CREATING WINDS OF CHANGE –
ADAPTING AND TRANSFORMING THE CRISIS MANAGEMENT SYSTEM USING EXERCISES

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Abstract

During a crisis, crisis management actors need to continuously adapt to the developing situation as well as to each other. However, the crisis management actors also needs to adapt and transform in-between crises in order to be prepared for future events. This type of development is complex as it has to be achieved in a conscious and concerted manner amongst a heterogeneous group of actors, of which some may not even recognize themselves as potential crisis managers.

Exercises are regarded as one tool for such development. If, how and under what circumstances exercises contribute to a conscious and concerted change at an inter-organizational level is not well understood. In this paper, the roles of inter-organizational exercises in the evolution of the collective crisis management ability are discussed, based on a systems theory approach.

This is done by combining the idea of a cyclic approach with a previously developed model for understanding how heterogeneous system-of-systems learn in order to adapt and transform. The result increases the understanding of the role of exercises in the development, underscores the necessity of conscious choices regarding the focus and design of exercises and exercise elements to achieve a structured development, and shows how the interplay between exercises and other sources of knowledge can be understood in such a development.

Keywords: Crisis management, exercises, learning, systems theory, organizational learning

Introduction

Large-scale crises have the potential to shake modern societies in their social, economic, and political foundations. Hence, societies invest considerable resources into developing their capabilities for preventing crises, managing crises, and mitigating the effects of crises.

Inter-organizational exercises are almost by default regarded as useful means to develop crisis management capabilities, although there is little research to confirm this (Berlin and Carlström, 2014; MSB, 2017; Perry, 2004). Previous research has mostly focused on if, how and to what extent such exercises result in learning amongst the individual participants, and found some positive effects (Berlin and Carlström, 2015; Borodzicz and van Haperen, 2002; Perry, 2004; Rutty and Rutty, 2011). It has also been pointed out that exercise observers and exercise managers may learn as much, or even more, from an exercise than the participants (Borodzicz and van Haperen, 2002; Olsén *et al.*, 2019).

The impact of inter-organizational exercises on the organizational level is less studied (Beerens and Tehler, 2016; Berlin and Carlström, 2014). Anecdotal accounts suggest that if organizations carry out crisis management exercises together they are better placed to handle real crises (MSB, 2020; National

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Commission, 2004). This could be an effect of exercises fostering inter-organizational relationships and an increased mutual understanding amongst individual participants (Berlin and Carlström, 2015; Perry, 2004). Berlin and Carlström (2015) noted that if exercises focus on collaboration, there may be a positive effect on the general ability to work together during future crisis events. Beerens (2021) studied evaluations and their role in supporting learning as well as in identifying development needs, and proposed a cyclic approach where exercises, and their evaluations, build upon each other to increase the capability.

Given the resources invested in inter-organizational crisis management exercises it seems vital to understand how they can contribute to concerted learning and change at the organizational and inter-organizational levels.

The objective of this paper is to discuss how inter-organizational exercises can contribute to a coherent and systematic development of crisis management capabilities. This is done by combining the idea of a cyclic approach (Beerens, 2021) with a previously developed model for understanding how heterogeneous system-of-systems, and more specifically crisis management systems, learn in order to adapt and transform in-between crises (Eriksson and Hallberg, 2021).

Crisis management and inter-organizational exercises

A crisis is a rare event that threatens considerable values, is characterized by a high degree of uncertainty, and leaves little time for analysis and decisions (Boin *et al.*, 2016). Crisis management usually cannot be based on pre-determined combinations of resources and capabilities, instead the response needs to be designed to fit the specific situation (Ansell *et al*., 2010; Boin, 2009; Comfort, 2007; Kim, 2014). The ability to improvise and change during a crisis is one key for success (Comfort, 2007; Boin et al., 2016). However, crisis management capabilities also need to develop in-between crisis to keep up with the continuous changes in threats and vulnerabilities (Eriksson and Hallberg, 2021).

During a response operation the crisis management actors can be regarded as a heterogeneous system-of-systems, i.e. the crisis management response system. Each sub-system, or actor, in the system has its own specific properties and its own purposes and mandates (Eriksson and Hallberg, 2021). In addition, there is a similar, but not identical, crisis management planning system in-between crises. While the response system is largely built on the resources made available by the actors in the planning system, not all actors in the planning system contribute to all responses. Moreover, actors that are not part of the planning system may contribute to a specific response (Eriksson and Hallberg, 2021). All taken into account, to achieve concerted and coordinated change in this heterogeneous system represents a considerable challenge.

Inter-organizational crisis management exercises

This paper focuses on *inter-organizational exercises*. In the most general sense, these are exercises that involve participants from two or more organizations, or in some cases only one organization, while other actors are simulated (Eriksson and Hallberg, 2019). However, there is no universally accepted definition of inter-organizational crisis management exercises. Definitions by government agencies tend to emphasize the role of exercises to test plans, procedures, and capabilities (FEMA, 2021b; Ministry of Civil Defence & Emergency Management, 2019; MSB, 2017; UK Government, 2021). Furthermore, *training and practicing* is also included in some of these definitions (Ministry of Civil Defence & Emergency Management, 2019; UK Government, 2021).

In previous research, inter-organizational exercises have often been described with regard to what they are supposed to achieve. Berlin and Carlström (2015, p. 11) stated that exercises "aim to help authorities to become better at handling accidents, crises and disasters"*,* while Beerens and Theeler (2016, p. 413) noted that exercises "can be used to test equipment and responses i.e. plans, procedures, skills and knowledge. In other cases, they are used to facilitate learning by, for example, developing and embedding routine skills and procedures".

However, Perry (2004, p. 66) has offered a more philosophical take:

> *Broadly speaking, exercises represent constructed opportunities to test the protocols and equipment specified under a plan and taught in the training phase. Exercises may be seen as a form of training in the sense that individuals are rehearsing response measures. Ultimately, however, exercises provide the forum or context to test the effectiveness of both the training program and the plan, as well as the ability of personnel to execute the plan.*

This definition underscores the role of exercises to test existing procedures and structures, but it also highlights that this is an indirect test of the modalities for introducing and implementing these procedures and structures in the organization or the crisis management system. Another potential role for exercises is to explore new capabilities or procedures (Eriksson and Hallberg, 2019). This may either be in the form of exercises where the participants are left to their own devices to seek and execute a solution for a specific situation, or in the form of exercises where a new procedure or capability is introduced and tested. Finally, exercises can also be used to signal ability, internally and externally (Eriksson and Hallberg, 2019; Perry, 2004).

These four types of objectives outline an exercise typology: (1) exercises for improving capabilities, i.e. to improve, or maintain, specific capabilities to a predefined level, (2) exercises for evaluation, i.e. to test/evaluate if a capability has reached a predefined level, (3) exercises for exploring, i.e. to explore/develop, for instance to find new procedures, and (4) exercises for demonstrating, i.e. to demonstrate capabilities and procedures internally or externally.

Other typologies are based on the exercise format, i.e. the character and properties of the exercises. There is a multitude of such typologies: Collaboration exercises, drills, and strategic exercises (Berlin & Carlström, 2015); table-top, functional, and full-scale exercises (Perry, 2004); table-top exercises, functional exercises, full-scale exercises with one actor and other actors being simulated, and full-scale exercises with several actors (Eriksson & Hallberg, 2019); discussion-based (seminars, workshops, table-top, games) and operations-based (drill, functional, full-scale) exercises (FEMA, 2021a); and table-top, command post, field training, and functional exercises (MSB, 2020). Although similar terms appear in two or more of these typologies, their definitions may differ from typology to typology.

In this paper, a format-based typology is used, consisting of table-top exercises, command post exercises, functional exercises, and full-scale exercises. *Table-top exercises* are defined as discussion-based exercises during which the participants walk through a scenario or a decision-making process step-by-step, either in a seminar format where the participants discuss the scenario together, or in a format where the participants act as representatives for their respective roles or organizations (Eriksson and Hallberg, 2019; MSB, 2017; Perry, 2004). *Command post exercises* are defined as exercises where one or several actors are subjected to a scenario. The participants are expected to react to it as they would in a real situation, typically with their regular organization and resources (MSB, 2017). The surrounding environment is usually simulated. *Functional exercises* are defined as exercises involving one function. They can come in the form of either drills, repeating the same steps until the participants master them, or single events, for instance to test or demonstrate a capability (Eriksson and Hallberg, 2019, Perry, 2004). Finally, *full-scale exercises* are defined as exercises that encompass the overall crisis management system (Eriksson and Hallberg, 2019, Perry, 2004). Full-scale exercises usually involve a large number of actors from different sectors and decision-making levels. However, actors and parts of the environment may also be simulated.

Functional and full-scale exercises often include field units, while command post and table-top exercises do not. All exercise formats can be, and are, used for inter-organizational exercises.

Exercise series

An exercise can be a one-off event or a part of a series of exercises. Beerens *et al.* (2012) proposed a cyclic approach to exercises, where desired and predefined exercise outcomes form the basis for the design, implementation, and evaluation of the exercise. If these outcomes are not achieved, a gap analysis defines the outcomes for the next exercise. If the outcomes are achieved, new development

objectives can be defined as the start of a new exercise cycle. In later research, Beerens (2021) noted that exercises and evaluations seldom build upon another, which affects the learning negatively.

Greenberg *et al.* (2017, p. 19) noted that gradual capability improvement can be measured in an exercise series, but that "the criteria used in the evaluations must also be consistent across time" to allow for comparability. However, in reality exercise evaluations are sprawling due to i.a. differences in methodologies and differences between the exercises which make comparability difficult at best (Beerens, 2021; Nordström & Johansson, 2019).

Van Laere and Lindblom (2019) observed that there is little research on how the design of exercises in an exercise series differs from that of one-off exercises. Based on more than 140 table-top exercises, they developed a framework for exercise series "where learning needs, training formats and techniques, training content, and training outcomes are interrelated" (Van Laere and Lindblom, 2019, p. 39).

Systems that learn in order to adapt and transform

By combining *systems theory* with *theories of organizational learning*, Eriksson and Hallberg (2021) described a model for understanding how the crisis management planning system can learn in order to adapt and transform in a coordinated and concerted manner in-between crises. The authors defined the system configuration as the system elements and their relationships, together with the goals, roles, mandates, culture, procedures, rules, and organization of the system.

In organizational learning, the term *theory-in-use* describes the body of knowledge – in documents, in organizational culture, in organizational and physical structures, and in *how things are done here* – directing an organization's actions (Argyris and Schön, 1996; Levitt and March, 1988). This body of knowledge is fluid and changes as the organization, and the individuals populating the organization, acquire new knowledge. *Single-loop learning* is the gradual improvement of the organization within its current theory-in-use, while *double-loop learning* results in a change of the theory-in-use itself, i.e. it is a much more fundamental process affecting the very foundations of an organization (Argyris and Schön, 1996).

The sub-systems in the crisis management system, such as the police or an electric power company, usually have their own specific theory-in-use. However, at the overall system level the situation is quite different. The lack of a common theory-in-use at this level means that agreeing on what to do and what to achieve, as well as how, can be complicated (Eriksson and Hallberg, 2021).

By equating the system configuration with the system's theory-in-use, Eriksson and Hallberg (2021) created a model for how systems learn in order to adapt and transform. In this model, incremental adaptation of the system configuration, such as the improvement of the procedures for inter-organizational communication, could be understood as an effect of single-loop learning. Conversely, transformation of the system configuration, such as the inclusion of new categories of sub-systems, could be understood as an effect of double-loop learning (Eriksson and Hallberg, 2021).

This allows for linking the need for change in the system configuration to the need for organizational learning, which in turn may facilitate a common understanding in the heterogeneous system-of-systems of what need to change and how.

If sub-performance is identified in the system, an organizational inquiry for new knowledge may take place (Argyris & Schön, 1996). The results from such an inquiry may imply the need for either adaptation (based on single-loop learning), or transformation (based on double-loop learning) of the system configuration (Eriksson & Hallberg, 2021). This can be translated into a process of three phases: (1) Identifying sub-performance, (2) developing new knowledge, and (3) implementing change. In the following sections, the potential roles of exercises in this process will be discussed using these three phases.

Using exercise to develop the crisis management system

The focus for this paper is how inter-organizational exercises can contribute to a coherent and systematic development of the crisis management capabilities in a structured manner. One challenge is

that while experiences are usually made in a response system (in either exercises or response operations), analysis and implementation of these experiences usually take place in the planning system (Eriksson and Hallberg, 2021).

Identifying sub-performance

The role of inter-organizational crisis management exercises to test the overall system as well as single organizations' ability to contribute to this system is stressed in many government definitions (FEMA, 2021b; Ministry of Civil Defence & Emergency Management, 2019; MSB, 2017; UK Government, 2021). As crises are rare, inter-organizational exercises may in fact be the only way to learn from the past and to test the functionality of the crisis management system in these types of situations (Beerens, 2021: Kettl, 2003; Brattberg, 2012).

Most inter-organizational crisis management exercises, regardless of their focus, produce information on the performance of the system and its actors. However, exercises focused on evaluation can be specifically designed to highlight and isolate exactly those capabilities that are to be measured in a controlled context.

The results from an evaluation of an exercise may indicate sub-performance and, in some cases, point out the potential causes for this sub-performance. This could in turn imply the need for either adaptation of single components and relationships within the current system configuration or transformation of the overall system.

Using information from evaluative exercises as a basis for double-loop learning, i.e. the transformation of a system from one configuration to another, could be somewhat precarious. Sub-performance identified in exercises carried out *within* the current theory-in-use could possibly reveal the *potential need* for rethinking the system configuration. It is, however, much less certain that this information should guide the actual transformation, as it is limited by the existing theory-in-use. This is in line with the theories of organizational learning, where double-loop transformation calls for strategic level analysis and decision-making (Argyris and Schön, 1996).

There are two basic preconditions for using exercises for evaluation. First, the system configuration has to be specified. Otherwise, it is difficult to know what and where to measure. Second, there have to be specified levels of acceptable performance, both at the system and the sub-system levels. Otherwise, it is difficult to know how to assess the results. These preconditions are stressed in exercise manuals as well as in research, often expressed in terms of the need for well-defined and evaluable exercise objectives (Beerens, 2021; MSB, 2017; Ministry of Civil Defence & Emergency Management, 2019). However, defining and delimiting the crisis management system, especially the crisis management planning system, is not straightforward (Eriksson and Hallberg, 2021).

Evaluative inter-organizational exercises can have any of the four exercise formats previously discussed. Table-top exercises may focus on the evaluation of plans, processes, and procedures as well as on the evaluation of joint decision-making and inter-organizational cooperation. Functional exercises may focus on the evaluation of equipment, procedures, interoperability, individuals, and groups. Command post exercises may focus on cooperation at the staff and command levels. Finally, full-scale exercises may focus on the evaluation of the overall crisis management system in a realistic setting with frictions present.

Searching for new knowledge

The role of inter-organizational exercises to identify new knowledge, possibly as a part of an *organizational inquiry*, has only been occasionally discussed (Grunnan and Friedheim, 2018; Kleiboer, 1997, 202; van Laere and Lindblom, 2019). Still, this is not an uncommon purpose for an exercise. For instance, the Swedish Civil Contingencies Agency (MSB) highlights the investigative purpose of exercises in "cases where no routine, capacity, nor know-how, are present" (MSB, 2017, p. 31).

In this paper, the term *explorative exercises* is used to describe exercises that are specifically designed to find an alternative modus as well as to describe exercises that test suggestions for system changes or

in other ways exploit knowledge from other contexts. Using the terminology of March (1991), explorative exercises may include *exploration* – pursuit of things that might come to be known – as well as *exploitation* – use of things already known.

Using explorative exercises to investigate in what direction the crisis management system could or should develop demands openness and courage in the design of the exercise as well as in the analysis of its results. In the heterogeneous crisis management system this could represent a considerable challenge, as actors may want to interpret the results to fit and strengthen their own specific theory-in-use.

Explorative exercises can identify new ways of doing things in well-known crises, but they may also focus on how to handle, and collaborate in, rare, unexpected, or previously not discussed, crises (Beerens, 2021; Borodzicz and van Haperen, 2002; Greenberg *et al.*, 2016; Grunnan and Fridheim, 2017). In most cases, the exercise format would be table-top, functional, or command post to allow for experimentation and exploration without the costs associated with full-scale exercises.

Implementing change

The role of inter-organizational exercises to implement new or improved procedures, technologies, and mandates, or maintain already established ones, in order to develop capabilities is mentioned in both handbooks and research (Beerens and Theler, 2016; Grunnan and Fridheim, 2017; MSB, 2017; UK Government, 2021). It is not the only tool for such implementation; training and revisions of manual are other examples. As was the case for evaluative exercises, a precondition for exercises to be successful in this role is an agreement on what constitutes acceptable levels of performance, i.e. what to implement.

Well-defined exercise objectives accepted by the participants form the basis for successful learning in inter-organizational crisis management exercises (Beerens, 2021; Darin-Mattsson and Hallberg, 2019). Without such objectives defining what to learn and influencing the design of the exercise, there is a risk that the learning will be context-dependent, coincidental, or simply wrong. Inter-organizational exercises can be used for implementing changes that are part of adaptation as well as transformation, i.e. they can have roles in both single- and double-loop learning.

Inter-organizational exercises used for implementing change can be table-top, functional, command post as well as full-scale exercises, depending on the nature of the desired change. However, inter-organizational exercises are primarily tools for implementing change in the cooperative aspects of crisis management.

Exercises and the need for post-exercise validation

Exercise results are context-dependent (Beerens, 2021, Andersson & Eriksson, 2015). What is true in one specific setting and at one specific moment in time is not necessarily true in all settings or in every moment in time. Sometimes, it is not even true in a similar setting. This means that the results from evaluative and explorative exercises need to be analyzed, validated, and generalized before being applied (Eriksson *et al.*, 2017). However, exercises are not the only sources of knowledge. Research, response operations as well as knowledge already internalized in the organization (the current theory-in-use) can be just as important (Beerens, 2021; Eriksson *et al.*, 2017). In the validation process, the exercise results need to be analyzed together with the information from these sources.

Validating the results from an inter-organizational exercise represents a considerable challenge in a heterogeneous crisis management system lacking a common theory-in-use (Eriksson and Hallberg, 2021). In an evaluative exercise, one actor may be completely content with its own contributions, based on its interpretation of its mandates and objectives, while others regard them as sub-performance. In an explorative exercise, the results may imply the need for changes in roles and objectives of single organizations, which may be equally sensitive. To alleviate this, Eriksson and Hallberg (2021) proposed using *efficacy* – the extent to which a sub-system contributes to the efforts of the overall system – as the preferred measurement of performance rather than effectivity – the extent to which a sub-system solves its tasks. This could allow for a discussion less prone to subjectivity and sensitivities. A common process for analyzing the results from inter-organizational exercises, including all relevant actors (in the

response system as well as the planning system), may facilitate agreements on sub-performances at the system level, but also on what lessons to implement and in what way (Eriksson *et al.*, 2017).

Creating winds of change

Inter-organizational exercises as agents for concerted change in the heterogeneous crisis management system may intuitively seem like a straightforward idea. Introducing exercises in the previously developed model for how system-of-systems, especially crisis management systems, learn in order to adapt and transform makes it apparent that the role of exercises in such a development process is not limited to implementing change. Exercises may serve as a diagnostic tool to determine system performance, identify needs for change and act as a laboratory for the search for, and test of, knowledge in the form of e.g. new methods and technologies. This is similar to the cyclic approach offered by Beerens *et al.* (2012) and Beerens (2021).

However, in this paper the need for analysis of exercise results, together with knowledge from other sources, is further stressed in all steps of the development cycle. This becomes especially important in processes resulting in any type of transformation of the crisis management system, i.e. double-loop learning. Conversely, validated exercise results can be used as an input in a variety of other activities. These include explorative activities such as organizational inquiries and research, but also activities for implementation such as training, revision of manuals and procedures, redesign of physical artefacts such as equipment or facilities, new exercises, etc.

Figure 1 illustrates the potential roles of exercises in a process for learning in order to adapt or transform, and the interplay between exercises and other sources of knowledge. The arrows represent flows of information.
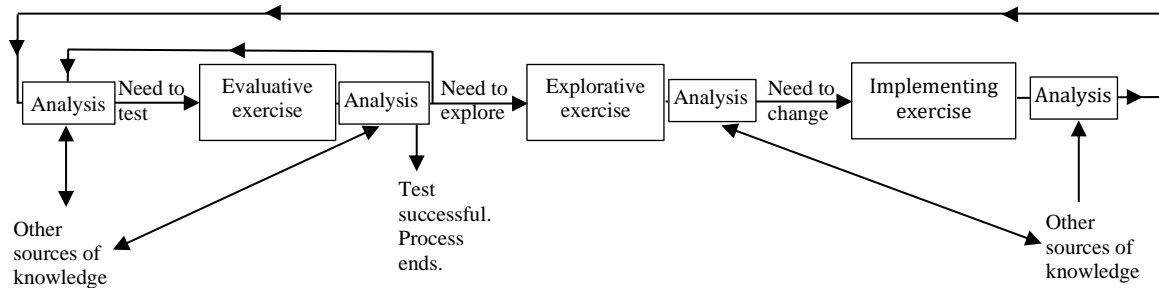

Figure 1 Potential roles of exercises in a process for learning in order to adapt or transform.

In a series of inter-organizational exercises this process is sequential, where each exercise has a clearly defined role and purpose. However, resources are often too scarce to allow for such an approach and a single exercise may have to include elements of evaluation and exploration as well as implementation. This can be problematic as an exercise element that focuses on evaluation, i.e. whether a resource (a system, a function, or an individual) has a predefined level of capability, hardly allows for the exploration of new strategies. Hence, the need for conscious decisions on the focus and design of exercises and exercise elements is paramount if they are to have a role in a structured change process.

Inter-organizational exercises are not always the most effective and efficient tools available for learning in order to adapt and transform. Using such exercises to investigate sub-performance or implement change in capabilities that has little to do with inter-organizational crisis management capabilities may be a waste of valuable resources, as this could be better done by using, for instance, intra-organizational exercises. However, even with a focus on inter-organizational capabilities, an inter-organizational exercise is not always the preferred option. An online training course could be more efficient for the implementation of new procedures, and a set of small experimental studies, or a research project, could be more efficient to explore the potential of a new technology.

Finally, the use of exercises as change agents in the crisis management system comes with several preconditions. First, the system needs to be clearly defined and delimited. Second, the process needs to include tools for agreeing on issues such as current capabilities, sub-performance, and the need for

change. Third, it is necessary to analyze whether an inter-organizational exercise is the most rational alternative. When these requirements are fulfilled, it is possible for the actors in the crisis management system to jointly agree on how the desired learning and change can be achieved through a series of inter-organizational exercises or exercise elements, what their objectives should be and, how they should be designed.

Conclusion

The main contribution of this paper is that it outlines a structure for understanding and discussing how a conscious use of exercises can contribute to a structured and concerted development of the heterogeneous crisis management system, what roles they can play in such change, and what some of the challenges are. It shows that by introducing a cyclic approach to exercises into a model for how complex systems learn in order to adapt and transform, such an understanding can be facilitated. It also underscores the necessity of conscious choices regarding the focus and design of exercises and exercise elements to achieve a structured development. Finally, the paper details how the interplay between exercises and other sources of knowledge can be understood in the development process.

As a next step, the model presented in this paper could be applied to a series of exercises to investigate if and how it improves the ability of decision-makers to use exercises to consciously adapt and transform the crisis management system.

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