Multi-level Alignment of Regional Approaches to Critical Infrastructure Resilience by Learning from Experience

Deliverable 4.3.1: multilevel framework for the alignment of regional CIP/R strategies with national and EU policies

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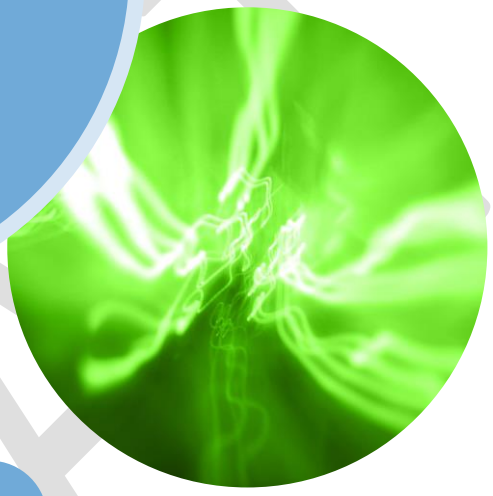

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Executive summary

Critical infrastructure systems are facilities and assets – such as roads and bridges, water supply, wastewater treatment, and power grids – so vital that their destruction or incapacitation would disrupt the security, economy, safety, health, or welfare of the public. Well functioning infrastructure systems are vital to the nation's prosperity and well-being.

Protection of infrastructures becomes a key issue for policy-making process and the related implementations, but at moment policies are not able to fully encompass all the aspects that can influence the society development. Critical infrastructures are complex and interdependent systems. Due to the fact that is difficult to predict their behaviour and to assess the related risks, the resilience of societies has to be improved, which pose a new challenge to policy-making process. This new challenge-driven and demand-oriented innovation policy requires a fundamental reframing of innovation policy and its tools.

In this report we elaborate an approach to tackle the issues raised by the multi-level governance of transformative innovation policy on Critical Infrastructure protection. Drawing on the socio-technical approach we understand that transformative innovation policy requires the effective blending of the technical and social systems in order to respond long-term challenges. These two aspects must however be considered interdependently, because arrangements that are optimal for one may not be optimal for the other and trade-offs are often required. In any case the report did not explored in detail in which way the technical and social aspects can contribute to improvement of the Protection of Critical Infrastructures. The evaluations here are limited to identify how to align the policy-making process with the implementation process. The analysis provided seeks to generate a framework for analysis for transformative policy on Critical Infrastructure protection, with a particular emphasis on finding the best ways to identify a constructive role for both the regional level and central government as enablers or transformational nodes. In particular, it identifies what is the main area of fragmentation, which requires an alignment in order define more innovative and efficient strategies. The framework could also be used as a means of better understanding and steering the processes by which Critical Infrastructure Protection policy is transformed to meet the challenges of increasingly complex policy challenges and increasingly under pressure European economies and societies.

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1. Introduction

The fast changes on knowledge and technologies occurred during the last century made communities, countries, economies and businesses more and more tight together through better infrastructures, faster and more efficient communication systems. Innovations such as the Internet and mobile phone have boosted productivity, created new business opportunities and enhanced access to information.

Yet the same dynamic that lies behind these gains – everything being more connected and interdependent – also threatens to undermine them. Modern critical infrastructure (CI) systems are tightly coupled, resulting in unprecedented complexity and difficulty to predict, limit and control the consequences of disruptions caused by hazards. Therefore, a paradigm shift in disaster risk management is needed: instead of focusing on predicting events, resilience needs to be improved as a basis for adequate response to any event. As the interconnections between transport, communication, financial and other world systems become increasingly complex, the traditional concepts of risk have has shown some limitations becoming inappropriate as a basis of modern global governance. Risks related to complex systems like critical infrastructure systems or more in general the full society, include elements that cannot be easily quantified using traditional tools and formulas from probability theory and mathematics, or made to fit the classical distinction between risk and uncertainty. As it becomes increasingly difficult to identify direct causality, traditional risk management needs to be supplemented with new concepts designed for uncertain environments. Many approaches in the disaster risk reduction area are still mainly sector specific and aim to assess e.g. the vulnerability of a system such as a certain type of critical infrastructure Although the respective research is valuable in order to learn more about the system characteristics and potential disaster risk reduction measures, it remains often vague how society is or could be affected by their failure.

In the recent years, resilience has become a key term in disaster risk management. The strengthening of infrastructures has been identified as an important field for disaster risk reduction. Resilience can be defined in many different ways but in general terms it could be considered as the capacity of a system (or a system of systems) to absorb a shock.

In order to reduce societal effects, a broader perspective needs to be taken since the operation of CIs determines the functioning of many societies. The resilience concept thereby offers the possibility to include societal aspects by taking into account the ability to absorb external shocks) in a more holistic view. This is specifically relevant as the effects of an infrastructure breakdown are mainly determined by the societal dependency on an uninterrupted supply/the level of preparedness. Paradoxically, high levels of supply security lead to an unawareness of the population and thus an unpreparedness towards potential failures.

1.1. MIRACLE Project Scope

The MIRACLE project aimed at promoting and fostering the development of Regional Critical Infrastructure Protection and Resilience (CIP/R) strategies.

Since institutions are struggling to tackle problems related to the complexity of interdependent infrastructural systems, the scope of this guideline is to support the implementation of coherent Critical Infrastructure Protection (CIP) and Critical Infrastructure Resilience (CIR) strategies in the EU, thanks to the alignment of Regional CIP/R Strategies with national and EU policies.

Furthermore it wishes to underline the advantages of the resilience concept and to illustrate how the definition of disaster management strategies can be defined and developed on Public-Private collaborations, since the large part of infrastructure services and systems belong to private companies and they are beyond immediate institutional governance control. In addition, it explores the regional dimension of such collaboration.

1.2. Scope of the report

The objective of this report is to provide a description of a multilevel framework for the alignment of regional CIP/R strategies with national and EU policies. The aim is to provide a common reference in the EU for the development of existing and future CIP and CIR policies, to ensure coherency, efficiency and complementarity of the actions taken to enhance security and to protect people and infrastructures.

The report aims to provide principles and long-term goals that form the basis of making rules and guidelines, and to give overall direction to planning and development of a regional strategy to improve the social resilience of communities by considering the role played by Critical Infrastructure intended as provider of essential service for citizens.

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2. Background

2.1. Critical infrastructure

Many different definition of Critical infrastructure can be found in the literature. Critical infrastructures are those infrastructures that provide services for our society (what is critical is less the infrastructure than the service), i.e. an essential support for economic and social well-being. Criticality describes the importance of an infrastructure/service with respect to the potential consequences that a disruption or a destruction of this infrastructure/service could have on:

- the population,
- the economy,
- the society
- and the environment.

According to the COUNCIL DIRECTIVE 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection, *Critical Infrastructure means an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions (art 2, par. a) and 'European critical infrastructure' or 'ECI' means critical infrastructure located in Member States the disruption or destruction of which would have a significant impact on at least two Member States. (art 2, par. b);*

Considering the different definition reported on the table below, it should be noted that the available definitions manly regard the national and international dimension. No particular attention is provided to the regional dimension. This aspect can leads to a number of variation during the design an implementation phase across the different regions in Europe where the National or European policy objectives are translate into the local dimension. This process may generate fragmentation and inhomogeneity across Europe. Critical infrastructures, including primarily the energy, financial services, health care, public services, and transportation sectors, are interconnected and interdependent on multiple levels and the geographical dimension is only one of such levels. This leads to a number of questions, which must be answered satisfactorily to protect the well-being of the population, functioning of government, and economic capabilities. Questions may include what cascading effects a regional failure of one critical infrastructure may have on other infrastructure components, or to elaborate how adding small and hence cost-effective amounts of redundancy can significantly enhance the overall robustness of this interconnected network of infrastructure services. More in general, questions will immediately raise at the

identification of what the stakeholders concerned, what are the decision-making processes to improve the protection of community, which are the main rules to define and implement strategies to protect critical infrastructures at regional level an so on.

Table 1: Some definition of Critical Infrastructure

Australia	"Critical infrastructure is defined as those physical facilities, supply chains, information technologies and communication networks which, if destroyed, degraded or rendered unavailable for an extended period, would significantly impact on the social or economic well-being of the nation, or affect Australia's ability to conduct national defence and ensure national security."
Canada	"Canada's critical infrastructure consists of those physical and information technology facilities, networks, services and assets which, if disrupted or destroyed, would have a serious impact on the health, safety, security or economic well-being of Canadians or the effective functioning of governments in Canada."
Germany	"Critical infrastructures are organisations and facilities of major importance to the community whose failure or impairment would cause a sustained shortage of supplies, significant disruptions to public order or other dramatic consequences."
Netherlands	"Critical infrastructure refers to products, services and the accompanying processes that, in the event of disruption or failure, could cause major social disturbance. This could be in the form of tremendous casualties and severe economic damage... "
United Kingdom	"The [Critical National Infrastructure] comprises those assets, services and systems that support the economic, political and social life of the UK whose importance is such that loss could: 1) cause large- scale loss of life; 2) have a serious impact on the national economy; 3) have other grave social consequences for the community; or 3) be of immediate concern to the national government."
United States	The general definition of critical infrastructure in the overall US critical infrastructure plan is: "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters." For investment policy purposes, this definition is narrower: "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on national security."

2.2. The Concept of Resilience

Resilience began being used in terms of disasters, especially by the engineering community (particularly referring to physical infrastructure), in the 1980's, and was related to the concept of being able to absorb and recover from a hazardous event. Since that time, hybrid definitions have arisen that combine the engineering with the ecological, or the ecological with the behavioral. According to the available definitions in the literature, the resili-

ence generally reflect how the community responds to some adverse event, a crisis. However, there are significant differences between all the definitions and it is difficult to select one as the most suitable one, i.e. a definition that can exhaustively encompass all possible meanings and implications. Each has value and has led to positive contributions within its domain. Thus, the definition one chooses should reflect the way in which it will be used.

The following definition can be taken as a reference to start the identification of the most suitable:

The resilience of a system (e.g. social, economic, technological, ect.) that face a critical event is the capability to anticipate risk, limit impact, and to find quickly a new sustainable equilibrium (or to bounce back) through its level of preparation and the capacity of survival, adaptability and evolution.

This definition contains the core concept of resilience of a system, i.e. the adaptability but also the perspective how to improve it. In other terms it indicates the desired trajectory, and can enable a system (e.g. a community) to determine how resilient it is and how to take actions to improve it.

If we focus on the definition of the Critical Infrastructure Resilience it can be defined as the way:

- To guarantee the functional continuity of the services provided by an infrastructures in time of stress and disaster;
- To limit the extent of losses and impacts in the area of concern if a disaster strikes;
- To ensure fast recovery if the infrastructure is severely damaged.

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3. Critical Infrastructure Protection and the Policy-Making Process

3.1. European Programme for Critical Infrastructure Protection

In 2004 the European Council started a consultation how to protect Critical Infrastructure, in particular against terrorism. The outcome was the definition of a programme to protect critical infrastructure, which was released as "'Communication on Critical Infrastructure Protection in the Fight against Terrorism'. In December 2004 it endorsed the intention of the European Commission to propose a European Programme for Critical Infrastructure Protection (EPCIP) and agreed to the creation of a European Critical Infrastructure Warning Information Network (CIWIN). In December the European Commission issued its finalised design as a directive EU COM(2006) 786; this obliged all member states to adopt the components of the EPCIP into their national statutes.

A key pillar of this programme is the 2008 Directive on European Critical Infrastructures. It establishes a procedure for identifying and designating European Critical Infrastructures (ECI) and a common approach for assessing the need to improve their protection. The Directive has a sectoral scope, applying only to the energy and transport sectors.

The Directive also requires owners/operators of designated ECI to prepare Operator Security Plans (advanced business continuity plans) and nominate Security Liaison Officers (linking the owner/operator with the national authority responsible for critical infrastructure protection).

a comprehensive review has been conducted in close cooperation with the Member States and stakeholders during 2012. The preliminary results of this review have been summarised in a Commission Staff Working Document. Based on the results of this review and considering other elements of the current programme, the Commission adopted a 2013 Staff Working Document on a new approach to the European Programme for Critical Infrastructure Protection. It sets out a revised and more practical implementation of activities under the three main work streams – prevention, preparedness and response.

The program and directive had the extreme merit to drive the attention to the role of Critical Infrastructure in supporting European societies. In any case, it has some important limits, manly due to the respect of the application of the principle of subsidiarity, which is foreseen by the treaties.

The main limits of the directive are:

- It mainly considers two sectors, i.e. the energy and transport sectors;
- It focus on the identification of European Critical infrastructure, i.e. infrastructure that can have impact on two or more Member States;
- The security issues rely on the preparation activities of the operator and in particular on the Operator Security Plan advanced business continuity plan;

- The suggested method to evaluate the criticality of an infrastructure is based on some simple criteria but any technical method is indicated as reference method to apply such criteria;
- It does not identify any particular process or mechanism which can facilitate the engagement or the collaboration of other stakeholders;
- It does not consider the role of the Critical Infrastructure in term of services provided to the public communities and the related resilience
- The regional dimension of the definition of strategies for the protection of Critical infrastructure is missed;

The identification of limits can be extended but it beyond the scope of this report. What it is interesting to note, that all these aspects, which where clear during the policy-making process and are the result of many constraints and compromises, imply a number of restriction and problems during the implementation phase. Basically they generate a fragmentation and inhomogeneity during the implementation phase across the different EU member states.

3.2. Policy-making trend and resilience

In October 2012, the European Commission presented a Communication − The EU Approach to Resilience: Learning from food crises, which provide the policy principles for action on helping vulnerable communities in crisis-prone areas. Increasing their resilience to future shocks will be a central aim of EU external assistance.

A part the scope and the field of application of this communication is interesting to note that for the European Commission increasing resilience (and reducing vulnerability) can be achieved by defining and implementing a multifaceted strategy and a broad systems perspective aimed at both reducing the multiple risks of a crisis and at the same time improving rapid coping and adaptation mechanisms at local, national and regional level. Strengthening resilience refers to three key principles:

- to anticipate crises by assessing risks,
- to focus on prevention and preparedness, and
- to enhance response to crisis.

Moreover it reckons that Resilience can only be built bottom-up: *"the starting point for the EU European Union approach to resilience therefore is a firm recognition of the leading role of partner countries. The EU European Union will align its support with the partner's policies and priorities, in accordance with established Aid Effectiveness principles."*

An Action Plan, which followed the Communication, laid the foundations for more effective EU collaborative action on building resilience, bringing together humanitarian action, long-term development cooperation and on-going political engagement. The Action Plan adds

value to previous commitments by maximising the synergy between interventions across thematic areas. It also gives new, and necessary, impetus for the implementation of the strong commitments made in the Disaster Risk Reduction (DRR). Such approach was also consider by other initiatives likes for instance, the EU Climate Adaptation Strategy. In April 2013, the European Commission adopted an EU Strategy on Adaptation which aims to ensure Member States are prepared for current and future climate impacts.

It consider the principles of adaptation to climate change applied through the Global Climate Change Alliance (GCCA), in particular with regard to policy dialogue and exchange of experiences, aid effectiveness and mainstreaming across all relevant sectors, including agriculture, water and health.

It is interesting to note that the EU Adaptation Strategy has three objectives:

- **Promoting action by Member States**: The Commission encourages all Member States to adopt comprehensive adaptation strategies (16 already have strategies) and will provide guidance and funding to help them build up their adaptation capacities and take action. The Commission will also support adaptation in cities by launching a voluntary commitment based on the Covenant of Mayors initiative.
- **Promoting better informed decision-making** by addressing gaps in knowledge about adaptation and further developing the European Climate Adaptation Platform (Climate-ADAPT) as the 'one-stop shop' for adaptation information in Europe.
- **Promoting adaptation in key vulnerable sectors** through agriculture, fisheries and cohesion policy, ensuring that Europe's infrastructure is made more resilient, and encouraging the use of insurance against natural and man-made disasters.

The Green Paper on the insurance of natural and man-made disasters considers that disasters not only cause loss of life, but also damage to the value of billions of euros every year, affecting economic stability and growth. Disasters may have cross-border effects and can potentially threaten entire areas in neighbouring countries. This is an important issue for citizens, companies and governments across the Union.

Considering the capacity of European Union to respond to a disaster, a EU Civil Protection Mechanism was developed in order to enables a coordinated assistance from the participating states. The European Commission supports and complements the prevention and preparedness efforts of participating states in the EU Civil Protection Mechanism. It organises a programme of training, exercises and exchanges of experts, as well as actions in areas where a common European approach is more effective than separate national approaches. Disaster prevention activities are being developed and constantly upgraded.

3.3. Policy fragmentation

There are already many policies at European and National level that aims at protecting social and economical communities. Many of these policies were defined to provide an answer to specific type of hazards or to define organisational structure to manage particular

type of disaster or accident. The result of such policy-making process bring as result to a fragmentation of approaches between and within the different European territories. This constitute an obstable to the development of common approaches in Europe to implement more resilience strategies and to better protect communities and critical assets. In general terms these fragmentations can considered as:

- **Strategic fragmentation:** many different policies objectives are defined according to too sectorial vision, e.g. the definition of strategies for economic sustainability many conflict with other policy goals like environmental or energy sustainability, which may influence the development of a more resilient society;
- **Hierarchical fragmentation**: sometime there is not a clear rank of the role/responsibilities organisations and institutions how to contribute to development of resilience strategies;
- **Functional fragmentation:** the roles and functions of some institutions and organisations involved in definition and implementation of resilience strategies are sometime overlapping (or even conflicting) or they are not covering all there required aspects to implement an efficient resilient strategy;
- **Geographical fragmentation:** some institutions and organisations may act in different way according to the different characteristics of the territories for which the resilient strategies are defined and implemented;
- **Organisational fragmentation:** in different countries or regions, some organisations involved in rescue services have different responsibilities and provide different tasks (functional); moreover the organisational model and structure which provide the collaborative framework of the organisations, can varies for one region to another.

The main reason of such fragmentations resides on the policy-making and implementation process. Implementation is the process of turning policy into practice. However, it is common to observe a 'gap' between what was planned and what actually occurred as a result of a policy.

3.3.1. Policy-making approach

There are three major theoretical models of policy-making process implementation:

- **Top-down approach:** This approach sees policy formation and policy execution as distinct activities;
- **Bottom-up approach:** This approach recognizes that individuals at subordinate levels are likely to play an active part in implementation and may have some discretion to reshape objectives of the policy and change the way it is implemented;
- **Principal-agent theory:** In each situation there will be a relationship between principals (those who define policy) and agents (those who implement policy), which

may include contracts or agreements that enable the principal to specify what is provided and check that this has been accomplished.

3.3.2. Policy implementation structure

We can distinguish between to main policy implementation structures:

- **Vertical (or Hierarchal) Structure:** The figures involved in such organizational strategy are organized in institutional layers, which reflect the level of responsibility, supervision and management. It reflects, at a certain degree, the vision of the top level. The control flows vertically, the higher layer in the hierarchy decides the strategies and each lower layer executes it. The advantage of this implementation strategy if that the high degree of task specialization, clear roles and responsibilities associated to each implementation layer makes the operations very predictable and easy to control. The disadvantages are mainly related to the fact that higher levels tends to keep most critical/strategical decision making power related to allocation of resources budgets, promotions etc, while they have least visibility of the actual facts at local scale. Strict rules and regulations, lack of decision-making power is inherently detrimental to local innovation.
- **Horizontal organization**: in a horizontal organization, the hierarchies are minimized; the reporting structure is not the primary control or decision making authority. The role of hierarchy is limited to strategic planning, resource allocations, resolving conflicts, interacting with external environment etc. Across the departments or team communication is encouraged, employees are empowered with decision making and independence; and a culture of collaboration is promoted. Horizontal coordination's success and effectiveness is very much dependent upon the cultivation of organization culture that promotes and rewards collaborations. The disadvantages of this approach can mainly related to the decentralization of decision-making process.

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4. The regional dimension

4.1. The regional approach

Risks related to complex systems can be generated by hazards that can cause many different types of impact on territories. Hazards and the related impacts can be geographically rather far away from each other. The greater is the interdependencies between social and economical systems, the greater is the potential for events to bring about unforeseen, cascading consequences.

Moreover, the territory for which a CI's services are delivered typically does not overlap with institutional areas administered by public institutions. Thus, a region should not identify with a specific administrative space or a geographical area but, more extensively, with a more virtual domain where the influences and interests of all stakeholders can represented. In other terms the region represent the "space" where stakeholders can effectively collaborate to improve the resilience of a community. According to this approach, the dimension and the characteristics of a region depend on the role, the decision-making power, the interests of the stakeholder involved in a collaborative process.

Therefore, there is no single model for regional collaboration, no universal approach that works in all situations. The approach and principles of this guideline can help to guide stakeholders across boundaries to achieve regional stewardship.

4.2. Stakeholders

Following Freeman (1984), stakeholders include any person, group, or organization, which affects and/or is impacted by an organization's decisions. Given various types of organization–stakeholder relationships, it is difficult to provide an exhaustive description of the characteristics of each type of stakeholder and moreover is beyond the scope of the guidleline to evaluate stakeholder network relationships and to describe the different strategies for managing stakeholders from the focal organization's viewpoint, as well as how stakeholders can influence the decisions of the organization.

Considering the MIRACLE project scope, stakeholder are all the group, institutions, actors can can effectively contribute to improve the community resilience. The list of stakeholders can be very long but for sake of simplicity we can distinguish between:

- **Public institutions** which play a role on the policy-making process and decision-making process in the field of public safety and security;
- **Public organization and authorities** that provide rescue and civil protection services
- **Public and Private operators** that provide critical infrastructure services.
- **Social Communities**

4.3. Public-Private Collaboration

If societies are to thrive in the face of the hazards, each element of the society as "interconnected system" − finance, supply chains, health, energy, the Internet, the environment and others − must become more resilient. In general, the biggest challenge in making systems resilient to systemic risk is managing their growing complexities and interdependencies, by proactively addressing collective action failures and resolving problems through cooperation (e.g. at international level). The growing complexity of today's interconnected communities reduces the ability to make well-informed decisions, leading to a loss of responsibility. Therefore, a more accurate collaborative approach is required where people and institutions work across jurisdictional lines and other boundaries. Impact generated by CI disruptions typically transcend institutional boundaries (e.g. regional, national) and involve shared resources as well as causality that are indirect and time-delayed. They are resistant to direct technical solutions, requiring instead changes to stakeholders' behaviour. Hence, in order to improve the resilience of a community, all stakeholders must display greater responsibility – including global businesses, governments, international organizations and civil society – while efforts are made to fundamentally reform governance approaches.

In these terms, the concept of region go beyond the definition geo-spatial scales and boundaries: the most appropriate scale of collaboration to improve the resilience of a community need to be a collaborative approach that allow to exploit the contributions of the involved stakeholders.

It must be clear that in this contest we are not referring to public-private partnerships (PPP), i.e. a typical long term arrangements between the public and private sectors whereby some of the service obligations of the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/ or public services. The MIRACLE guideline approach specifically refers to a collaborative process where the driving force is the opportunity for each partner to achieve better results by working together. In these terms, there is no substitution of role between the public and private actors but simply the exploitation of synergies activated by a collaborative approach.

Therefore, we can define:

"The Public-Private Collaboration is the collaboration of stakeholders, e.g. government, public or private CI operators, responders, and communities, in order to raise the resilience of essential services that our communities rely on."

According to this definition MIRACLE guideline aims atexamining interorganizational collaborations, and especially social partnerships, the collectivity of organizations that come together to solve ''complex problems'' that cannot typically be solved by one organization acting alone. Even though individual organizations have separate (often conflicting) goals, the focus is on the community, not on any individual organization.

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5. Multi-Alignment

The reported recent initiatives at European level acknowledge that in the future the EU policy-making will refer more and more to strategy based on resilience approaches. At the same time, such initiatives demonstrated that at the moment there still is a certain degree of fragmentation.

In order to overcome fragmentations, an alignment is required between the general scope to create a more resilient society, the policy goals and the related implementation strategies to reach them.

Many different types of alignment can be identified (multi-alignment):

- **Strategy alignment:** it has to consider how to define a more resilience society and this objective must considered in a consistent way by all the policies and the related whole body of law (e.g. Directives, Legislation, norms, etc.)
- **Governance alignment:** it reviews the processes of organisations, and more in general stakeholders involved in the process of implementing resilience strategies, in order to define common decision-making processes, rules and responsibilities to enforce a common policy; organisation which aims to perform similar tasks or have similar responsibilities and duties, can operate in different context following different type of governance approaches;
- **Collaboration alignment:** it has to characterise how each partner can be interact with the others; this alignment has to shape how the stakeholders involved in the process of implementing resilience strategies define and implement a collaborative process; this alignment can be influenced by the different governance rules of each partner.
- **Technical alignment:** this process has to evaluate that technical approaches, methods and standards adopted by the different policies are consistent and coherent (e.g. CI vulnerability assessment methods); a policy typically indicates what the objectives that need to be achieved and the assessment to have be performed without any formal indication about the methods, the techniques or standard which need to be consider; this generate an number of different approaches that generate results which sometime are not even comparable; in order to ovoid this inhomogeneity of appraisals, reference standards and methods need to be clearly identified;

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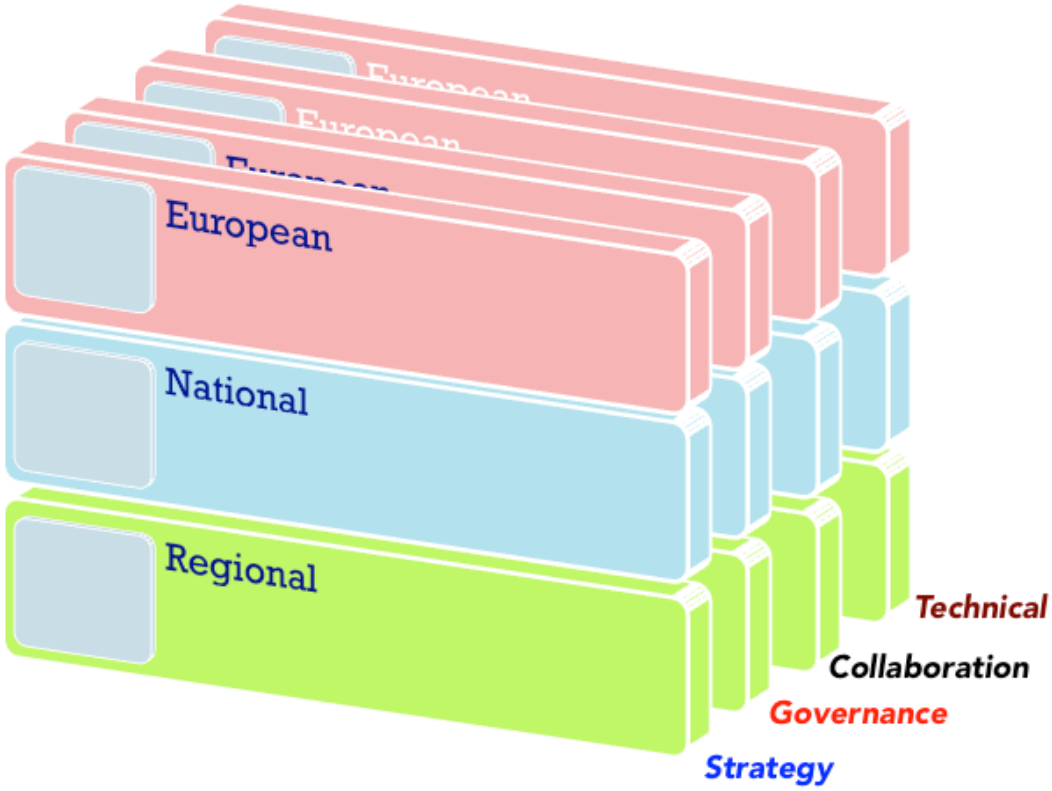

Figure 1. Type of alignment that influence the policy-making process and the implementation process

As general approach these tree different alignment must be considered:

- Multi-alignment of the policy-making process
- Multi-alignment of the implementation process

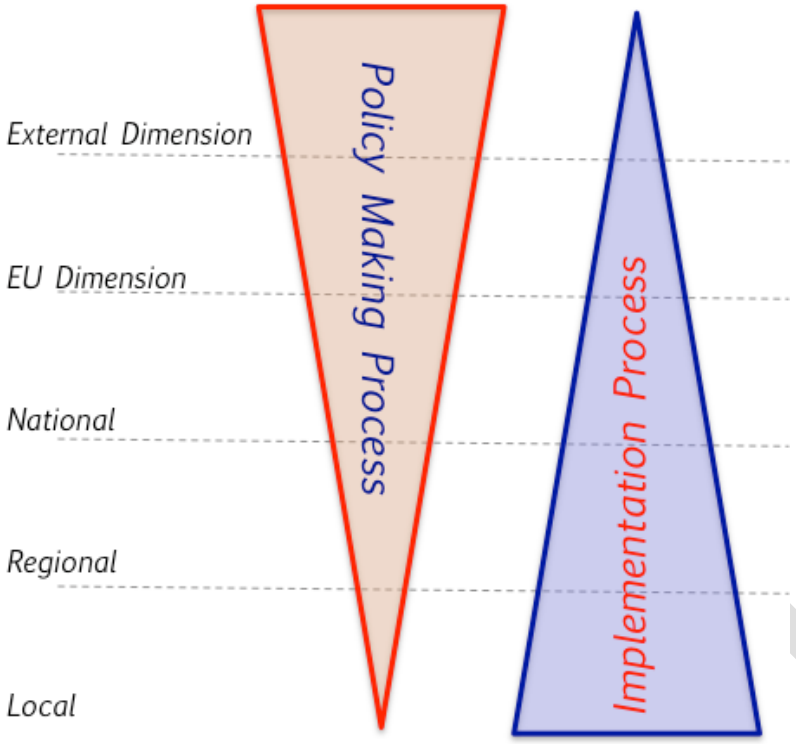

Figure 2. Schematic representation of the relevance of policy-making process and the implementation process at the different levels

5.1. Multi-alignment of the policy-making process

The policy–making process has to be mainly developed according to a top-down approach that flows from the top hierarchical policy-making level to the local one. This process has to guarantee that the key aspects and objectives identified at higher level can be coherently translated during the transposition of them at the lower levels. In particular this process will take care about:

- **Strategy alignment** i.e. each policy-making level will assure the aliment the higher and lower level, as well as the coherence with all the laws that contribute to develop a more resilience society and communities, and define the role of Critical Infrastructure operators; Considering for instance the typical EU directive transposition process, the outcome depends on the institutional arena in which decision-making takes place and the interests of the domestic actors involved. These institutional arenas can vary from parliament to national ministries and agencies. Domestic actors are taken as policy-specific veto players. Their preferences may lead to two different responses to the requirements of a directive: they can transpose a directive literally, keeping

deviations to a minimum or they can adopt a non-literal interpretation of the directive, leading to more substantial deviations within the boundaries allowed by the European Commission.

- **Governance alignment:** each policy making institutions has already in place the rules and mechanism to define and to implement new policies; anyhow it is not always required to involve stakeholders; therefore such alignment requires the definition of mechanisms for considering the contributions of CI operators and more in general stakeholders and the characteristics of decision-making processes which allow to implement resilient strategies.
- **Collaboration alignment:** define the role and the type of relationship of each stakeholder involved in the policy-making process and into the transposition from higher level and to a lower level.
- **Technical alignment:** policy-making process has to provide clear indication about the technical method to consider during the implementation of a policy; this aspect will help the technical activities related to the implementation phase, but overall, the homogeneity of results will facilitate the policy implementation monitoring process; It will allow also to compare results between different regions and to perform benchmarking analysis. Therefore, it relatively less important how sophisticated and accurate are the reference methods as far as they are able to record consistently changes in time related to the the policy implementation process.

One of the main goal of such alignment if to identify conflicts and synergies at different policy levels as well as between and within sectors to highlight strategies for improving policy coherence and effectiveness.

In order to increase the efficacy of policy that aims to increase the residence of the society by considering the role of Critical Infrastructure it become compulsory to foresee a mechanism that allow the integration of knowledge that can be derive from the regional scale (bottom-up generation of knowledge) with the top-down policy-making processes through innovative approaches to assess the effectiveness, costs and benefits of adaptation strategies at different scales. The reason of such requirement is mainly related to the fact technologies and critical infrastructures services are in continuous evolution which make even more difficult the appraisal of the potential impacts of CI failures on exposed citizens/customers. At the same time citizens more and more ask for higher levels of protection, mainly because are not able to substitute CI services to perform their daily life tasks. Since resilience is an inherent and dynamic attribute of a community, such mechanism as to guarantee that from one side policy-makers are aware about the complexity associate with CI services delivered in different context and situations, and from the other side about the demand of protection requested by citizens.

5.2. Multi-alignment of the implementation process

The implementation process has to be mainly developed according to a bottom-up approach, i.e. the process that enable to identify the problems related the regional dimension by implementing a collaborative approach with all the stakeholders (public and private) that can contribute to identify practical and adaptive solutions to reach the objectives defined by policies. The goal of stakeholder involvement in the implementation phase of a policy and more in general the public private collaboration, is to increase the performance of policies, in terms of the service outputs and outcomes for the population and communities. By involving stakeholders, governments and public agencies create access to information and resources that stakeholder organizations possess, and build support for their policies. This approach can also overcome implementation obstacle deriving a partial interpretation and evaluation of problem at the local scale, which can better expressed and represented by the forum of stakeholders. In particular this process will take care about:

- **Strategy alignment:** review past actions and set vision and level of ambition of future engagement of actors that can contribute to define better resilience strategies; verification of stakeholder common understanding about vision and scope of a collaborative approach at local scale.
- **Governance alignment:** Define criteria for identifying and prioritizing stakeholders and select an engagement mechanism. It defines the characteristics of the collaborative process and deliberative process;
- **Collaboration alignment:** define the role and the type of relationship of each stakeholder involved in the implementation process but also the information sharing process.
- **Technical alignment:** during the implementation phase the reference method and technical approach can be more advanced that the one indicated by the policy; in any case is required the partners that contribute to implementation of the policy for instance at regional scale are align on what type of method to adopt to measure e.g. vulnerabilities, system dependencies or risks; in any case even advanced and more sophisticated approach have to ensure the capability of converting the outcomes and results according to the reference method indicated by policies instruments; this will guarantee the possibility to provide a feedback to support the policy implementation monitoring and the opportunity to collect information form different region which can be compared and analysed at national level and/or at EU level.

In addition it could be noted that since the implementation process aims at improving the resilience of a community against CI infrastructure disruption or, more in general, during disaster, the multi-alignment of the implementation process need to be considered along the different phase of the disaster management cycle:

- Mitigation - Minimizing the effects of disaster.
- Preparedness - Planning how to respond.
- Response - Efforts to minimize the hazards created by a disaster.

- Recovery - Returning the community to normal.

5.2.1. Mitigation phase

Mitigation is the continuing effort to lessen the impact that disasters have on people and property. Mitigation can be defined as the sustained action that reduces or eliminates long-term risk to people and from hazards and their effects."

Mitigation efforts attempt to prevent hazards from developing into disasters or to reduce the effects of disasters. The mitigation phase of emergency management differs from the other phases in that it focuses on long-term measures for reducing or eliminating risk. The implementation of mitigation strategies is a part of the recovery process if applied after a disaster occurs.

It is not particular interesting to investigate what are vulnerabilities of a critical infrastructure as technological system since most of time this analysis required the disclosure of sensitive information that operators are not typically willing to release. CI operator can perform this analysis internally. It is more important to establish collaboration between rescue authorities and CI operators in order to define reference scenario and to design together mitigation strategies. CI operators will define their owns strategies how to make their systems more resilient and protect their assets. In any case, the collaboration and the alignment between public authorities and CI operators will allow defining more accurate mitigation strategies since public authorities aims to protect their communities and CI operators their customer and more in general their business.

Mitigation is the most cost-efficient method for reducing the affect of hazards, although not always the most suitable.

On of the problem related to the collaboration during the mitigation phase it is related to the allocation of resources (most of the time economical resources) i.e. how to identify cost-effective measures to eliminate or reduce risks to life and property from CI infrastructure disruption. The "cost-effective" issue is added to this analysis to stress the important, practical idea that, to be beneficial, a mitigation measure should save money in the long run. If the cost of a mitigation project is less than the long-term costs of disaster recovery and repair for the region, the mitigation is considered cost-effective. On other hands in order to avoid conflicts, it should be clear how each partner could benefit from this saving.

It could be concluded that mitigation phase the following type of alignment are required:

- Alignment between the mitigation objectives and priorities of Public Authorities and CI operators;
- Aligment with mitigation priorities of the citizens and communities;
- Identification of potential benefits gained by each stakeholder
- Alignment and balance between allocation of public and private resources;

- Alignment with public programs defined at higher administrative level (e.g. National International) which provide funds and resources for implementing mitigation strategies; this process can be approached according to a top-down approach, i.e. the mitigation priorities can be set for instance, by central government and implemented regional level or in the other way around, i.e. regional declare what are its priorities to the central government (bottom-up approach). In any case the two entities have to agree which approach to adopt and this go beyond the scope of defining advanced resilience strategies.

To reach such alignment the partners has to define at least:

- A common approach and model to assess benefit and costs.
- A common approach to identify and to describe significant critical scenario.
- To define efficient way to communicate and interact with citizens and communities.

5.2.2. Preparedness phase

Preparedness takes the form of plans or procedures designed to save lives and to minimize damage when an emergency occurs. This is a continuous cycle of planning, organizing, training, equipping, exercising, evaluation and improvement activities to ensure effective coordination and the enhancement of capabilities to prevent, protect against, respond to, recover from and mitigate the effects of natural disasters, acts of terrorism and other man-made disasters. These activities ensure that when a disaster strikes, emergency system will be able to provide the best response possible.

This phase requires a continuous collaboration between public authorities, CI operators and even people exposed to disasters. The obstacle to define efficient plans it is mainly related to the capacity find a mechanism that compromise between the needs and priorities of CI operators and public rescue services.

The preparedness phase requires particular attention about the information sharing process between First Responders and CI operators during an emergency. Information technologies can help, but there are always constraints (technical, strategic, economic, etc.) to synchronize the information flows of private operators with the public ones, in particular if the shared information can influence the decision-making process.

5.2.3. Response phase

The response phase includes the mobilization of the necessary emergency services and first responders in the disaster area. This is likely to include a first wave of core emergency services, such as firefighters, police and ambulance crews. Response is defined as the actions taken to save lives and prevent further damage in a disaster or emergency situation. Response is putting preparedness plans into action according to a strict “command

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and control" approach. During this phase typically there is not the opportunity to review roles or procedures therefore, the leadership and the responsibilities are in the hands of the responders according to predefined organizational scheme. CI operators can collaborate to rescue activities as many other actors under the control of first responder but they will mainly benefit from the fact the contribute to define a common plan that take into account their need in terms of communication strategies, coordination, prioritization of action and so on.

5.2.4. Recovery phase

The aim of the recovery phase is to restore the affected region to its previous state. It differs from the response phase in its focus; recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, re-employment, and the repair of other essential infrastructure.

The collaboration between public authorities and CI operators can be very valuable in this phase because it allow implementing a common lesson-learnt process and to identify priority to restore a sustainable environment.

Like the mitigation phase, the recovery phase can adopt either an bottom-up approach or a top-down one. It requires:

- Alignment between the recovery objectives and priorities of Public Authorities and CI operators;
- Aligment with recovery priorities of the citizens and communities;
- Identification of potential benefits gained by each stakeholder
- Alignment and balance between allocation of public and private resources;
- Alignment with public recovery strategies defined at higher administrative level (e.g. National International) which provide funds and resources for implementing mitigation strategies;

To reach such alignment the partners has to define at least:

- A common approach and model to assess benefit and costs of a particular recovery strategy in particular considering the actions that will prevent the occurrence of a similar event.
- To define efficient way to communicate and interact with citizens and communities.

6. Multi-type of aliment according to role Public-Private actor role at different institutional level

As it has been illustrated above, several different types of stakeholders can be involve in the policy making process and in the implementation one. Public institutions which play a role on the policy-making process and decision-making process in the field of public safety and security collaborate with other authorities and Critical Infrastructure operators in order to define a more suitable strategies which can ensure the definition of more resilience society and at the same time, it will enable to reach specific objective of each involved stakeholder (e.g. protection of the population, improvement of the CI business continuities, protection of the market, etc.).

The figures, which can represent the different stakeholders within a public-private collaboration, can vary according to institutional relevance of such collaborative process. At regional level, for instance, the appointed figure by CI operator will be more involve on operational activities; at national level the same operator will appoint a figure with more strategic vision, skills and industrial responsibilities, at the international level it will represent by a delegate of an association.

This chapter describes what can be the role of private and public actors during the different type of institutional collaboration.

6.1. External institutional level

Member states as represented within some international institutions and organizations (e.g. United Nations, the European Union, the Council of Europe, NATO, G8, OCSE, etc.) can collaborate in order to define strategies and programmes to define and maintain an adequate level of security. The definition of global strategies, shares goals and the adoption of common measures ensure a mutual benefit. Such measures are then translated into the national- policy making process.

Considering the characteristic of the partners involved in such process is difficult to identifies the influence of Public-Private collaboration. In any case, lobbies and representative of groups of interest are able to bring their instances with such processes.

6.2. EU institutional level

The role of the of the European Union is well defined the treaties. In particular, the principle of subsidiarity is defined in Article 5 of the Treaty on European Union. It ensures that decisions are taken as closely as possible to the citizen and that constant checks are made to verify that action at Union level is justified in light of the possibilities available at national, regional or local level. Specifically, it is the principle whereby the Union does not take action (except in the areas that fall within its exclusive competence), unless it is more effective than action taken at national, regional or local level. It is closely bound up with the

principle of proportionality, which requires that any action by the Union should not go beyond what is necessary to achieve the objectives of the Treaties.

According to such principle the Member States collaboration, throughout the European Institutions, has to guarantee the aalignment between all the different policies that can contribute to improve society resilience and which are directly related to the protection of Critical infrastructures. For instance policy on energy market that needs more investments in infrastructure including smart grids should requires also the definition of measure to protect them and to prevent interdependent cascading disruption due for instance to natural disasters.

In other terms Member states, European Committees, Civil society representative, Association of CI operators, Civil protection authorities, and so on, have to stimulate the an harmonisation and standardisation process across Europe to ensure equal economic condition for development and resilience of local communities and social cohesion. This process had to be supported by an efficient monitoring approach, which allows to improve periodically the harmonisation process, when new needs and regulation is required by stakeholders.

6.3. National institutional level

The EU Nations have to contribute to align their objectives about the resilience of communities with EU ones. A sound collaboration has to be stimulated and engaged between CI operators and first responders, Civil Protection authorities in order to define common objectives and programmes to increase the protection of Critical Infrastructures and to improve the resilience of communities. The national government has to be initiator of this collaborative process between CI operator and public authorities. It also has to act as leader.

At the moment the Council Directive 114/2008 simply requires that each Member States must ensure that an Operator Security Plan (OSP) or an equivalent measure is in place for each designated European Critical Infrastructure. The purpose of the OSP process is to identify the critical assets of the European Critical Infrastructure as well as the existing security solutions for protecting them. Member States must also ensure that a security liaison officer or equivalent is designated for each European Critical Infrastructure. The officer serves as the contact point between the operator of the European Critical Infrastructure and the Member State authority concerned. The purpose is to allow for the exchange of information regarding the risks and threats relating to the European Critical Infrastructure.

The approach of the Directive reflects the constraints of the EU related to the application the principle of subsidiarity. In any case Members state has to go beyond such limit and to stimulate a more proactive collaboration between operators, public authorities and stakeholders that can contribute to improve the protection of Critical infrastructure and the resilience of communities.

In this terms is not sufficient the alignment of European policy and the national one. In particular government has to take care how the definition of national program can be implemented and exploited at the regional scale. It has to facilitate the definition of collaborative

process and the information sharing process between partners but also between the regional dimension and the national one in order to few an adequate monitoring strategy.

Finally, in order to promote the harmonization of methods, techniques and approaches to facilitate the collaboration between public and private partners, governments have to support the dissemination of best practices and methodologies regarding the protection of critical infrastructure and guideline how to improve the communities resilience.

6.4. Regional institutional level

As we defined the regional concept before, the regional dimension of public-private collaboration is identified by interpreting and integrating all the common interests that can contribute to promote the exploitation of synergies between public authorities involved in the protection of society and communities and Critical Infrastructure operators. The goal of regional partnerships is to achieve more than individual organizations can achieve on their own.

The collaboration between public and private members mainly focus on the implementation of practical strategies in order to reach the general policy goals that can be stated at National or at European level. Therefore, such collaboration is very pragmatic and it aims to remove the obstacles that limit the cooperation between the first responders and CI operators, mainly during the mitigation and the respond phase of a disaster management cycle.

In order to achieve such goal the Public-Private collaboration has preliminarily:

- to clearly identify what are the common interests of the partners;
- what is wiliness to collaborate and the sense of community which enable members to collaborate;
- to assess the level of commitment, investing time and energy in regional community protection and resilience;
- to identify what are the mechanisms for problem solving, addressing issues, and taking collective action with external organizations which may influence the work of Public-Private collaboration;
- to assess the required resources (e.g. human, technical, logistic and financial) and how access to them through commitments of institutional partners;

Therefore the public and private collaboration has to produce operation plans and procedure to improve the protection of CI and thus, of communities. Particular attention has to be paid to the information sharing and communication processes among private and public authorities during all the different phases of the risk management cycle.

Finally, the regional partnership has to guaranties to different information flows and coordination to guarantee:

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- **an efficient communication towards the national authorities** in order to update them about strategies and actions implemented, together with the results obtained and obstacle encountered at regional level; this process aims to feed the policy monitoring process and to improve the policy making process.
- **an efficient communication towards the local authorities, communities and stakeholders** in order to improve the implementation of the defined strategies and to coordinate the specific action relevant for the local dimension; this communication process also aims to collect suggestion and feedback from local stakeholders.

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7. Regional CI Public-Private Collaboration

7.1. Why to establish a Regional CI Public-Private Collaboration

The answer to why to establish CI Public-Private Collaboration can be rather trivial: there is added value in working with other organizations. Anyhow to assess and to describe such benefits is not always an easy exercise. The benefits of effective partnerships are not always immediately evident. Establishing effective and inclusive collaboration among actors that can play a role to improve the resilience of a community against failure of Critical Infrastructure services takes time. Therefore, it is important to create beforehand the right framework and review the structure and process of the partnership on an ongoing basis to measure its success or failure.

From a community development perspective, the test to determine if these partnerships are effective is whether they actually contribute to improve its resilience, which also implies what will empower people for social and economic change. Organizations linking community and institutional interests list the following components regarding the share of work: close, mutual cooperation; common goals; shared involvement in decision making; sharing risks and benefits; common interests; responsibilities; and power. These components focus on both the process of the collaboration (e.g., shared decision making, shared power) and the capacity of each partner to assume responsibility for a share of the effort.

7.2. What is a Regional CI Public-Private Collaboration

A working definition of a collaboration or partnership is “a collaborative relationship between entities to work toward shared objectives through a mutually agreed division of the efforts.”

Considerations in any collaborative process will vary based on the kinds of organizations involved, as well as on the intensity and interdependence of the relationship they choose to have. Therefore, there is a single way to watch or to design a collaborative process among Private CI operators (or other private stakeholders) and Public Authorities involved in defining strategies to protect citizens and to improve the resilience of societies.

The key for a Public-Private community to establish and maintain a successful collaboration, is to find a way to build on the strengths of all partners in various categories. In recent years, there has been a significant increase in the number of institutional “sponsors” of collaborations focusing on community improvement. Agencies at the state levels, universities, corporations, and national nonprofits have all provided support to partnerships with community impacts.

7.3. Capacities of a Regional CI Public-Private Collaboration

At least four fundamental capacities are required to implement a successful Public-Private collaboration:

- A sense of community, portraying a degree of connectedness among members;
- A level of commitment, investing time and energy in community well-being, often funnelled into local organizations;
- Mechanisms for problem solving, addressing issues, and taking collective action with external organizations ;
- Access to resources (human and financial) through commitments of partners.

In the context of partnerships, without such characteristics, the collaboration is at risk of being merely an empty recipient, which is not able to provide any factual improvement to the regional community. In addition to levels of collaborative capacity, in order to function as a partner, each organization must have a degree of organizational capacity to manage projects and budgets and establish manageable objectives to keep people involved. In other words, if only one side of the partnership is involved in actual project management, there is no assurance that it is representative of shared interests or that there is any capacity for sustainability.

7.4. Type of Regional CI Public-Private Collaboration

7.4.1. Cross-sector collaboration

Cross-sector partnerships are between organizations from different fields: non-profits, business, government, and academic. These partnerships can be challenging to maintain over time because you often have divergent needs and cultures. However, within cross-sector partnerships this weakness can be turned into strength.

The key is to find common ground and purpose that everyone in the partnership has a stake in.

7.4.2. Collaboration between donors and recipients

Partnerships between donors and recipients can often create confusion because I minly base of transition of money or other form of support. Collaboration aims at taking advantage of what the recipient, as well as the donor, can bring to the relationship. Even more important, a partnership seeks joint “ownership” of the relationship and tries to build the capacity of the recipient to undertake sustainable development. Therefore, this means that donors cannot impose conditions to coerce recipients to do things that they don’t want to do in order to obtain resources or support they need. A collaborative process recognizes that both sides must be involved in defining the terms of the relationship.

Moreover, the two sides, i.e. the members of a collaboration development, certainly have strong interests in common, but at the same time they are likely to have some divergent interests too.

7.4.3. Informal Collaboration

The collaboration between partners is characterized high degree of autonomy and there is not a stringent organizational commitment. Typically this type of collaboration are set in an early stage where stakeholders, operators and public authorities are not fully aware of all the potential benefit that a more structured approach can imply. The collaboration is seen as of coordinating actions and efforts and to share some information. There is not any leadership and the coordination rules are not explicit. Therefore, this form of collaboration can evolve according to the objectives and the commitment of the participants.

7.4.4. Strategic Alliance

Even if partners still operate independently, the decision-making power of the collaboration is transferred to promote particular activities. For instance some functions can be managed independently according to the interest of the collaboration partners and on the basis of a predefined agreement. One the simplest delegated function is typically the management of a secretary, which aims to coordinate the implementation of a program. More advanced functions related to the joint management can be transferred, e.g., administrative or programming, till form of collaboration that involves changes to structure and control of the collaboration where organizations create a new structure to advance an administrative or program-related function and even governance functions and fund raising activities.

7.5. Key aspects a Regional CI Public-Private Collaboration

7.5.1. The Regional dimension of the collaboration

It has to be clear to all members that concept of regional dimension go beyond the simple geographical interpretation but is the integration of all the dimensions that empower and constraints the collaborative process of each partner. For example it can be identified by comparing the responsibilities and duties of each pubic authority, which it has comply with to administrate a particular area, with service delivery characteristics of each CI operator. Considering the difference of roles and objectives, the definition of the region of concern required a preliminary identification and characterisation. Most of the time even the geographical area that can be associated to each partner is not unique.

7.5.2. Leadership

Collaboration implies a shared leadership among respected individuals who are recognized and empowered by their own organizations and trusted by partners to build consensus and resolve conflicts. In any case there are many styles of leadership in both formal and informal organizational structures that can be adopted in order to improve the collaborative model.

7.5.3. Common understanding

A common understanding of the framework, culture, values, and approach of partner organizations needs to exist. Among this dimensions, particular attention need to be paid to share the interpretation of the concept of regional dimension, that as it has mentioned above is not strictly related to the geographical or territorial dimension. It is also important a clear understanding of individual members' roles and responsibilities regarding the division of labor and more in general of the required effort.

7.5.4. Purpose

A shared common vision and purpose that builds trust and openness and recognizes the value and contribution of all members also needs to exist. Additionally, shared and transparent decision-making processes—extending the scope of influence over and involvement with other services and activities—will prove essential to the collaborative process. Shared goals and aims, understood and accepted as being important by each partner, lead to improved coordination of policies, programs, and service delivery, and, ultimately, better outcomes.

7.5.5. Culture and Values

Shared "can-do" values, understanding, and an acceptance of differences (e.g., values, ways of working) are all key components of a successful collaboration. Having respect for the contributions of all partners, combined with an absence of status barriers, will lead to the active involvement of members who are identified as being effective, representative, and capable of playing a valued role in the partnership.

7.5.6. Learning and Development

A healthy collaboration promotes an atmosphere of learning. This may involve monitoring and evaluation aimed at improving members' performance. Investing in partner skills, knowledge, and competence needs to be highly valued within the partnership. This open mindset and spirit of facilitation creates opportunities to shape each other's work and learn together. In this environment, members can more effectively reflect on both developmental successes and failures.

7.5.7. Communication

Effective communication at all levels within the partnership and within partner organizations, sharing and accessing all knowledge and information, needs to exist.

7.5.8. Performance Management

Management practices and resources are required to achieve the collaboration goals and complement the intended purpose of the collaboration. Specifically, members must demonstrate accountability for the actions they take and ownership of delivery of the objectives and targets for which they are responsible.

7.5.9. Barriers

Attention should be paid to barriers, which can impair the working relationship of partners. Furthermore, as relationships evolve, partners must work to resolve any barriers. Below is a list of potential barriers to successful collaboration:

- limited vision/failure to inspire
- One partner manipulates or dominates, or partners compete for the lead
- Lack of clear purpose and inconsistent level of understanding purpose
- Lack of understanding roles/responsibilities
- Lack of support from partner organizations with ultimate decision-making power
- Differences of philosophies and manners of working
- Lack of commitment; unwilling participants
- Unequal and/or unacceptable balance of power and control
- Key interests and/or people missing from the partnership
- Hidden agendas
- Failure to communicate
- Lack of evaluation or monitoring systems
- Failure to learn
- Financial and time commitments outweigh potential benefits
- Too little time for effective consultation

7.5.10. Develop and maintain trust

Fairness involves the conduct of the collaboration, affording equal status among the partners and equality regarding the distribution of partnership benefits or gains. You will also want to:

Ensure that the collaborative is able to sustain a level of trust when faced with external problems that inhibit the contribution of individual partners

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Ensure that the right people are in the right place at the right time

- Ensure that the trust that is built up within partnerships is protected from any mistrust that develops in parent organizations

Finally, the collaboration need to be open and honest, and communicative. Exchanging information in an open network will help build shared understanding and values. The need for effective communication goes beyond the collaboration itself.

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8. Conclusions

Risks for society and communalities deriving in the interconnected environment like that characterised by Critical Infrastructure systems and socio-economic system can no longer be treated as something that is confined to particular sectors or domains. Physical transport, trade and travel networks, energy and water supply networks, and global information technology infrastructure can become either a strong support for social and economic development and stability or an amplifier of cascading shocks.

In an era of definition of policies on aspect which are not still fully understood by science and which are characterized by strong interaction between social and technical systems, there is an increasing need for the cognitive and politico-strategic alignment of Public and Private actors in terms of problem perception; of 'making sense together', identifying wicked problems and designing policy tools and instruments that are capable of renewal, as well as designing and implementing coordinated action. One of the axes upon which such a sense-making and transformation could take place is between the regional, central and transnational government levels, in a process of bringing together a consortia or community of interests where the understanding of current social problems and the potential means of solving them could be realized. In this context, the collaboration between Public and Private stakeholders can be understood as a process of interpreting and defining common problems to provide more efficient answers and solutions.

In order to implement such process the policy-making process has to consider several weaknesses, which make the implementation of Critical Infrastructure protection strategies, partial, fragmented and inefficient. This report reviewed what are the type of fragmented aspects associated the definition Critical Infrastructure protection strategies and it suggested some approaches to remove them. In particular, it considers that the definition of collaborative approaches at regional scale, between Public authorities involved in the protection of communities and Critical Infrastructure Operators and other stakeholders is best way to identify efficient mitigation strategies. Moreover, it acknowledge the crucial role the regional level where local stakeholders can better collaborate to improve society resilience and are likely to play an active part in policy implementation. Therefore, the central government level needs to recognise and be sensitive to regional realities and perceptions, as it is on the local level that the majority of policy problems, as well as innovation processes engaging local communities, take place. The regional level can, at best, act as a catalyst for change and policy transformation by implementing local strategies for protection of Critical Infrastructure and for improving society resilience, while the central and transnational government levels enable regional level processes of protection to take place through various policy frameworks and instruments (regulative, normative, resource or strategic steering).

In conclusion, the regional level and national/international level have to establish a tighter synergy. To do this, efforts to understand, measure and foresee the evolution of these complex systems must first be improved. Next, procedures and institutions that are globally coordinated yet locally flexible and responsive must be developed. To meet rising com-

plexity effectively, regulation must not become more complex but, perhaps paradoxically, more simple. Simple and flexible rules are required as rising complexity cannot be matched by ever more complex and burdensome regulations.

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