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**POLICY BRIEF
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EXECUTIVE SUMMARY

The Smart Mature Resilience (SMR) project responds to the need for resilience in European cities and offers concrete policy measures to further increase cities' maturity and capacity to absorb and bounce back from shocks. Within SMR's framework, seven cities and four universities are working together to co-create tools that support policymakers in making informed decisions to develop their cities' resilience.

This first SMR policy brief summarizes the key points to be articulated to city-level policymakers following on from the Smart Mature Resilience project. It presents the following main issue statements:

1. **European cities need to become more resilient.**
2. **Resilience-building supports livelihoods, improves quality of life and saves cities money.**
3. **Resilience relies on adaptable critical infrastructures, dynamic social interactions and the capacity to withstand and accommodate the effects of climate change.**
4. **Resilience-building involves integrating disaster risk assessment into city management processes and improves land use planning.**
5. **Holistic assessment and decision-making in cities can enhance resilience in Europe.**
6. **Building city resilience involves education and capacity-building and is a transgenerational investment in the future of a city, region or community.**
7. **The SMR project has developed tools to assess and build cities' resilience.**
8. **The SMR project results can inform the policymaking process towards developing resilience.**

This document provides a definition of resilience, the policy context and activities to build resilience in cities and demonstrates how the tools produced by the SMR project can support the following activities: assessing resilience maturity, identifying and implementing resilience-strengthening strategies, understanding risk systemicity and enhancing stakeholder engagement. This document also notes three standards that are central to resilience development and concludes with the recommendation that city-level policy-makers continue to work on fostering and mainstreaming resilience through local action, in the context of a global resilience-building efforts.

IN A NUTSHELL

The Smart Mature Resilience (SMR) project responds to the need for resilience in European cities. Seven cities and four universities are working together to: 1) co-create tools supporting city-level policymakers to make informed decisions concerning resilience and 2) develop a European Resilience Management Guideline. These tools provide guidance to cities and local governments in order to assess their local resilience status and set measurable targets, together with local stakeholders. The five Resilience Tools developed through SMR helps to define a guiding operational framework, along with training to support municipalities and relevant stakeholders in implementing an integrated management system that fosters city resilience.

This policy brief summarizes the policy-relevant results of the SMR project for policymakers working on European urban issues that are relevant to resilience. The results of this project have been produced directly by and with the local governments of three core cities, Donostia/San Sebastian, Glasgow, and Kristiansand, (henceforth Tier-1 cities) and consolidated closely with a second group of cities, Rome, Riga, Bristol, and Vejle (henceforth Tier-2 cities). Also, to further ensure the political and contextual relevance of the solutions developed, a third tier of cities has been engaged as a sounding board. This ensures that the following information and recommendations are directly relevant to city managers and policymakers, and, by extension, national and European policymakers. The Tier-3 cities are: Amman, Athens, Malaga, Malmö, Manchester, Münster, Reykjavik, Stirling, and Thessaloniki.

Strategic resilience planning feeds can influence and support a range of fields, including: risk management, critical infrastructure protection, urban planning, environmental planning, climate change adaptation, security and civil protection, international cooperation development, education, and crisis management.

WHAT IS CITY RESILIENCE?

A review of 119 worldwide and approximately 170 European research articles showed that the concept of resilience is very general and tends to mean different things within different contexts. The SMR Project has defined City Resilience as:

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

STATEMENT OF ISSUE

European cities are changing socially and populations are ageing. Climate change is increasing weather events such as storms, floods and heat waves. Human-made disasters such as terrorist attacks, which previously happened only every 4-5 years in European cities, are now occurring several times a year.

As these threats and trends become more frequent and intense, cities risk social, infrastructural, environmental and economic decline. It is crucial to face these new realities and build resilience to current and future challenges. Essential to this process are strong and robust governance and political frameworks which enable policymakers and authorities to make well-informed decisions that benefit the wider public, ensure continuous political support, and secure and anchor resilience in long-term city planning.

A proactive approach to resilience can generate wide-reaching benefits across cities' social, environmental and economic systems and make them a better place to live. Investing in resilience can save cities significant costs when disasters are averted entirely or at the least well-handled – enabling economic systems to recover quickly and cities' core operations to continue without major disruption. The following are key themes of particular relevance for increasing investment in resilience and contributing to the Sustainable Development Goals:

- 1** Resilience supports livelihoods, improves life quality and reduces poverty
- 2** Resilience involves land use planning that integrates consideration and assessment of disaster risks into existing processes
- 3** Resilient cities manage and protect their (critical) infrastructure, while also connecting it to continuous productivity and extensive development investment
- 4** Resilience involves education and capacity building, which then translates into transgenerational investment in the future of a city, region, community

Resilience involves protecting and safeguarding housing, and can support social equality and security. Planning for resilience and anticipating risks at various levels of government is essential to ensure the on-going operation of critical infrastructure and social services, and to arrive at solutions in the case of a crisis.

Given that this is an undertaking that affects a broad range of city departments and external stakeholders, involving them in a cross-sectoral resilience-building strategy is of paramount importance. With this in mind, the SMR project is developing tools for multi-sectoral application to assess and build urban resilience.

POLICY CONTEXT

At a global scale, the UN 2030 Agenda for Sustainable Development identified climate change adaptation and disaster risk reduction as two of its main goals (EEA, 2017). The 21st Conference of the Parties (COP21) and its Paris Agreement on Climate Change (UNFCCC) further enforced this mandate by adopting for the first time the concept of climate adaptation and emphasizing its importance.

On the EU level, the EU „Adaptation Strategy to Climate Change“ (2013) formed a turning point in the understanding of the concept of resilience within the EU context by expanding it beyond simply vulnerability, or “lack of resilience” to include other aspects, transforming ‘resilience’ into a broader concept.

More specifically, this broader perspective moved beyond the idea of protection to acknowledge the essential role

played by interdependencies amongst infrastructure and the cascading effects that a disruption in one may trigger. In this way, the policy context of resilience in cities can be extended to account for unexpected and novel events and the capability of a system to self-organize and cope. This applies not only to climatic effects but also to social dynamics.

The concept of city resilience in the three fields mentioned so far (critical infrastructure, climate change, social dynamics) still lacks widespread operationalization and examples of practical implementation are few. These are therefore the focus areas of SMR’s work. The recent flood in Kristiansand (October, 2017) is a good example of the urgency to act and the relevance of the SMR project, as portrayed by the following statement of Professor Jose J. Gonzalez, the University of Agder (UiA):

»The serious flooding this autumn drew attention to the research project, but it’s about so much more than just flooding and extreme weather. In addition to natural disasters, the research project deals with how cities can prepare for and handle conditions such as heat waves, juvenile delinquency and economic changes. Several of the models have already been tested and have already achieved good results in cities such as Vejle and Glasgow. In both cities, they have managed to turn economic recession into new optimism and growth.«

STAGES OF RESILIENCE MATURITY

Within this European policy context on adaptation, and factoring in cities’ different needs and priorities in order to effectively build resilience, the SMR project has identified five stages of resilience maturity, as follows:

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

Figure 1: The resilience maturity stages

Knowing the resilience baseline (starting point) of a city helps local and national policymakers to more wisely and appropriately choose the fields and areas where their policies and efforts need to be concentrated in order to further boost resilience. This knowledge is also useful to policymakers in the EU and worldwide who are particularly interested in facilitating the exchange of knowledge and good practices amongst cities and between different levels of governance (horizontal and vertical upscaling).

With this in mind, SMR is developing and testing tools with cities that guide policymakers in identifying the resilience level of their cities and, on a case-by-case basis, help them in identifying appropriate policy and financial measures. These tools and their relevance to policy makers are discussed next.

ACTIVITIES TO BUILD RESILIENCE IN CITIES

Several tools have been developed in a co-creation process involving cities and researchers as part of the SMR project. These can be applied in order to assess, plan and implement resilience policies at city level and are: the Resilience Maturity Model, Risk Systemicity Questionnaire, and Resilience Information Portal. All phases of the tools' development were closely followed and commented on by the Tier-1 and Tier-2 cities, and, even more so, they were applied practically during Stakeholder Focus Groups in the different cities. These tools support the following activities:

ASSESSING RESILIENCE MATURITY

To enable cities to self-assess their resilience maturity stage, SMR has developed the Resilience Maturity Model which can be used to obtain a clear and simple overview of where action is needed across four priority areas: Leadership & Governance, Preparedness, Infrastructure & Resources, and Cooperation (Figure 1).

RESILIENCE DIMENSIONS

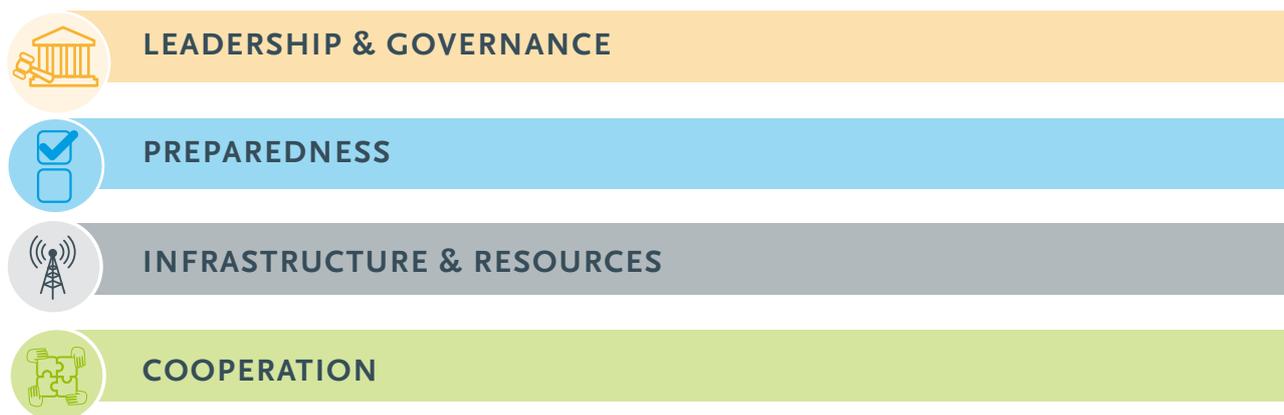


Figure 2: The resilience maturity model dimensions

The choice of the four priority areas was the result of extensive research and analysis of various existing frameworks. This analysis (Oxley, 2013; Lu and Stead, 2013; UNISDR, 2015) indicated the necessity of an integrated approach to city planning and development across governmental institutions (Leadership & Governance). A resilience-focused approach also emphasizes the need to be prepared for a wide range of disasters, both short-term

and long-term, that are not necessarily predictable (Preparedness) (Desouza, 2014; Lu and Stead, 2013; 100 Resilient Cities, 2016). Furthermore, building resilience requires enhancing the performance of the city's infrastructure in the face of multiple and unexpected disasters, rather than preventing or mitigating the loss of assets due to expected disasters (Infrastructure & Resources) (100 Resilient cities, 2016; UNISDR, 2012).

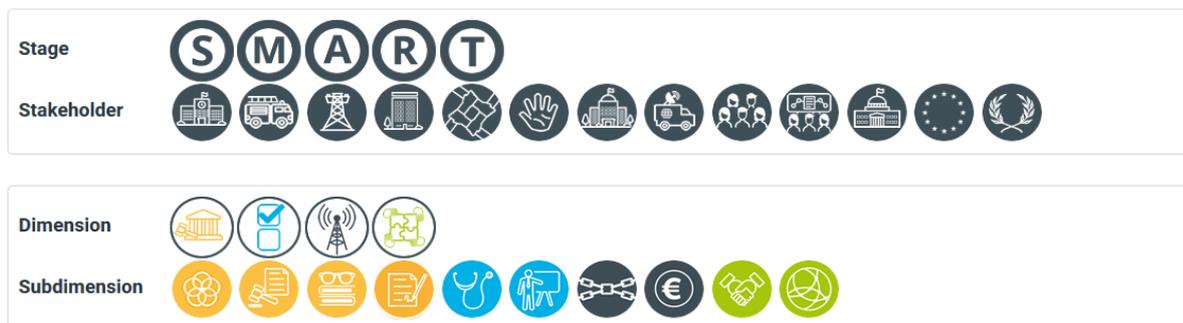
Finally, building city resilience is a complex process that requires taking action to engage a wide variety of stakeholders including civil society, and the private and public sectors (Co-operation) (Desouza, 2014; Oxley, 2013; Lu and Stead, 2013; UNISDR, 2015; 100 Resilient Cities, 2016). Based on this, the four resilience dimensions have been defined and used to classify attributes and priority areas.

IDENTIFYING AND IMPLEMENTING RESILIENCE-STRENGTHENING STRATEGIES

Based on the above assessment of a city's resilience maturity across the four priority areas, the Resilience Maturity Model then proceeds to offer policymakers a set of policy recommendations and indicators for rolling out resilience. It provides them with a strategic roadmap depicting how the policies defined in each stage influence the resilience process and the city's progression towards achieving its goals. The Resilience Maturity Model enables, from a strategic level, the identification of areas that need to be improved in each city

and reflection of these in policymaking and planning. Once the weaknesses have been identified, priorities should be defined and resilience-strengthening policies developed which would then aid the implementation process. Figure 2 below displays the starting page for the Resilience Maturity Model where users choose the stage, dimension, or stakeholders they wish to engage and, based on the choice, are directed to the relevant policy recommendations.

Figure 3: Resilience maturity model stages, stakeholders, dimensions and sub-dimensions



UNDERSTANDING RISK SYSTEMICITY

In order to help decision makers to identify the main risks in their cities and therefore the priority action areas, SMR has developed the Risk Systemicity Questionnaire (RSQ) (Figure 3). The RSQ enables cities to consider risk in a new way and helps them identify feedback loops and cross-cutting issues that affect all departments and which may otherwise be neglected as it is no one person's responsibility to address them.

The main advantage of the RSQ is that it brings together a variety of stakeholders within the city and helps to facilitate discussion and exchange across departments and stakeholder groups in order to assess the interrelationships between risks: the 'systemicity' of risk in their cities. The tool provides with

a discussion guidance and facilitation method that can bring topically-different departments or stakeholders (e.g. citizens) together and focus their discussion to share their knowledge or. The result is a profile of risks which then, jointly with the Maturity Model and other existing resilience tools and methods in cities, marks clear action areas for policymakers.

Beyond serving local policymakers, the RSQ also serves to update and complement existing EU guidelines with respect to Risk Assessment and Disaster Management thereby having the potential to inform EU-level policy-making (European Commission, 2010).

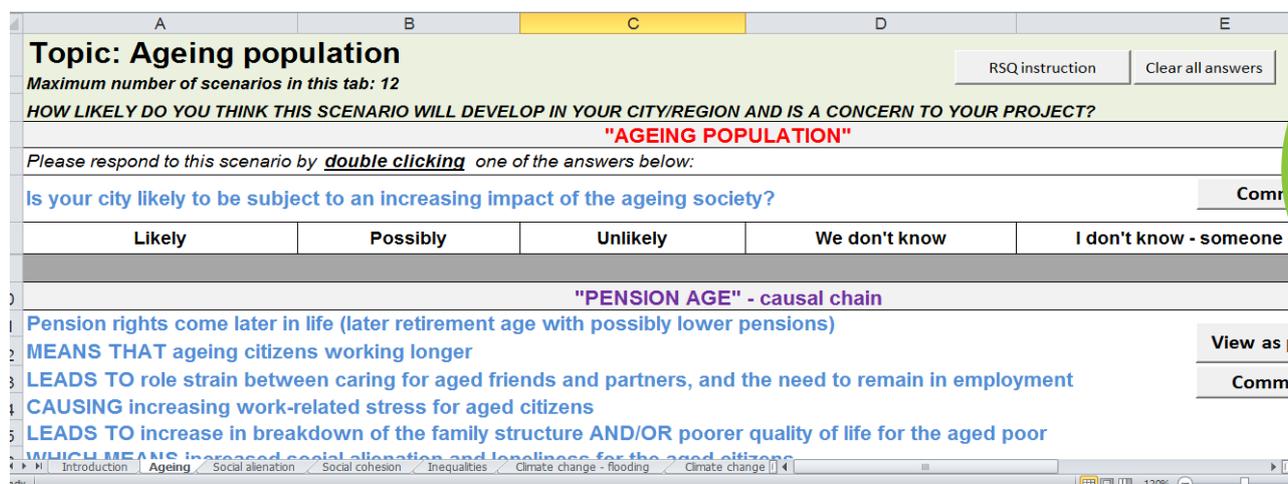


Figure 4: Snapshot of the updated RSQ theme "Ageing population"

ENHANCING STAKEHOLDER ENGAGEMENT

The Maturity Model and RSQ facilitate a continuous process of discussion and participation amongst city stakeholders, thereby increasing their awareness of, engagement with and commitment to the resilience building process. To further supplement these tools, SMR is developing a digital portal, the Resilience Information Portal (Figure 4), which aims to further facilitate awareness and engagement among key partners by enabling cities to improve their own IT systems.

This portal is a communication platform for exchange within a municipality, as well as between a municipality and its external

stakeholders. The development process aimed at a broad-purpose, versatile, flexible and easy-to-use platform.

Several communication platforms are already up and running. Thus, the portal functions as a toolbox which enables cities to freely integrate necessary functions. It consists of two parts: design goals (based on communication challenges identified by the Tier-1 cities as part of the portal design process) and functional specifications. The design goals are the basis for identifying required functionalities, such as:

1. **Information Sharing:** Communication starts with setting up a physical service centre for citizens. Platforms (website, social media, and internal systems) to share information with stakeholders are implemented;
2. **Establish a Communication Structure with Stakeholders:** Long-distance communication as well as face-to-face conversation should be supported by the platform;
3. **Citizen Engagement and Raising Awareness:** Producing a sense of unity is the means to get people involved;
4. **Knowledge Sharing (local, national, European):** a library that stores best practices aimed at city resilience;
5. **Information Sovereignty:** the cities take into account that information on all platforms should be consistent and accurate. This contributes to building trust among stakeholders and citizens;
6. **Usability:** Information technologies cannot reach everyone whom cities should approach, including disadvantaged groups. Striking the right balance between technologies and disadvantaged people should be considered.

The functional specifications, on the other hand, are intended for use by IT professionals and IT decision-makers. They aim to support planning in municipal IT departments and provide operative help. The functional specifications do not impose certain paradigms, technological frameworks or third-party programs, but rather provide recommendations that can complement existing IT infrastructure. They provide great levels of freedom and room for customization to facilitate a technological solution that aligns with non-technological decisions, particularly deriving from a municipality's IT strategy.

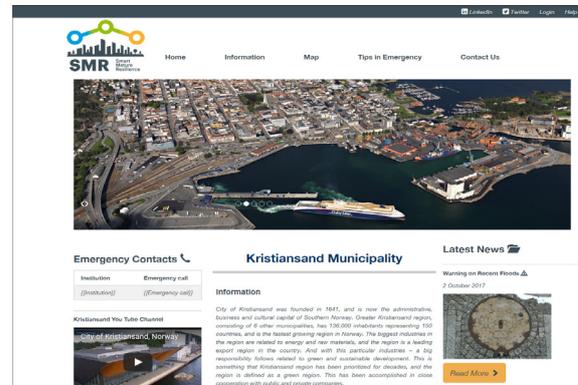


Figure 5: SMR Resilience Information Portal

REINFORCING THE POLITICAL IMPERATIVE BY ENGAGING IN STANDARDIZATION ACTIONS

In addition to developing tools that inform and enforce the resilience-building process in cities, SMR is aware of the imperative to develop resilience-supporting standards that derive from the standards that derive from research and practice and aim at building resilience in cities and communities. Standards are an acknowledged instrument for mainstreaming innovation so that it influences decision-making in all sectors and at all governance levels (private/public, global/EU/national/local, etc.) and have therefore been chosen for transferring the research results to the market.

For this reason, SMR has been actively engaging in standardization activities with DIN and lobbying to create a standard for resilience management, including three different CEN workshops aiming to develop three CEN Workshop Agreements (CWAs): “City Resilience Development – Information Portal”, “City Resilience Development - Maturity Model” and “City Resilience Development - Operational Guidance”.

Examples of existing standards that the SMR project has deemed important and of policy relevance are:

- ➔ **ISO 37101:2016 - Sustainable development in communities – Management system for sustainable development**
Requirements with guidance for use: aims at helping cities and communities to better coordinate participatory development and implement a local sustainability program. The standard supports good governance by describing a coherent, community-based management approach. Guidance for cities on practical implementation is under development (ISO/AWI 37104);
- ➔ **ISO 37120:2014 - Sustainable development of communities – Indicators for city services and quality of life**
Recommends a selection of indicators for local reporting on life-quality. The selection is voluntary and based on local priorities;
- ➔ **ISO/TR 37150:2014 - Smart community infrastructures – Review of existing activities relevant to metrics**
Provides a reference framework for “smart community infrastructures”.

CONCLUSION AND RECOMMENDATIONS

We face global challenges pertaining to climate change, critical infrastructure and social dynamics, and cities are increasingly being seen as ‘global players’ for sustainable development integrated in the overarching sustainability objectives at all levels (including the UN’s SDG 11 and New Urban Agenda, and the European Urban Agenda). Reliable procedures and supporting instruments are

needed to help cities implement their commitments effectively and efficiently and to assess performance.

A major driver of most urban resilience challenges stems from the concentrated territorial patterns of cities in terms of population, activities, businesses, infrastructures, etc. This serves as a multiplier for any kind of natural or anthropogenic risk that may threaten a

city, meaning even a minor shock can lead to catastrophic consequences. To respond effectively to this challenge, it is necessary to define risks and to assess urban resilience in relation to them.

Additionally, as demonstrated in this policy brief, the very concept of city resilience is not yet fully understood. Many policies are still conceived and designed as „stand-alone“ initiatives with insufficient attention to risk interdependencies. While most resilience challenges are well-known, there is a knowledge gap when it comes to the design of resilience actions and strategies that address multiple risks, which the project tools seek to address.

The SMR Tier-1 and Tier-2 cities closely followed and commented on all phases of tool development and, even more so, were able to apply them practically during Stakeholder Focus Groups organized by the project. This practical testing and development of the SMR tools in a co-creation process with the cities resulted in the development of new methodologies to assess the interdependency of risks and proved to be valuable in developing the relevant policies.

Despite this, certain challenges remain, particularly pertaining to the customization of the tools: cities are different, and therefore resilience and risk assessments must offer a consistent methodology that is at the same time able to adapt to different contexts.

City resilience is still a developing and evolving science, with many obstacles and challenges still need to be overcome. This means that strong resilience policies and governance frameworks are needed. The first outcome of resilience policies, as studied during the SMR project, is to overcome reciprocal overlapping and interference among different stakeholders. Such constraints still hamper a coordinated approach to resilience-building. The biggest advantage of SMR is to provide a powerful governance tool that guides the discovery of risk interdependencies (also considering that such co-relations can be hidden or unexpected).

Cities need to develop a modern governance model based on city resilience that manifests itself, for example, in the setup of an urban resilience office and new resilience policies that build on the available scientific knowledge and professional expertise.

HOW CAN SMR SUPPORT YOU TO BUILD YOUR CITY'S RESILIENCE?

1. **Join the SMR Tier-4 circle of cities** to exchange with resilient cities in person and online. Start by joining the Smart Mature Resilience group on LinkedIn, signing up to the SMR newsletter or engaging with us on Twitter.
2. **Use the SMR Resilience Management Guideline** to structure and inform the resilience management process cycle in your city.
3. **Use the SMR Resilience Maturity Model** to self-assess your resilience maturity stage and identify areas in most need of investment.
4. **Train your staff on use of the Resilience Maturity Model** by using the City Resilience Dynamics Model.
5. **Use the Risk Systemicity Questionnaire** to hold facilitated risk self-assessment discussions.
6. **Supplement your city communication infrastructure** with the Resilience Engagement and Communication Portal toolbox.
7. **Use the Resilience Policies tool** to find replicable case studies and add your own experiences through the Wiki function.
8. **Contribute to the development of city resilience standards** by taking part in SMR-initiated standardization activities.

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