Operationalizing resilience capabilities deployment in the Emergency Management Cycle – *READ tool*

P. Trucco & B. Petrenj
*Fondazione Politecnico di Milano, Milan, Italy*
E-mail: paolo.trucco@polimi.it

I. Kozine & H. B. Andersen
Technical University of Denmark, Kgs. Lyngby, Denmark
E-mail: igko@dtu.dk

The key features and functionalities of the tool that translates the READ framework for the integration of CI resilience capabilities into the EM set-up are presented.

The tool prototype was implemented in MSAccess™.
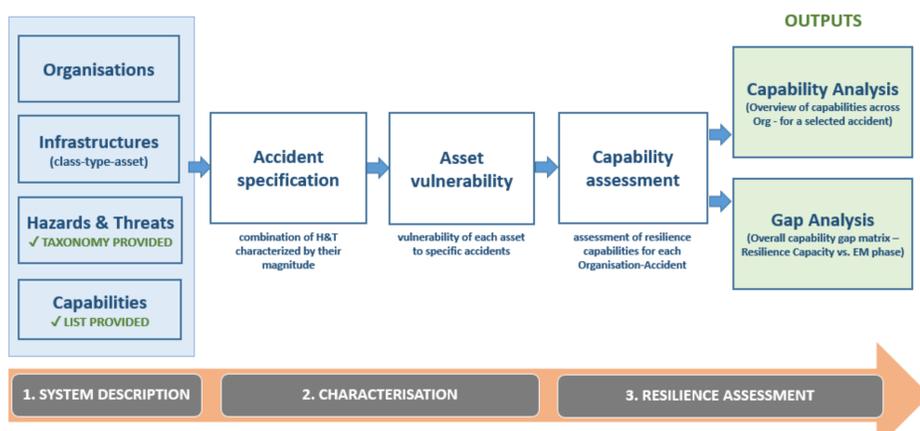
1. System and Organisational Context Specification

The characteristics of the system under analysis and the organisations involved in the EM are specified. In this part, the users should go through a few setup steps:

➢ Specification of each single organization, classified by type and role;
➢ Specification of the technological infrastructure (Classes, Types and Assets);
➢ Specification of relevant Hazards & Threats – a taxonomy is provided;
➢ Documentation of the existing types of capabilities and their classification – a proposed (and editable) list is provided

2. Characterisation

Consists of two steps:

➢ Accident Events Specification, where different possible future events can be described and documented as the scenario of reference for the next assessment and planning phases (e.g. electrical blackout event, heavy snowfall, etc.).
➢ Asset Vulnerability Analysis, where for each asset its vulnerability is defined for each of the accidents of interest.

3. Assessment of Resilience Capabilities

Referring to a specific accident event at a time, the users assign different types of capabilities to organizations, describing in which way the capability is specifically implemented in each organisation (assets-resources-routines). An assessment is also given on the current and the target (i.e. desired) level of this capability as planned by the corresponding organization. The capability assessment is done considering the vulnerability of assets to the accident in question.

Capability levels					
Missing	Very Low	Low	Medium	High	Very High
0	1	2	3	4	5

After all the capabilities are assigned to organisations and the assessment completed, it is possible to have an overview of the current state of the overall system. The Resilience Capacity Analysis function shows the distribution of specific capabilities throughout the organization types and levels, as well as their compounds for selected accident events.

Gap Analysis	Preparedness	Prevention	Mitigation	Response	Recovery
Absorptive	12	6	8	13	9
Adaptive	12	6	8	13	9
Preventive	12	6	8	12	8
Restorative	4			5	5

Show detailed list

Firstly, the maximum Gap is selected for each couple Organisation-Capability, as the biggest gap across different scenarios. Then the gap analysis is calculated by summarizing those capability maximum gaps by Resilience capacities (rows) and EM phases (columns).

The test case, based on a piece of data collected for preparation of a full pilot case in Lombardy Region (Italy), demonstrated the applicability of the approach and the functionalities of the software tool. The proposed approach and the tool were used to support the preparedness and collaborative planning activities in the context of the public-private partnership on CI Resilience in Lombardy Region. Thanks to a unified model and capability classification, different actors – energy or transport operators, first responders, etc. – were able to represent their resilience capacities in a way that is more understandable by the partners and usable for joint emergency planning. It also demonstrated the power of the proposed approach in fostering multi-agency and multi-stakeholder collaboration, and information sharing.

Learn about the READ project
http://www.read-project.eu