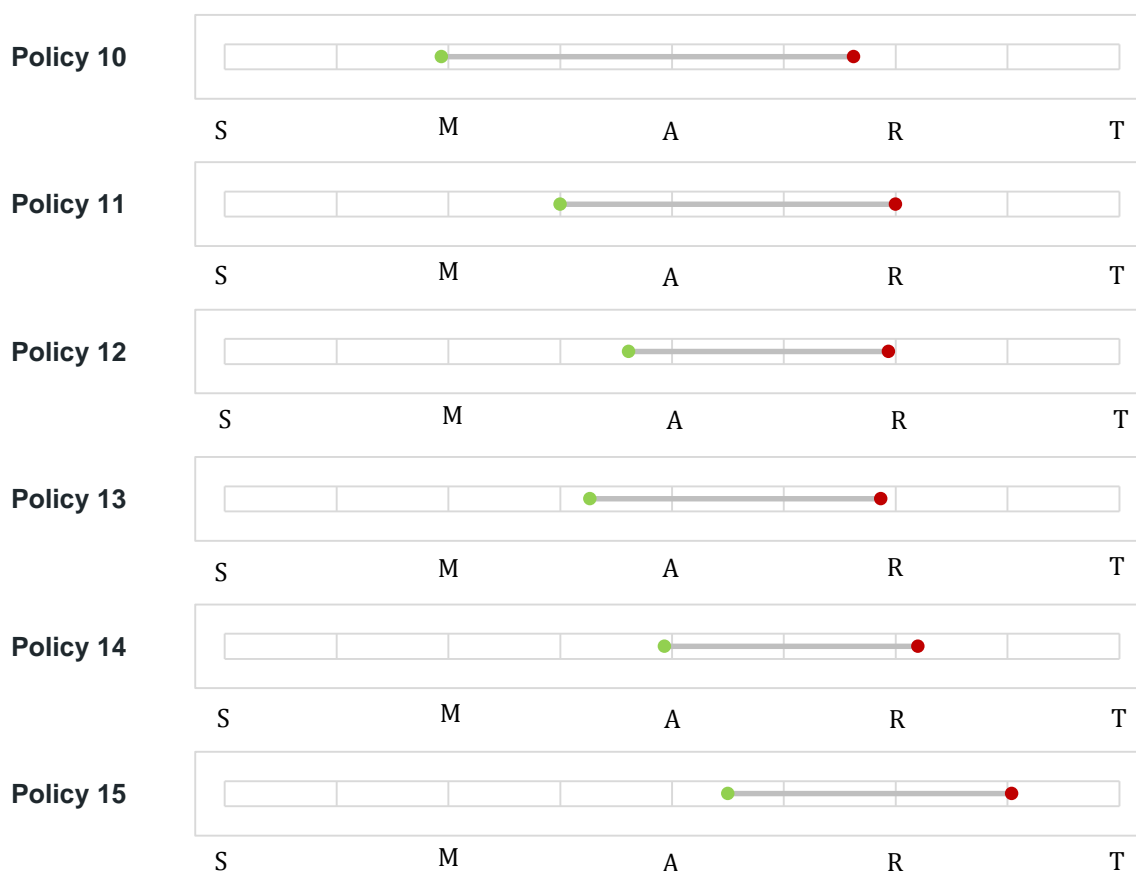
Table 18. Results of the second policy group

		S	M	A	R	T	N/A	Average Stage (1-5)
1	Start	43.7 %	40.6 %	12.5 %	0 %	0 %	3.1 %	1.67
	End	9.3 %	40.6 %	28.1 %	15.6 %	3.1 %	3.1 %	2.61
2	Start	25 %	50 %	21.8 %	3.1 %	0 %	0 %	2.03
	End	6.2 %	12.5 %	18.7 %	34.3 %	28.1 %	0 %	3.65
3	Start	34.3 %	25 %	34.3 %	6.2 %	0 %	0 %	2.12
	End	3.1 %	12.5 %	31.2 %	31.2 %	21.8 %	0 %	3.56
4	Start	40.6 %	37.5 %	15.6 %	3.1 %	0 %	3.1 %	1.80
	End	3.1 %	21.8 %	43.7 %	9.3 %	18.7 %	3.1 %	3.19
5	Start	50 %	40.6 %	9.3 %	0 %	0 %	0 %	1.59
	End	12.5 %	34.3 %	31.2 %	15.6 %	6.2 %	0 %	2.68
6	Start	21.8 %	46.8 %	21.8 %	6.2 %	0 %	3.1 %	2.12
	End	3.1 %	25 %	25 %	34.3 %	9.3 %	3.1 %	3.22
7	Start	34.3 %	37.5 %	9.3 %	6.2 %	6.2 %	6.2 %	2.06
	End	3.1 %	34.3 %	15.6 %	12.5 %	28.1 %	6.2 %	3.3
8	Start	15.6 %	37.5 %	34.3 %	9.3 %	0 %	3.1 %	2.38
	End	0 %	9.3 %	18.7 %	46.8 %	21.8 %	3.1 %	3.83
9	Start	15.6 %	25 %	31.2 %	15.6 %	6.2 %	6.2 %	2.7
	End	6.2 %	0 %	21.8 %	25 %	40.6 %	6.2 %	4
10	Start	34.3 %	43.7 %	15.6 %	3.1 %	3.1 %	0 %	1.96
	End	6.2 %	9.3 %	18.7 %	28.1 %	37.5 %	0 %	3.81
11	Start	15.6 %	31.2 %	34.3 %	9.3 %	3.1 %	6.2 %	2.5
	End	3.1 %	3.1 %	18.7 %	34.3 %	34.3 %	6.2 %	4
12	Start	9.3 %	28.1 %	34.3 %	21.8 %	3.1 %	3.1 %	2.80
	End	3.1 %	3.1 %	21.8 %	34.3 %	34.3 %	3.1 %	3.96
13	Start	6.2 %	43.7 %	25 %	15.6 %	3.1 %	6.2 %	2.63
	End	0 %	6.2 %	25 %	31.2 %	31.2 %	6.2 %	3.93
14	Start	3.1 %	31.2 %	28.1 %	28.1 %	3.1 %	6.2 %	2.96
	End	0 %	6.2 %	9.3 %	46.8 %	31.2 %	6.2 %	4.1
15	Start	3.1 %	18.7 %	34.3 %	15.6 %	15.6 %	12.5 %	3.25

	End	0 %	0 %	15.6 %	9.3 %	59.3 %	15.6 %	4.51
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The following graphs represents in which stage should each policy of the second group starts, based on the expert's answers:





Based on the results, in order to allocate the policies to a stage, in most of the cases the mode stage corresponds to the stage where the policy was placed by the SMR team in the MM validating them.

However, there are some cases where the results highlight a lack of agreement amongst experts with some of the experts believing that these policies should be implemented in the earlier stage whereas others believe that they should be implemented in the later ones. These policies are:

- Policy 9 Develop a legislation framework identifying obligations and constraints to ensure the implementation of resilience action plans
- Policy 12 Embedding standards on resilience guidelines, tools and policies
- Policy 14. Integrate the municipal resilience action plan with national plans and,
- Policy 15. Integrate the municipal resilience action plan with international plans

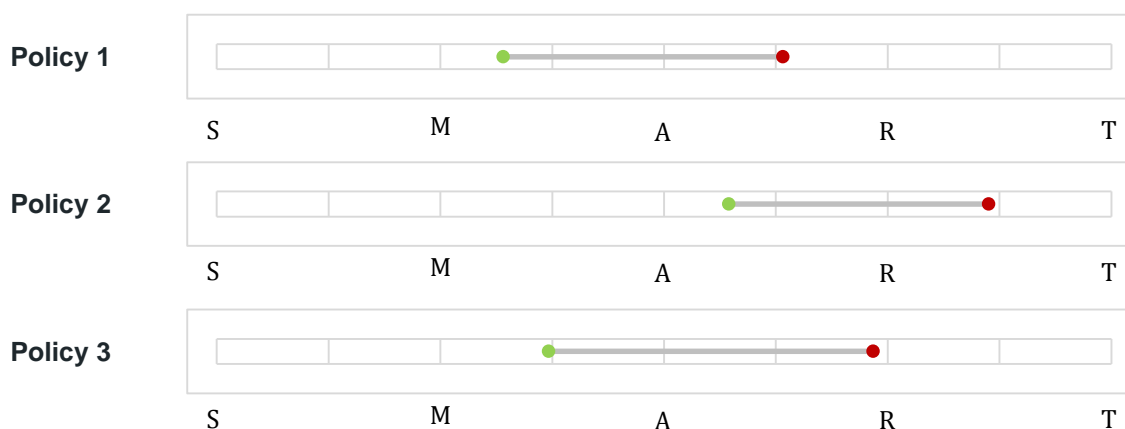
The mean stage of these policies, however, corresponds to the second stage (see Table 18) except for the policy 15, which correspond to the third stage. Therefore, these policies have been placed at the second and third stages as the Delphi results suggested.

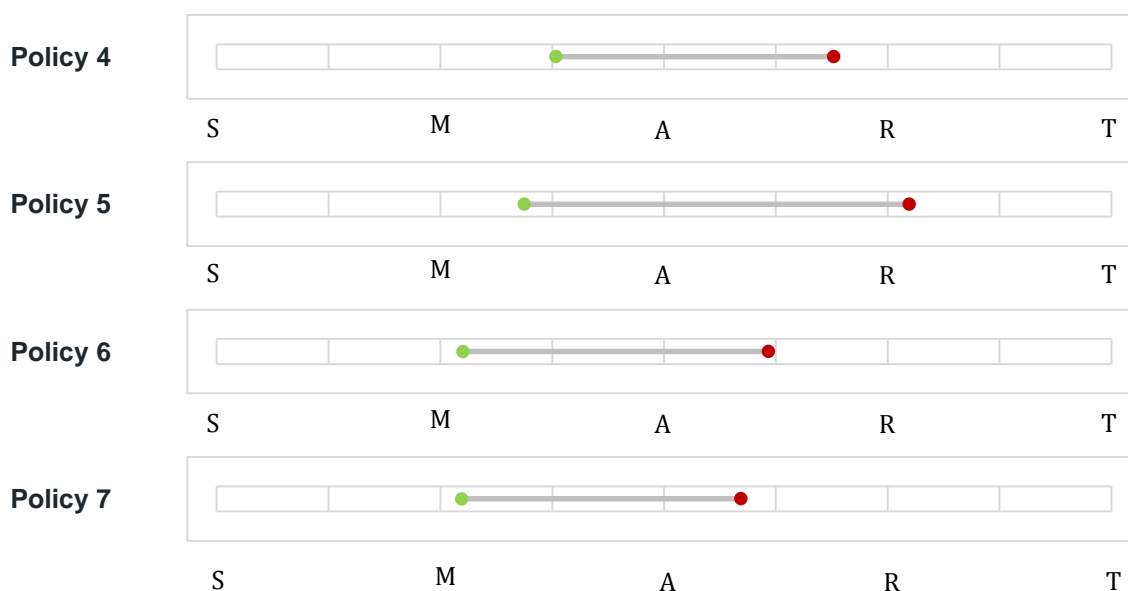
Table 19 shows the results of the classification of the policies included in the third group. All the policies are represented with the numbers presented in Table 16.

Table 19. Results of the third policy group

		S	M	A	R	T	N/A	Average Stage (1-5)
1	Start	18.7 %	43.7 %	28.1 %	9.3 %	0 %	0 %	2.28
	End	3.1 %	9.3 %	37.5 %	31.2 %	18.7 %	0 %	3.53
2	Start	0 %	18.7 %	40.6 %	28.1 %	9.3 %	3.1 %	3.29
	End	0 %	0 %	12.5 %	28.1 %	56.2 %	3.1 %	4.45
3	Start	12.5 %	46.8 %	18.7 %	15.6 %	3.1 %	3.1 %	2.48
	End	0 %	6.2 %	25 %	34.3 %	31.2 %	3.1 %	3.93
4	Start	12.5 %	28.1 %	40.6 %	9.3 %	0 %	9.3 %	2.51
	End	3.1 %	12.5 %	18.7 %	25 %	31.2 %	9.3 %	3.75
5	Start	21.8 %	28.1 %	40.6 %	9.3 %	0 %	0 %	2.37
	End	3.1 %	3.1 %	25 %	15.6 %	50 %	3.1 %	4.09
6	Start	28.1 %	40.6 %	12.5 %	12.5 %	0 %	6.2 %	2.1
	End	6.2 %	12.5 %	34.3 %	12.5 %	28.1 %	6.2 %	3.46
7	Start	31.2 %	40.6 %	18.7 %	6.2 %	3.1 %	0 %	2.09
	End	3.1 %	21.8 %	31.2 %	25 %	18.7 %	0 %	3.34

The following graphs represents in which stage should each policy of the third group starts, based on the expert's answers:





Based on the results, in order to allocate the policies to a stage, in all the cases of this third group the mode stage corresponds to the stage where the policy was placed by the SMR team in the MM validating them.

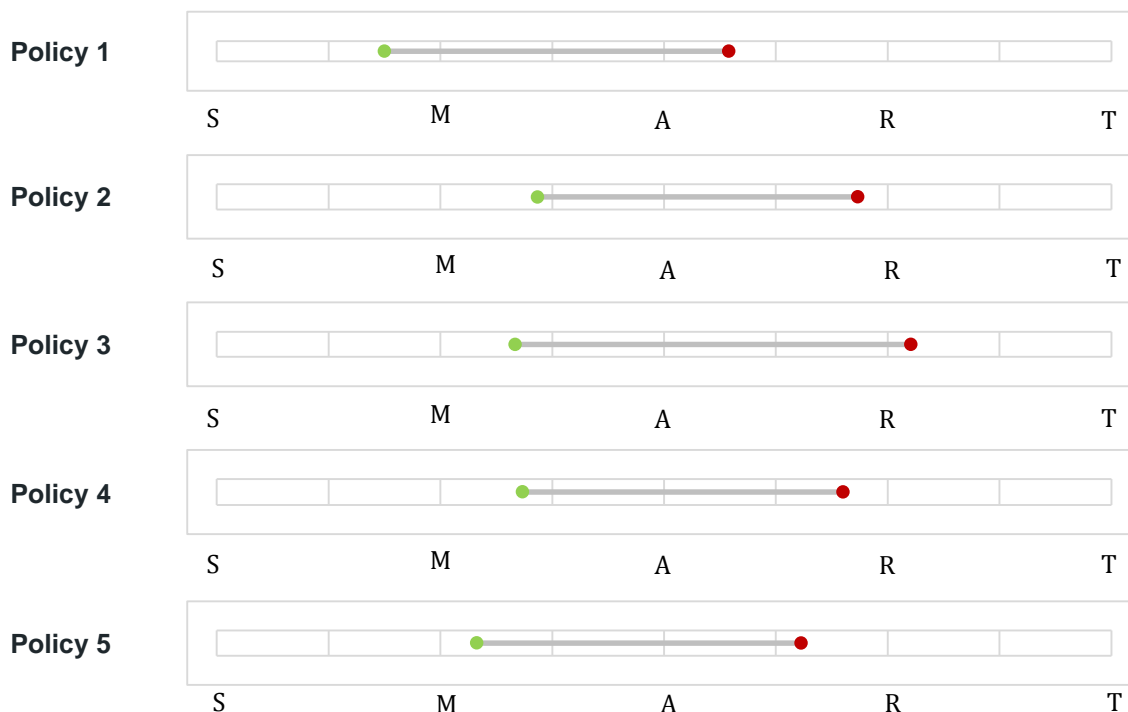
Table 20 shows the results of the classification of the policies included in the group four. All the policies are represented with the numbers presented in Table 16.

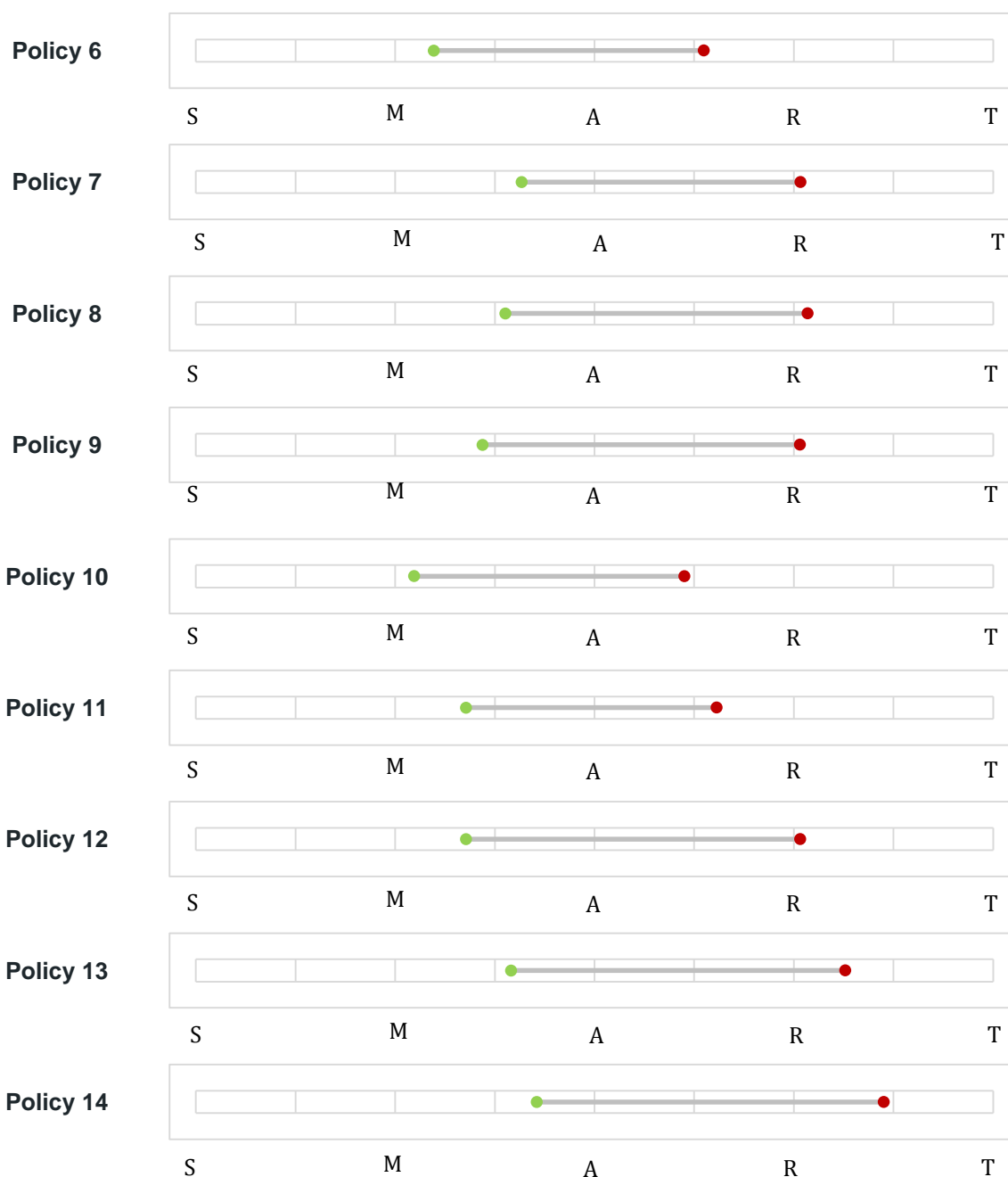
Table 20. Results of the fourth policy group

		S	M	A	R	T	N/A	Average Stage (1-5)
1	Start	43.7 %	37.5 %	18.7 %	0 %	0 %	0 %	1.75
	End	18.7 %	3.1 %	34.3 %	12.5 %	28.1 %	3.1 %	3.29
2	Start	12.5 %	40.6 %	28.1 %	12.5 %	0 %	6.2 %	2.43
	End	0 %	12.5 %	25 %	18.7 %	37.5 %	6.2 %	3.86
3	Start	21.8 %	28.1 %	34.3 %	9.3 %	0 %	6.2 %	2.33
	End	0 %	6.2 %	12.5 %	37.5 %	34.3 %	9.3 %	4.10
4	Start	15.6 %	37.5 %	34.3 %	3.1 %	3.1 %	6.2 %	2.36
	End	0 %	3.1 %	31.2 %	40.6 %	18.7 %	6.2 %	3.8
5	Start	18.7 %	46.8 %	28.1 %	3.1 %	0 %	3.1 %	2.16
	End	0 %	15.6 %	28.1 %	31.2 %	21.8 %	3.1 %	3.61
6	Start	21.8 %	40.6 %	28.1 %	6.2 %	0 %	3.1 %	2.19
	End	6.2 %	15.6 %	15.6 %	37.5 %	21.8 %	3.1 %	3.54
7	Start	9.3 %	34.3 %	34.3 %	12.5 %	3.1 %	6.2 %	2.63
	End	3.1 %	6.2 %	9.3 %	40.6 %	34.3 %	6.2 %	4.03

8	Start	9.3 %	37.5 %	31.2 %	9.3 %	3.1 %	9.3 %	2.55
	End	3.1 %	6.2 %	9.3 %	34.3 %	37.5 %	9.3 %	4.06
9	Start	18.7 %	34.3 %	31.2 %	15.6 %	0 %	0 %	2.43
	End	3.1 %	9.3 %	12.5 %	31.2 %	43.7 %	0 %	4.03
10	Start	28.1 %	43.7 %	21.8 %	3.1 %	3.1 %	0 %	2.09
	End	9.3 %	12.5 %	21.8 %	31.2 %	21.8 %	3.1 %	3.45
11	Start	25 %	31.2 %	25 %	12.5 %	3.1 %	3.1 %	2.35
	End	9.3 %	6.2 %	21.8 %	34.3 %	25 %	3.1 %	3.61
12	Start	18.7 %	40.6 %	25 %	9.3 %	3.1 %	3.1 %	2.35
	End	0 %	6.2 %	18.7 %	37.5 %	34.3 %	3.1 %	4.03
13	Start	18.7 %	18.7 %	46.8 %	9.3 %	3.1 %	3.1 %	2.58
	End	0 %	3.1 %	6.2 %	50 %	37.5 %	3.1 %	4.25
14	Start	18.7 %	18.7 %	37.5 %	15.6 %	6.2 %	3.1 %	2.70
	End	0 %	0 %	12.5 %	28.1 %	56.2 %	3.1 %	4.45

The following graphs represents in which stage should each policy of the fourth group starts, based on the expert's answers:





Based on the results, in order to allocate the policies to a stage, in most of the cases the mode stage corresponds to the stage where the policy was placed by the SMR team in the MM validating it.



There is a particular case in which the SMR team disagree with experts and the order proposed by the experts has been changed. When ordering the policies within the fourth policy classification, experts defined that the policies shown below should start at the Moderate Stage:

- Policy 2. Develop training courses for citizens and companies regarding resilience based on their specific needs and conduct frequently public drills
- Policy 8. Develop public consultations for the development of resilience action-plans to support their implementation and receive continuous feedback by citizens and stakeholders.
- Policy 9. Develop wider collaborative networks with representatives from the emergency services, CIs, public and private companies, academic entities, media, citizens, and volunteer organizations to ensure the performance of duties, to reflect on and make decisions about the progress of the city's resilience.

However, the SMR team agreed during the workshops that these policies should be implemented at the Robust Stage where the number of stakeholders is higher. In the case of citizens or public and private companies, as it has been seen in the first Delphi questionnaire, their involvement in the Maturity Model starts in the Robust Stage so it would not make sense to involve them in previous stages. This issue was discussed during the workshop in Vejle and all the SMR partners agreed with the classification of these policies.

Finally, analyzing the results of the estimation of the number of years that a policy needs to be completely developed, the experts' did not reach a consensus. The reason is that each city has its own characteristics and problems. Thus, to implement a specific policy each city will need more or less time than others.



4 SUMMARY AND CONCLUSIONS

The Delphi method applied to validate the City resilience definition and the Resilience Maturity Model has been a very useful tool. It has reduced the confrontation and inhibited effects within interacting groups, while at the same time retaining the power of combined knowledge of a group of experts.

Multidisciplinary experts from different sectors (Critical Infrastructure, Climate Change, Social Issues) and different levels (City representatives and European Dimension) took part in this Delphi process. In the first round of the Delphi process 41 experts of 71 (57.75%) collaborated and finally 32 experts completed the entire process.

As outcomes of this process, first an improved version of the City Resilience definition was achieved. In addition, descriptions of the five stages of the Maturity Model as well as comprehensive stakeholder involvement in the development of the model were obtained. At the beginning there was less consensus found in the description of the early stages of the Maturity Model (Starting and Moderate) so they needed to be reformulated. In the case of the stakeholder, it has been seen that their involvement increased in the later stages. Furthermore, the classification of a set of resilience building policies based on the maturity stage was completed. The information about the implementation timeline of the policies was used as input for defining more concrete and specific policies that need to be implemented at the different stages of the maturity model. Therefore, the evolution of the general policy over time was provided by disaggregating the general policy into specific policies that need to be implemented at each stage.

However, one of the limitations of using average values when determining the implementation timelines of the policies is that most of them start very close to Moderate stage and finish very close to Advanced stage. This is because the average values are always in the middle values and therefore, very few policies start in the Starting stage and finish in the Vertebrae stage. This limitation was taken into account when defining the Maturity Model and therefore, a more qualitative analysis of the data was carried out when assigning the policies that need to be implemented at each stage of the maturity model.

The general outcome of this report is an expert assessment of resilience implementation approaches and elements that can be adapted to relevant critical infrastructures and the role of the population, rescuers and the media with a view to derive a resilience maturity model (WP2 and WP3). Thus, the results in this deliverable will be mainly used for tasks 2.6 “Development of a preliminary version of the Resilience Maturity Model” and 3.1 “Revised Resilience Maturity Model”.

D1.4: DELPHI ANALYSIS REPORT.



In the future, the names of the policies will be standardized so that all the names follow the same structure when defining them and several indicators will be defined in order to be able to assess the level of each policy.



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ANNEX I. FIRST QUESTIONNAIRE

Smart Mature Resilience: Delphi survey

This Delphi survey is an important task in a major workpackage of the Smart Mature Resilience (SMR) European project funded by the H2020 program's call DRS-7-2014. The SMR project aims to develop a Resilience Management Guideline to improve the resilience level in Europe, focusing mainly on risks and problems derived from critical infrastructures dependencies, climate change, and human dynamics.

This survey requests your expert opinion as part of a Delphi process which aims to consolidate the feedback received from different experts about the resilience building process. The Delphi process will consist of two rounds of questionnaires. Each will take you no longer than 30 minutes to complete it and you will have two weeks to answer. Your responses to the survey will be handled anonymously.

Cities play a key role in any society's resilience building process. The SMR project does not consider cities as isolated entities but as interconnected and interdependent units. Therefore, cities are vertebrae in a strong European resilience backbone (see Figure 1). Actually, the SMR project counts with seven cities as partners (Kristiansand, Donostia, Glasgow, Vejle, Bristol, Rome and Riga).

* Required

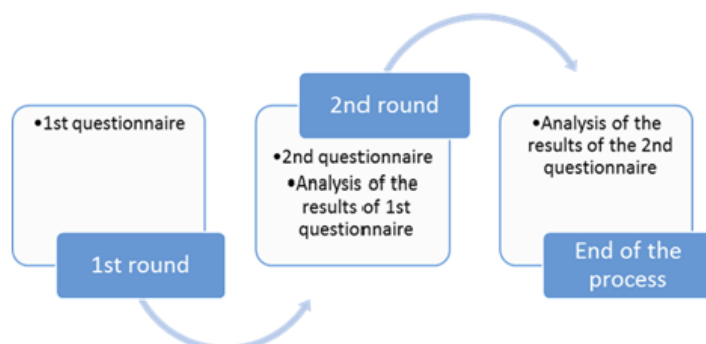
Figure 1: SMR European backbone concept



So far, the SMR project team has developed a city resilience definition and a maturity model that identifies an ideal path with five stages to support cities in the resilience building process. The purpose of this survey is to validate the resilience definition and the maturity model. In addition, we would like to identify the most relevant stakeholders that need to be included in each of these five stages.

In the second round, you will be asked to answer a second survey. We will also provide you with an anonymous summary of the opinions gathered in the first round so you can review it and analyze the level of consensus among the participants – and see your own position with regard to the others. After the second round, we will send you a summary of the results.

Figure 2 gives you an overview of the process:



We would like to thank you for helping us. If you have any questions regarding the survey or the project, please send an email to Josune Hermantes (jhermantes@tecnun.es) and Maider Sainz (msainz@tecnun.es).

General questions

1. To help us contact you in relation to future iterations of the survey, we kindly ask you to provide your email address in the box below. *

2. Please, specify the name of the company/organization you are working for: *

3. Please, specify your job title. *

4. How long have you worked in your field? *

Mark only one oval.

- ☐ < 1 year
☐ 1-3 years
☐ 4-10 years
☐ 11-20 years
☐ 21+ years

SMR City Resilience definition

The SMR project has developed the following definition of city resilience:

City Resilience "is the ability of an urban system or community to resist, absorb, adapt and recover from shocks and long-term stresses to keep the city functioning as a functional unit (vertebra) of society's resilience backbone, and to learn from on-going processes through city and cross-regional collaboration to anticipate future demands and strengthen the general preparedness, through an understanding of the risk landscape and developing appropriate risk mitigation strategies".

5. Please, provide your comments and suggestions regarding this definition, and let us know how far you agree: *

MATURITY MODEL – stages and stakeholders

Building city resilience is a complex process that requires the commitment and involvement of numerous stakeholders. The SMR project considers a CITY (in capital letters) as an environment that involves all the relevant stakeholders in the resilience building process, as it is shown in Figure 3.

If you need further information about each stakeholder, please click on this link.

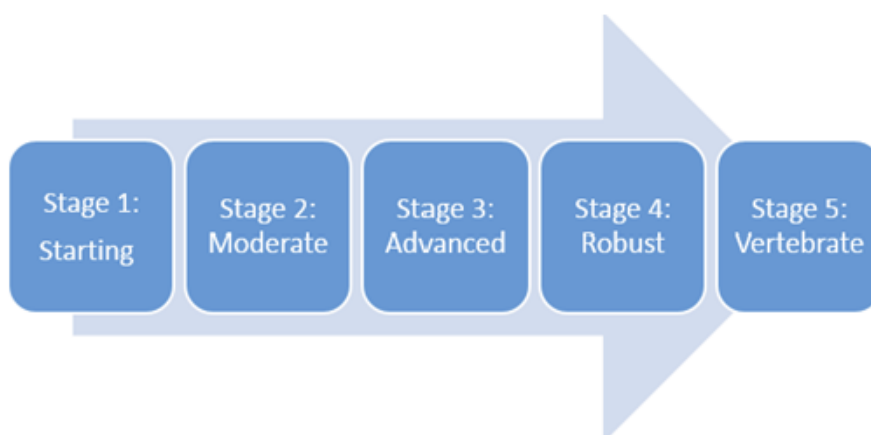
<https://es.scribd.com/doc/310608185/Table-of-Stakeholders-of-the-city-and-their-roles-in-building-city-resilience>

Figure 3: CITY concept – a city that involves all the relevant stakeholders in the resilience building process



In order to guide cities in this resilience building process, the SMR project is developing a maturity model with different stages that serves to guide cities through the ideal path of building resilience. A city will start from one stage, and from there move on to a more advanced stage, passing through a number of intermediate stages. In fact, the cities will define specific resilience building policies for each of the maturity stages taking into consideration the descriptions and requirements of the maturity stages. Note that the implementation of these policies will allow the city to move forward from one stage onto the next. Our maturity model uses the following five stages (see Figure 4): Starting, Moderate, Advanced, Robust, and verTebrate (SMART). So, for a city that starts the resilience building process in the first stage (Starting) it will be necessary to implement all the policies specified in the maturity model for that stage in order to move on to the second stage (Moderate). The same process will continue until achieving the requirements specified in the fifth stage (VerTebrate).

Figure 4: Maturity model stages (SMART)



In this survey, we ask for your feedback on the maturity stages and the level of involvement of the relevant stakeholders in each stage.

Important: Please, be aware that we are using the city concept in the first three maturity stages since all the relevant stakeholders are not still involved in the resilience building process. While we use the CITY (in capital letters) concept in the Robust and VerTebrate maturity stages, where all the stakeholders are already involved in the resilience building process.

Please, review the description of each stage and indicate at what extent you agree with the following statements.

Stage 1: STARTING

The following statements describe the expected outcomes of this maturity stage.

6. Please, review these statements of the stage 1 and indicate at what extent you agree with each of them: *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. So far, the crisis management is based on risk assessment without having an integrated approach towards multi-hazard approach; therefore, any risk assessment is still fragmented and incomplete regarding hazards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The local government recognizes the need to develop an integrated action plan, so that the resilience approach is included in the city's agenda.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The city has programmed policies regarding resilience building, but any efforts to take on this resilience approach are incipient and individual, since there is no collaboration among the relevant stakeholders that are active in the city.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The city has developed a risk assessment to anticipate failures and mitigate risks as an input for the resilience action plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The approach is limited within the city's borders, sub-urban and regional interlinkages are not considered. There is lack of collaboration with sub -urban or regional stakeholders and networks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. A multi-governance* approach with a global dimension is dormant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The city is not part of a larger resilience network.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*The concept of multi-level governance refers to take into account all levels of governance within the city. This approach includes understanding the dynamic inter-relationship within and between different levels of governance and government. The transfer of competencies upwards to supra-national organizations and downwards to sub-national authorities has arguably transformed both the structure and capacity of national governments.

7. Please, provide any comments on this definition. You could use the numbers to refer to each statement. Is anything missing?

8. Which stakeholders should be involved in this first stage? To what extent are these stakeholders relevant for the resilience building process in this first (starting) stage? *

Mark only one oval per row.

	Not relevant	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant	N/A
Local government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical Infrastructure (CI) providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public & Private companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NGOs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic and scientific entities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Are any important stakeholders missing?

Stage 2: MODERATE

The following statements describe the expected outcomes of this maturity stage.

10. Please, review these statements of the stage 2 and indicate at what extent you agree with each of them: *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. The city sets up the organizational structure to manage the resilience action plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. At the same time, a communication strategy is set up that will scale up resilience building efforts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The risk assessment with regard to hazards affecting critical infrastructures and man-made threats is operationalized in cooperation with critical infrastructure providers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The resilience action plan includes a risk assessment for expected events (e.g., floods, power outages etc) that defines measures to rapidly bounce back getting everything working again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The resilience action plan includes policies to be prepared and respond to unexpected events using a holistic approach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Plans have been developed to involve all stakeholders, develop private-public cooperation, include volunteers and organizations and foster a resilience culture among the stakeholders.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The city recognizes the relevance of a multi-governance approach with a global dimension and acts to strengthen the approach, although the resilience management is still fragmented and siloed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The city monitors the implementation of resilience development policies, using control measures, although there is a lack of a formalized resilience management process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The city has started planning for networking with other global cities with regard to resilience and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Please, provide any comments on this definition. You could use the numbers to refer to each statement.

12. Which stakeholders should be involved in this second stage? To what extent are these stakeholders relevant for the resilience building process in this second (moderate) stage?

*

Mark only one oval per row.

	Not relevant	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant	N/A
Local government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical Infrastructure (CI) providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public & Private companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NGOs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic and scientific entities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Are any important stakeholders missing?

Stage 3: ADVANCED

The following statements describe the expected outcomes of this maturity stage.

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14. Please, review these statements of the stage 3 and indicate at what extent you agree with each of them: *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. The city has developed an operational and holistic resilience strategy that integrates all sectors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The resilience action plan implements a risk assessment that includes measures to rapidly bounce back (getting everything working again) and 'bounce forward' (taking opportunities as they come along to thrive under change).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The resilience action plan defines measures to increase the flexibility of city infrastructures to deal with unexpected events and to adapt to on-going circumstances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The progress of the city resilience action plan is monitored using leading and lagging indicators in order to gather information on the progress and effectiveness/impacts of the implemented policies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Fostering community resilience and public & private cooperation is part of the approach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The multi-governance approach with a European dimension is included in the plans, but not yet fully operationalized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The city is member of a major network of European cities with regard to resilience and sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The resilience learning process is formalized through regular debrief meetings to identify the resilience best practices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The public-private cooperation is operationalized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Please, provide any comments on this definition. You could use the numbers to refer to each statement.

16. Which stakeholders should be involved in this third stage? To what extent are these stakeholders relevant for the resilience building process in this third (advance) stage? *

Mark only one oval per row.

	Not relevant	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant	N/A
Local government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical Infrastructures (CIs) providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public & Private companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NGOs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic and scientific entities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Are any important stakeholders missing?

Stage 4: ROBUST

The following statements describe the expected outcomes of this maturity stage.

18. Please, review these statements of the stage 4 and indicate at what extent you agree with each of them: *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. The city has identified all the stakeholders and has engaged the majority of them to its resilience holistic approach, so in this stage we can speak of a CITY. Stakeholders are proactive and perceive value added by resilience on their quality of life and economy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The resilience action plan is evaluated based on regularly collected information and the successes and possible draw-backs of the process are reported, giving feedback for the resilience action plan revision process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The CITY is capable of 'bouncing back', 'bouncing forward', and ensuring protection from impacts for expected and unexpected events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The city resilience action plan is improved and updated based on the feedback and suggestions received from the city stakeholders through consultation processes and participatory platforms.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The multi-governance approach with a global dimension is well developed and operationalized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The city is participating in a variety of important city networks with regard to resilience and sustainability, with a proactive posture and continuous learning transferring knowledge and best practices to be prepared for any unknown events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Please, provide any comments on this definition. You could use the numbers to refer to each statement.

20. Which stakeholders should be involved in this fourth stage? To what extent are these stakeholders relevant for the resilience building process in this fourth (robust) stage? *

Mark only one oval per row.

	Not relevant	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant	N/A
Local government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical Infrastructures (CIs) providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public & Private companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NGOs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic and scientific entities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Are any important stakeholders missing?

Stage 5: VERTEBRATE

The following statements describe the expected outcomes of this maturity stage.

22. Please, review these statements of the stage 5 and indicate at what extent you agree with each of them: *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	N/A
1. The CITY excels regarding its resilience as part of the regional, national and global system resilience, understanding that in order to become resilient the environment needs to be resilient as well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The CITY acts as a vertebra in the European resilience backbone and has an internalized resilience culture.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The resilience action plan is continuously improved based on lessons learned from past events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. 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 can self-organize to help in case a crisis occurs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The CITY acts as a leader in global networks and participates in the definition of resilience standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Please, provide any comments on this definition. You could use the numbers to refer to each statement.

24. Which stakeholders should be involved in this fifth stage? To what extent are these stakeholders relevant for the resilience building process in this fifth (vertebrate) stage? *

Mark only one oval per row.

	Not relevant	Slightly relevant	Moderately relevant	Very relevant	Extremely relevant	N/A
Local government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
European government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical Infrastructures (CIs) providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public & Private companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NGOs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Academic and scientific entities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Citizens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Are any important stakeholders missing?

Thanks a lot for your help!

ANNEX II. SECOND QUESTIONNAIRE

Smart Mature Resilience: Delphi survey

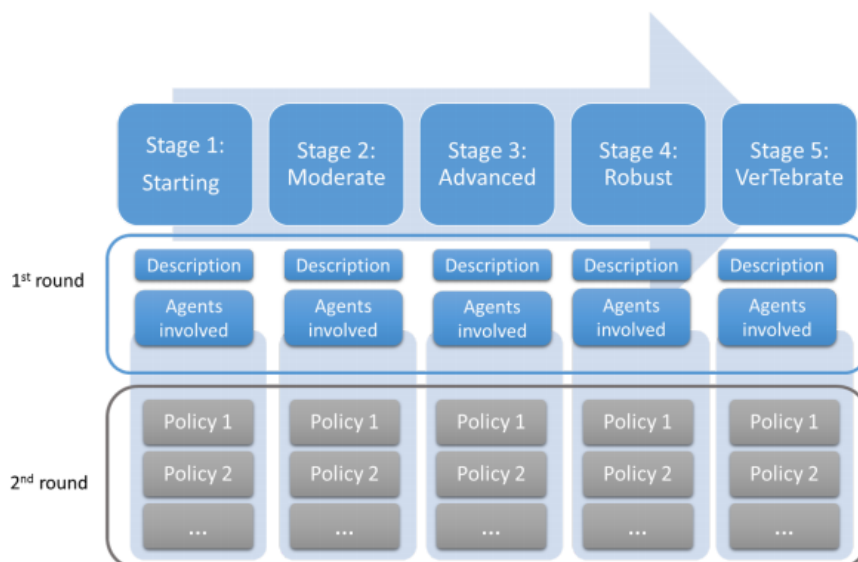
The Smart Mature Resilience (SMR) European project aims to develop a Resilience Management Guideline to improve the resilience level in Europe, focusing mainly on risks and problems derived from critical infrastructures dependencies, climate change, and social dynamics.

In the previous survey sent out by the SMR team, you were asked to give your feedback on the SMR city resilience definition, the description of the five stages included in the maturity model as well as the involvement of the stakeholders in each maturity stage. Thanks to your comments, we have made changes in those statements where there has not been a clear consensus, so in this survey we kindly request that you re-vote concerning your agreement or disagreement on the new descriptions of these statements.

Additionally, in this second round we would like you to classify some resilience building policies based on the maturity stage where they should start to be implemented to achieve highest efficiency (see Figure 1).

* Required

Figure 1: Maturity Model validation process through Delphi methodology: Delphi process- 1st and 2nd round



1. To help us contact you to send the results of the Delphi process after this round, we kindly ask you to provide your email address in the box below *

Maturity Model – stages description

D1.4: DELPHI ANALYSIS REPORT.



In order to guide cities in this resilience building process, the SMR project is developing a maturity model with different stages that serves to guide cities through the ideal path of building resilience. A city will start from one stage, and from there move on to a more advanced stage, passing through a number of intermediate stages. Our maturity model uses the following five stages: Starting, Moderate, Advanced, Robust, and verTebrate (SMART).

Based on the results obtained in the first round, we can say that we have reached a wide consensus in most of the statements that define each maturity stages as well as in the level of involvement of the relevant stakeholders in each stage.

Following, the statements where the consensus has not been reached have been rewritten. Please, review the new description and indicate at what extent you agree with the following statements that define the following maturity stages.

Please, click on this link if you want to see the whole description of each maturity stage.

<https://es.scribd.com/doc/314682923/Link-Delphi-2>

2. Stage 1: Starting *

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree	N/A
1. Different city departments have started developing resilience policies however, a common strategy is still missing. There is no coordination between the different activities conducted by different departments. The relevant stakeholders and sectors work independently from others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The local authority adopts a local governance approach in the resilience building process. The need for a multi-governance* approach is still not recognized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The participation of the local municipality in resilience networks is incipient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The resilience approach is limited within the city's borders. Moreover, there is a lack of collaboration with sub urban or regional stakeholders and networks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please, provide any comments on these statements. You could use the numbers to refer to each statement.

* The concept of multi-level governance refers to take into account all levels of governance within the city. This approach includes understanding the dynamic inter-relationship within and between different levels of governance and government.

MATURITY MODEL – stages and stakeholders

4. Stage 2: Moderate *

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree	N/A
1. The local authority carries out initiatives to increase the awareness level of the different municipal departments to foster a resilience culture among them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The local authority recognizes the relevance of a multi-governance approach and accordingly defines a strategy to strengthen this approach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Please, provide any comments on these statements. You could use the numbers to refer to each statement.

Policies classification

In addition to the description of the maturity stages and the agents involved in each of these stages, the maturity model also includes a set of policies that cities should follow to complete each of the maturity stages. This way, CITIES know the steps they should take to achieve the objectives of each stage.

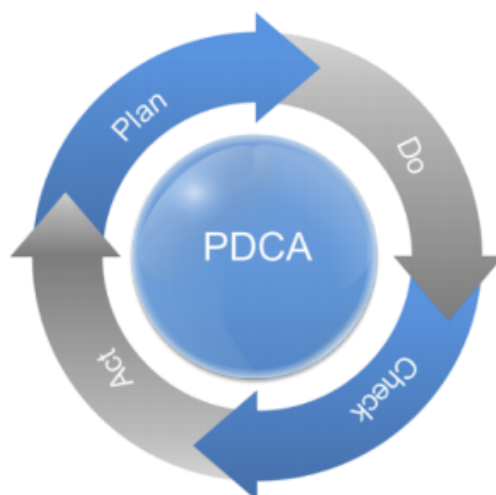
Note that the implementation of these policies will allow the CITY to move forward from one stage onto the next. It should be highlighted that when one CITY progresses to the next stage, it does not mean that it has to forget about previous stages, but that it should at least maintain what it has already achieved or further develop the policies of the previous stages.

In this second round, we would like to ask you to place each policy in the maturity stage that where its development should start.

Important: when you classify one policy in one stage, it doesn't mean that this policy will start and be fully developed in the same maturity stage. The SMR project considers the word 'development' as a PDCA cycle (Figure 2), that consists of a logical sequence of four repetitive steps for continuous improvement and learning.

The PDCA cycle begins with the Plan step that involves identifying a goal or purpose and defining a plan. These activities are followed by the Do step, in which the components of the plan are implemented. Then follows the Check step, where outcomes are monitored to test the validity of the plan for signs of progress and success, or problems and areas for improvement. Finally, the Act step closes the cycle, integrating the knowledge and learning generated by the entire process, which can be used to adjust the goal. These four steps are repeated over and over as part of a never-ending cycle of continuous improvement.

Figure 2: PCDA cycle



In the following sections, you will see a list of policies that help cities to build resilience. Considering the definition of the five maturity stages* (Starting (S), Moderate (M), Advanced (A), Robust (R) and VerTebrate (T)), we would like you to:

- a) Select at which stage each policy should start its development
- b) Select at which stage each policy should finish its development
- c) Estimate the number of years you consider this policy needs to be completely developed.

Following, you can see an example of how to answer these questions. In the case of the first policy we have considered that it starts at the advanced stage and it will be finished at VerTebrate stage. This policy will take around 8 years to be fully developed. On the other hand, the second policy will start and finish its development at the Starting stage, and it will take 1 year.

Please note that if you do not agree with a specific policy, or you do not understand it, just answer N/A in when this policy should be started and finished and write 0 years in its duration.

*Please, click on this link if you want to see the whole description of each maturity stage.

<https://es.scribd.com/doc/314682923/Link-Delphi-2>

Example of how to answer the following questions

1. Policy 1

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Number of years this policy needs to be developed: *

8 years

2. Policy 2

	S	M	A	R	T	N/A
Choose when this policy should be started	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Number of years this policy needs to be developed: *

1 year

Policies classification**6. 1. Develop measures to increase Critical Infrastructures' (CIs) redundancy ****Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Number of years this policy needs to be developed: *

8. 2. Develop measures to increase CIs flexibility **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Number of years this policy needs to be developed: *

10. 3. Develop periodical maintenance procedures to guarantee the correct level of performance of CIs **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Number of years this policy needs to be developed: *

12. 4. Develop a contingency plan aimed at keeping CIs functioning at minimal level in case of disaster **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Number of years this policy needs to be developed: *

14. 5. Develop early warning, monitoring systems to alert for potential arising risks **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Number of years this policy needs to be developed: *

16. 6. Develop an incentive system for public and private sectors to promote the investment in measures that increase the resilience and penalties to those who increase the risk and vulnerabilities **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Number of years this policy needs to be developed: *

18. 7. Set up a disaster relief fund for emergencies **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Number of years this policy needs to be developed: *

20. Please, provide any comments on these policies. You could use the policies' numbers to refer to them.

Policies classification

21. 1. Develop a resilience action plan with short term perspective to prevent and respond to shocks *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Number of years this policy needs to be developed: *

23. 2. Develop a resilience action plan with long term perspective to prevent and respond to shocks and stresses *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. Number of years this policy needs to be developed: *

25. 3. Include the resilience action plan into the local government budget to increase the resilience of the city *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. Number of years this policy needs to be developed: *

27. 4. Develop resilience policies with respect to high risk areas. *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. Number of years this policy needs to be developed: *

29. 5. Develop a list of key assets relevant to cope with known variations and disturbances. *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30. Number of years this policy needs to be developed: *

31. 6. Develop a list of organizational abilities to re-organise structures in response to threat scenarios to fit the needs of the current context (on-going crisis). *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Number of years this policy needs to be developed: *

33. 7. Creation of a resilience department or committee to steer and coordinate the city's resilience action plan *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. Number of years this policy needs to be developed: *

35. 8. Develop a resilience building programme whose aim is to support citizens' initiatives that contribute to increase resilience *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. Number of years this policy needs to be developed: *

37. 9. Develop a legislation framework identifying obligations and constraints to ensure the implementation of resilience action plans *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. Number of years this policy needs to be developed: *

39. 10. Scout and assess current initiatives, projects and funding opportunities such as EU-Projects/Programmes to eventually create joint alliances *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. Number of years this policy needs to be developed: *

41. 11. Develop a strategy for multi-governance approach *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. Number of years this policy needs to be developed: *

43. 12. Embedding standards on resilience guidelines, tools and policies **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Number of years this policy needs to be developed: *

45. 13. Integrate the municipal resilience action plan with regional plans **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46. Number of years this policy needs to be developed: *

47. 14. Integrate the municipal resilience action plan with national plans **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

48. Number of years this policy needs to be developed: *

49. 15. Integrate the municipal resilience action plan with international plans **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

50. Number of years this policy needs to be developed: *

51. Please, provide any comments on these policies. You could use the policies' numbers to refer to them.

Policies classification**52. 1. Develop a list of best practices regarding resilience used in different sectors to include them in the resilience action plan ****Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53. Number of years this policy needs to be developed: *

54. 2. Make resilience policies and activities available in a platform so that they can be replicated by other CITIES *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

55. Number of years this policy needs to be developed: *

56. 3. Arrange public debriefing sessions to facilitate a shared understanding, reflection and discussion on the resilience building process *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

57. Number of years this policy needs to be developed: *

58. 4. Develop a local government resilience website/communication platform that offers secure online space for sharing information to other stakeholders *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

59. Number of years this policy needs to be developed: *

60. 5. Develop partnerships (like research projects) with academic and scientific entities to incorporate technologies, methodologies and tools for developing resilience. *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

61. Number of years this policy needs to be developed: *

62. 6. Develop and maintain an updated internal database of past shocks and current risks for learning purposes, only for local authorities, emergency services and CIs *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

63. Number of years this policy needs to be developed: *

64. 7. Integrate lessons learned from past emergencies in the resilience action plan *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

65. Number of years this policy needs to be developed: *

66. Please, provide any comments on these policies. You could use the policies' numbers to refer to them.

Policies classification

67. 1. Develop technical training and emergency drills *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

68. Number of years this policy needs to be developed: *

69. 2. Develop training drills for citizens and companies regarding resilience based on their specific needs *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

70. Number of years this policy needs to be developed: *

71. 3. Develop a culture of resilience by organizing resilience awareness activities, such as campaigns, events and training activities *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

72. Number of years this policy needs to be developed: *

73. 4. Develop procedures for cross departmental coordination assigning responsibilities, duties and resources regarding the resilience action plan *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

74. Number of years this policy needs to be developed: *

75. 5. Develop a communication strategy to inform the stakeholders about the resilience action plan (gaps, problems, achievements and opportunities) *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

76. Number of years this policy needs to be developed: *

77. 6. Develop a stakeholder engagement plan **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

78. Number of years this policy needs to be developed: *

79. 7. Develop platforms (i.e. databases) that enable the sharing of resilience lessons learned and best practices among CITY stakeholders. **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

80. Number of years this policy needs to be developed: *

81. 8. Develop public consultations for the development of resilience action-plans to support their implementation and receive continuous feedback by citizens and stakeholders. **Mark only one oval per row.*

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

82. Number of years this policy needs to be developed: *

83. **9. Develop wider collaborative networks with representatives from the emergency services, CIs, public and private companies, academic entities, media, citizens, and volunteer organizations to ensure the performance of duties, to reflect on and make decisions about the progress of the city's resilience. ***

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

84. **Number of years this policy needs to be developed: ***

85. **10. Develop and conduct technical resilience assessment meetings prior to and after emergencies, disasters and crisis ***

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

86. **Number of years this policy needs to be developed: ***

87. **11. Formalize the learning process, institutionalizing regular debriefing meetings ***

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

88. **Number of years this policy needs to be developed: ***

89. 12. Develop participation in regional networks to promote initiatives, exchange experiences and increase cooperation *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

90. Number of years this policy needs to be developed: *

91. 13. Develop participation in national networks to promote initiatives, exchange experiences and increase cooperation *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

92. Number of years this policy needs to be developed: *

93. 14. Develop participation in international networks to promote initiatives, exchange experiences and increase cooperation *

Mark only one oval per row.

	S	M	A	R	T	N/A
Choose when this policy should be started	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choose when this policy should be finished	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

94. Number of years this policy needs to be developed: *

D1.4: DELPHI ANALYSIS REPORT.



95. Please, provide any comments on these policies. You could use the policies' numbers to refer to them.

Thanks you for completing this survey – your collaboration is much appreciated!



ANNEX III. EXPERT'S COMMENTS IN THE FIRST QUESTIONNAIRE

SMR City Resilience definition

The SMR project has developed the following definition of city resilience:

City Resilience “is the ability of an urban system or community to resist, absorb, adapt and recover from shocks and long-term stresses to keep the city functioning as a functional unit (vertebra) of society’s resilience backbone, and to learn from on-going processes through city and cross-regional collaboration to anticipate future demands and strengthen the general preparedness, through an understanding of the risk landscape and developing appropriate risk mitigation strategies”.

Please, provide your comments and suggestions regarding this definition, and let us know how far you agree:

Agree to a great extent; I suggest "...risk mitigation and adaptation strategies" rather than risk mitigation only.

I highly agree

A lot of fine words but rather a curate's egg of a definition. Seems to cast cities as isolated from their hinterland and rural environments, it is framed in terms of just risk rather than risk and opportunity. It lacks a dynamic nature and appears in the mode of defensive, fortress building rather than continual testing and training. The monitoring of the external environment seems confined to learning from other cities rather than appreciating global trends and their consequences.

Is a definition needed? Words like resilience and sustainability are slippery, hard to pin down, always opening up more questions as to what you mean by the words used to describe what you mean. As with beauty, resilience is in the eye of the beholder and not something to measure.



Although the statement is fine, there needs to be recognition of the Community Risk Register, which is available on the Scottish Fire and Rescue website. This document details the risk landscape and also the mitigation strategies. A lot of this work has been carried out by the multi-agency groups across the Glasgow Local Resilience Partnership, the West of Scotland Regional Resilience Partnership and also in conjunction with Scottish Government Resilience Division. More information on this can be provided, if required.

Agree. It contains key issues as "self-adaptation" which implies the presence of internal feedback loops (results of knowledge cycles) and "preparedness", which is a further relevant requisite for resilience, which implies a daily analysis and control of the "environment" (i.e. the contrary of actions triggered only by emergency situations)

For me, this definition still mixes resilience and risk management. I also do not understand how the tension between maintaining functions and adapting / transforming is resolved. The role of collaboration is just proclaimed, with unclear purpose and functionality. Mixing all of those components, the definition becomes very fuzzy, long, and almost random.

I'm agree

I agree with the definition. I think it could be shortened to make it a bit clearer, some wording to me could be removed and not change the definition. Something like:
'City resilience is the ability of an urban system of community to resist, absorb, adapt and recover from shocks and long term stresses, and to learn from on-going processes through city and cross-regional collaboration to anticipate future demands and strengthen general preparedness.'

I broadly agree with the definition, would like to see the taking action by cities as more explicit (cities need to be acting as well as understanding, having strategies etc in order to be resilient) and also more explicit the "entire" community - some shocks and stresses will leave large sections of the community able to resist and absorb etc but leave the poorest and most vulnerable most at risk or increase disparity.

To long definition and hard to work With.

- should it be "urban systems and communities?"
- "Keep the city functioning as a coherent unit" rather than as a "functional unit"? Not sure that functioning on its own is sufficient. It's functioning within a recognisable framework. Aleppo is 'functioning!'



- 'to learn from ongoing processes' – 'processes' is so vague in this context to be meaningless
- cut it to just "learn through city and cross regional collaboration..."?
- "increase understanding of the risk landscape" as opposed to through an understanding..."?
- Bit long. Needs to be broken into 2 sentences...?

Agree

I agree upon this definition. I could comment that the Word stakeholders could be in the definition instead of cross-regional collaboration

I agree with the general definition, but it feels a bit wordy, could you drop the last point? 'through an understanding of the risk landscape and developing appropriate risk mitigation strategies'.

agree - although feel it should be expanded to include challenges such as climate change and other more long term stresses more clearly

I agree upon this definition. I could comment that the Word stakeholders could be in the definition instead of cross-regional collaboration

I am quite agree with the definition of SMR City Resilience

Does it need to be that long? Can it be divided in to shorter sentences? It's difficult to read.

I think it's a good definition. I see the picture of a robust and intelligent city in my mind when I read it.

Local governments are the closest level to the citizens and to their communities and as such must be prepared of all risks to the local society. the definition is good.

Agree

me parece una definición brillante. Honestamente, no conocía este concepto de resiliencia para las ciudades. Es una perspectiva muy interesante para ir acercándonos a modelos de ciudades que respondan a las necesidades de los hombres y mujeres que viven en ellas y sus proyectos de vida y felicidad.

Generally ok but there are two aspects I would make suggestions on. Firstly, as per the 100RC definition I like the idea of scale so that it includes individuals, communities, organisations and systems. Secondly, I would like a more positive definition which focuses on the possibility of "bouncing forward" and yielding a resilience dividend so that investment in resilience brings a virtuous circle of co-benefits.



A resilient city is also well placed to take advantage of its resources, particularly resources stemming from people and communities. It is democratic and inclusive and devolves power and decision making as close as possible to the people who decisions affect. The city population are adept and confident in taking part in such processes.

I think there out to be an element of growth included here - learning from experience and becoming stronger as a result

I Agree

While I agree with the definition I feel that it could be more concise. I do not think the "functional unit (vertebra) of society's resilience backbone" section should be included in the definition of city resilience, though I understand that it has been included within the context of the SMR project as a whole.

suggestions:

in general simple=clear so can be shortened. Short concise sentences specifying the different aspects

- add short-term shocks,

to keep the city functioning as a functional unit (vertebra) of society's resilience backbone "

this is not very clear , change

Not much reference to whom (general categories) this definition is referred to citizens, policy makers, services etc. Maybe worth adding something on this aspect.

I do agree

I agree. However, I find this definition "very scientific" and less devoted to the "practical impact on the city". I believe a stronger focus on socio-ecological aspects of the city should be emphasised in the definition of city resilience.

Agree

Anticipate future (known and unknown) demands...and bounce forward based on the threats that is envisioned.

I agree to the definition. "..., and to continuously learn from on-going



I agree. Is the urban system including also citizen? it's important to clarify

OK, but I miss sustainability

The definition contains a lot of good aspects. I agree.

Would add to anticipate not only future demands but changing patterns of future risks, through mitigation and forecasting/modelling methods

agree in general and my offer is to add "... and action plans"

Stage 1: STARTING

- 1. So far, the crisis management is based on risk assessment without having an integrated approach towards multi-hazard approach; therefore, any risk assessment is still fragmented and incomplete regarding hazards.**
- 2. The local government recognizes the need to develop an integrated action plan, so that the resilience approach is included in the city's agenda.**
- 3. The city has programmed policies regarding resilience building, but any efforts to take on this resilience approach are incipient and individual, since there is no collaboration among the relevant stakeholders that are active in the city.**
- 4. The city has developed a risk assessment to anticipate failures and mitigate risks as an input for the resilience action plan.**
- 5. The approach is limited within the city's borders, sub-urban and regional interlinkages are not considered. There is lack of collaboration with sub -urban or regional stakeholders and networks.**



6. **A multi-governance* approach with a global dimension is dormant.**
7. **The city is not part of a larger resilience network.**

Please, provide any comments on this definition. You could use the numbers to refer to each statement. Is anything missing?

I'd consider sharing of competencies and of knowledge, rather than "transfer of competencies"

I have answered the questions from a general perspective - the answers does not give the present status for Vejle.

What do you mean by 'local government recognises'? Some people, even many people, in local government jobs may recognise the need but the authority as an entity doesn't recognise (it can't even think) - some level of management may issue a formal document that says the authority recognises...

You talk about the 'city' here but it is not the CITY as defined. So what do we mean - is it the local authority that represents the citizens? For example some stakeholders may be part of larger resilience networks

The described scenario is typical of the current situation in many cities, where there is a "linearized" approach to complexity (each sector defines its resilience strategy INDEPENDENTLY from the others). City is internally divided into sectors and, moreover, cities belonging to the same districts do not have a common shared resilience strategy. It thus seems a good starting point for setting up a resilience-enhancing strategy.

Not sure if there is any "stage 0"? Here, we assume already considerable activities, and I was wondering what the baseline is.

On (4): this assumes the existence of a resilience action plan...

I think the definition is ok. I would add that this is an acknowledgement of the limits of 'city' sovereignty. It is important as multi-level governance is an 'interdependency' and there are costs and benefits to the relationship, in terms of resilience. Understanding what is within the power of city's to deliver is key to understanding the resilience of a city and predicated on understanding multi-level government.



Agree

Tampoco conocía este concepto. analizándolo, me cuesta ver qué se haya desarrollado en mi entorno. Por la distribución compentencial que tenemos en la CAV, en el territorio y la ciudad, bastante complejo observo importantes dificultades en lo referente a este concepto de gobernanza multinivel.

Re #7 not sure what this means

I don't consider the development of a "risk assessment" within a "starting stage"

A general consideration: How hierarchical is the organization and how much freedom is there for the individual employee or middle manager to launch 'resilience activities'??

It's complete

Charter for Multilevel governance in Europe contains word "interdependence" but it does not conflict with the text above

Local government

Regional government

National government

European government

Emergency services

Critical Infrastructure (CI) providers

Public & Private companies

Media

NGOs

Academic and scientific entities



Volunteers

Citizens

Are any important stakeholders missing?

Maybe the "active citizenship", although it can be included into "Citizens" "Volunteers" and "NGOs" altogether

National Health Service, Housing Providers (e.g. Wheatley Group / Glasgow Housing Association)

No

Might be covered by volunteers, but voluntary and community groups are also important.

no

I believe Civil servant units or military forces are under the definition of National government

Where do non-emergency health providers fit into this picture?

I believe Civil servant units or military forces are under the definition of National government

I think public and private companies should be separated into 2. I.e at this stage I wouldn't expect the engagement of business to the same extent of public organisations like health boards, environmental protection bodies, social housing providers etc.

NO

no.

Educational institutions

Community groups and religious institutions



depending on recognized types of disaster involvement of the resources of the material reserves in the disaster management upon the written permission of the Minister for Interior or the authorised official thereof

Stage 2: MODERATE

- 1. The city sets up the organizational structure to manage the resilience action plan.**
- 2. At the same time, a communication strategy is set up that will scale up resilience building efforts.**
- 3. The risk assessment with regard to hazards affecting critical infrastructures and man-made threats is operationalized in cooperation with critical infrastructure providers.**
- 4. The resilience action plan includes a risk assessment for expected events (e.g., floods, power outages etc) that defines measures to rapidly bounce back getting everything working again.**
- 5. The resilience action plan includes policies to be prepared and respond to unexpected events using a holistic approach**
- 6. Plans have been developed to involve all stakeholders, develop private-public cooperation, include volunteers and organizations and foster a resilience culture among the stakeholders.**
- 7. The city recognizes the relevance of a multi-governance approach with a global dimension and acts to strengthen the approach, although the resilience management is still fragmented and siloed.**
- 8. The city monitors the implementation of resilience development policies, using control measures, although there is a lack of a formalized resilience management process.**



9. The city has started planning for networking with other global cities with regard to resilience and sustainability.

Please, provide any comments on this definition. You could use the numbers to refer to each statement.

In my opinion, the definition is very accurate and complete. But, I think the definition as a whole is relevant to a more advanced stage of maturity. This observation is also applicable to the first stage of maturity, which describes a level that doesn't appear at the very beginning, but fairly developed already.

Clarity needed around what we mean by 'city'. At this Moderate stage it seems to be a question of how well aware stakeholders are of the final 'resilience' destination. It's all about setting things up ready to move to the next stage.

This is the step of improving the global awareness, of the identification of the holistic nature of the resilience problem. The major outcome of step 2 is to grow sensibility around the global vision that should encompass the efforts, the set up of a multi-governance system, the beginning of a real collaboration among CI operators and other stakeholders. All should be endorsed and driven by Local Government (municipality, civil protection or other, depending on the different national policies and legal commitments).

(3) and (4) should be in stage 1. Not sure how (7) could be measured or in how far simply good intentions will help - find it irrelevant.

Not keen on the emphasis on plan writing in point 6, although fostering a resilience culture among stakeholders is very important.

Not sure what the second half of point 7 adds - I would leave it at the recognition of the relevance of a multi-governance approach.

I think 8 & 9 might be a bit advanced for the 'moderate' stage of the model.

no 3. why the distinction on man-made events? Is this necessary?

These activities - especially networking with other cities - feels perhaps too advanced for Stage 2.

Number 4 is really important but should actually start in stage 1 S - as with the RSQ this is also a method of engagement and debate that is helpful for initial stakeholder involvement.

None



Local government

Regional government

National government

European government

Emergency services

Critical Infrastructure (CI) providers

Public & Private companies

Media

NGOs

Academic and scientific entities

Volunteers

Citizens

Are any important stakeholders missing?

National Health Service and Housing Providers i.e. housing associations

No

no

no

Transport providers as well as CI

no

Educational institutions



Stage 3: ADVANCED

- 1. The city has developed an operational and holistic resilience strategy that integrates all sectors.**
- 2. The resilience action plan implements a risk assessment that includes measures to rapidly bounce back (getting everything working again) and 'bounce forward' (taking opportunities as they come along to thrive under change).**
- 3. The resilience action plan defines measures to increase the flexibility of city infrastructures to deal with unexpected events and to adapt to on-going circumstances**
- 4. The progress of the city resilience action plan is monitored using leading and lagging indicators in order to gather information on the progress and effectiveness/impacts of the implemented policies.**
- 5. Fostering community resilience and public & private cooperation is part of the approach.**
- 6. The multi-governance approach with a European dimension is included in the plans, but not yet fully operationalized.**
- 7. The city is member of a major network of European cities with regard to resilience and sustainability.**
- 8. The resilience learning process is formalized through regular debrief meetings to identify the resilience best practices.**
- 9. The public-private cooperation is operationalized**



Please, provide any comments on this definition. You could use the numbers to refer to each statement.

Same observation as of the stage 2: the complete definition is almost perfect, but it describes a level that is more than simply advanced

At this stage, local and regional scale should be ready to form an unicuum, sharing resilience policies, contingency plans. Citizens should be asked for playing an active role (as "probe" and as part of the strategy for implementing the resilience strategies). Integration of cities in a EU-wide network of cities (sharing best practices, comparing adopted resilience strategies, comparing resilience scores based on commonly adopted metrics etc.) is also a good point of step 3.

(2) for me, "bounce back" and "bounce forward" cannot be combined; in this phase it should only be "bounce forward", in line with the need for flexibility and agility for instance in (3). (9) should be in M stage.

Again this feels quite advanced (when I think of Bristol)

Re number 3 - i feel that data gathering and preliminary analytical conversations must be initiated in an earlier stage to define availability of data sources and any percieved data gaps.

none

Local government

Regional government

National government

European government

Emergency services

Critical Infrastructure (CI) providers

Public & Private companies

Media

NGOs



Academic and scientific entities

Volunteers

Citizens

Are any important stakeholders missing?

National Health Service and housing providers such as housing associations

No

no

Educational institutions

In addition to infrastructure owners there are also cross sector IT services.

Stage 4: ROBUST

1. The city has identified all the stakeholders and has engaged the majority of them to its resilience holistic approach, so in this stage we can speak of a CITY. Stakeholders are proactive and perceive value added by resilience on their quality of life and economy.

2. The resilience action plan is evaluated based on regularly collected information and the successes and possible draw-backs of the process are reported, giving feedback for the resilience action plan revision process.

3. The CITY is capable of 'bouncing back', 'bouncing forward', and ensuring protection from impacts for expected and unexpected events



4. The city resilience action plan is improved and updated based on the feedback and suggestions received from the city stakeholders through consultation processes and participatory platforms.

5. The multi-governance approach with a global dimension is well developed and operationalized.

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

Please, provide any comments on this definition. You could use the numbers to refer to each statement.

Not sure what a multi-governance approach with a global dimension means, what does it look like? If we are now talking about a CITY do we understand the mechanisms for decision making? Will there be tensions between opportunism and democratic processes? The analysis so far seems to ignore power and control processes - resilience is a political issue and can have major implications when it comes to attempts to transform systems as it tends to reinforce the status quo.

(5) Too vague; what does that mean concretely? (2): I think it should be (4), and actually I would like to see a citizen science approach to data collection. (3) see previous stage.

All stakeholders - who are they? Is there any numbers to all stakeholders? Norwmally it will depend on the crisis and situation

Can something be added about education (of the whole population) and the inclusion of young people in particular?

Local government

Regional government

National government



European government

Emergency services

Critical Infrastructure (CI) providers

Public & Private companies

Media

NGOs

Academic and scientific entities

Volunteers

Citizens

Are any important stakeholders missing?

National Health Service and Housing Providers, such as housing associations

No

no

none

Educational institutions

Stage 5: VERTEBRATE

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

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



- 3. The resilience action plan is continuously improved based on lessons learned from past events.**
- 4. 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 can self-organize to help in case a crisis occurs.**
- 5. The CITY acts as a leader in global networks and participates in the definition of resilience standards.**

Please, provide any comments on this definition. You could use the numbers to refer to each statement.

The definition seems to some extent redundant with the "Robust" stage. I suggest to do a slight downgrade of the "Starting" definition, and to include some of the "Vertebrate" definition into the "Robust" stage. As a result, the stages would be 4 instead of 5.

Well at last the idea comes in at 1. that resilience is about looking out for others as much as for self. This final stage should really be about what a CITY can do for all and any other community. It should be past just understanding but into activity to build resilience elsewhere.

3. is to be commended but extended to be a process of reflection on the whole city where the concept of social cohesion is thought through. Who is marginalised and not able to participate?

Where do we bring in the ideas of stress testing, trialling of responses, gaming - the analogy is sports training.

An internalised resilience culture ... nice phrase, what does it mean? Do we foresee companies sacrificing efficiency for redundancy, will local authorities regulate development to assure facilities to maintain and improve personal resilience etc. Lots to think about.

(1) the city understands that it cannot control the environment. (3) The revisions should be forward-looking and participatory, not based on past events. (2) mixes internal culture and external backbone. To me, these are two components. (both of them important!)



I Wonder if this is possible to achieve, and if it should be achieved. What is the Next step? How to develop? resilience is a continuous work and process.

Is there something about resilience impacts being embedded in decision making across sectors - in development policies in Local Government, to business growth strategies in city businesses to business plans (and curriculums) for local schools and colleges

There does not seem that much difference between Stage 4 and 5. I think that all stages need to be revisited to make stages 2 and 3 "lower" stages of resilience to create space between 4 and 5

I think self organisation of communities is actually quite a basic thing in resilience. However, the self organisation must be operationalised as part of a fully integrated approach.

I think number 3 should be happening throughout every single stage of resilience. Although the sophistication of this methodology would develop.

I also think that the resilience action plan at this stage should be addressing interdependencies between long term stresses and acute shocks.

None

The CITY has initiated online educational methods and strategies in resilience to reach different target groups.

Local government

Regional government

National government

European government

Emergency services

Critical Infrastructure (CI) providers

Public & Private companies

Media

NGOs



Academic and scientific entities

Volunteers

Citizens

Are any important stakeholders missing?

National Health Service and Housing Providers, such as housing associations

No

no

none

Primary and Secondary Educational Institutions - teaching an understanding of the environment, how to care for it and the impact of environmental degradation is central to long-term sustainability and resilience.

Educational institutions practicing online training

ANNEX IV LIST OF STAKEHOLDERS

Stakeholders of the city	Roles in building city resilience
Local government	Local government includes the different departments of the city council and it is considered as the institutional level closest to citizens. It provides a strategic planning vision to better prepare the city to respond to disaster risks and improves health, well-being and education. Furthermore, local government is responsible for ensuring the continuity of services in the city.
Regional government	A regional government is a government entity that has a control on a specific area that may include different cities.
National government	A national government is the political authority that controls a nation. The national government is responsible for maintaining security and stability and for establishing national laws and enforcing them.
European Legislative Body	The EU government is made up of the government of the EU Member States and it is the highest political authority in the EU. It is responsible for setting overall EU policy
Emergency services	The emergency services include entities that manage emergencies such as civil protection units and managers, as well as entities that are on the front line of emergencies such as police, firefighters, military forces and health care services. The role of these entities is to provide security and safety to citizens by reducing, preparing and responding to disaster risks.
Critical infrastructure providers	<p>Critical infrastructures provide essential needs to the citizens such as health care, transportation, telecommunications, water, energy etc. Their adequate functioning in case of emergencies is crucial.</p> <p>This stakeholder also includes the Health Service, not only focused on emergencies.</p>

Media	Media includes the local newspapers and radio and television channels. They play an important role disseminating hazard information and early warning measures in an easy to understand and accessible manner.
Academic and scientific entities	Academic and scientific entities include universities and research centers. They contribute to increasing the knowledge and the development of methodologies and technologies to better mitigate and prepare for, respond to, and recover from emergencies.
Public and private companies	Public and private companies include consultancies, insurance companies, and businesses. Many services depend on city structures, and thus companies need to be engaged in awareness raising and training programs so that they are able to prepare and respond to emergencies.
Citizens	Citizens play a vital role in initiating action by advocating for change and influencing decisions from the local government. Citizens need to be empowered to act responsibly in emergencies.
Volunteer organizations & NGOs	<p>Volunteer organizations include youth organizations, churches, day centers, community emergency response organizations. These organizations may be funded by governments, business or private persons and provide support such as food and shelters.</p> <p>An NGO is an organisation that is neither a part of a government nor a conventional for-profit business. Usually set up by ordinary citizens, NGOs can act as support or lobbying bodies, encouraging others to be prepared or plan ahead in case of emergencies.</p>