Identification of key factors that support and limit action plan implementation after a SimEx and suggestions on how to overcome the challenges

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Lund 2023

Title: Identification of key factors that support and limit action plan implementation after a SimEx and suggestions on how to overcome the challenges

Titel: Identifiering av nyckelfaktorer som bidrar och begränsar implementering av åtgärder efter en SimEx samt förslag på hur utmaningar kan lösas

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Number of pages: 48 pages

Keywords: simulation exercise, evaluation, action plan, implementation, challenges, usefulness, improve, learning, lessons learnt, debrief session, capacity development, capacity strengthening, capacity building, disaster risk management, disaster risk reduction, emergency preparedness, and disaster preparedness.

Abstract: It is difficult to prepare for events with large-scale consequences and low probability. Simulation exercises (SimEx) provide the opportunity to improve preparedness through strengthening capabilities before an actual emergency. Conducting a SimEx could be very expensive and therefore the SimEx should be thoroughly evaluated. Action plans (AP) determine the relevant recommendations to be implemented to address the gaps of the SimEx. However, the action plan is not always fully implemented, and the purpose of this master's thesis was to better understand the factors supporting and limiting action plan implementation after a SimEx. The purpose was also to better understand how challenges related to action plan implementation could be overcome. To fulfil this purpose, one literature review and one interview study were conducted. This resulted in that 11 key factors could be identified that were categorized into five themes: Planning, Resources, Learning, Realism, and Priority. Failure in one theme could lead to action plan failure and it is recommended to consider all themes to increase the probability of AP implementation. Furthermore, there are many challenges related to action plan implementation and it is recommended to document successful ways to overcome the challenges. Lastly, action plans are connected to capacity development (CD) for disaster risk reduction (DRR) and factors that support and limit CD for DRR could be applicable to AP implementation e.g., clear terminology.

Summary

It is difficult to prepare for events with low probability and large-scale consequences. Simulation exercises (SimEx) provide opportunities to improve emergency response systems in a safe environment, and if weaknesses are identified in a simulated capability, it is possible to address the subject gaps before an actual emergency. To improve preparedness, it is important that the simulation exercise is evaluated and that gaps in the SimEx are addressed. An action plan determines the recommendations to be implemented to address the identified gaps in the SimEx. The action plan (AP) should include: Recommendations (both short-term and long-term), specific activities for implementation, implementation type, responsible person/unit, timeline, and remarks. However, the action plan is not always fully implemented even though a SimEx could be very expensive and time-consuming. The purpose of this master's thesis was to identify key factors that limit and support the implementation of action plans based on a SimEx. The purpose was also to better understand how challenges related to action plan implementation could be overcome. The following research questions were assessed:

- What are the key factors that limit and support the implementation of action plans based on simulation exercises?
- What can be done to overcome the challenges related to the implementation of the action plan?

To address the research questions, one literature review and one interview study were conducted. This resulted in 11 identified key factors that support and limit action plan implementation that was categorized into five themes: Planning, Resources, Learning, Realism, and Priority. It is difficult to determine if one theme is more important to consider than another since failure in one theme could result in action plan implementation failure. Furthermore, there were no major discrepancies between the literature review and the interview study. Both discussed that active involvement is necessary for successful AP implementation, and that the purpose, scope, and objectives of the SimEx should be clear. Moreover, to overcome challenges related to AP implementation challenges, good cultural understanding is suggested. There are many challenges and different ways to overcome them. In case that good ideas are identified to overcome AP implementation challenges, the ideas should be documented so that individuals that were not part of the SimEx still gain an understanding of the challenges and how to overcome them. This is also expected to reduce the impact of for instance staff turnover, which limits action plan implementation.

The assessment of the research questions resulted in that connections could be identified between AP implementation and capacity development (CD) for disaster risk reduction (DRR). Action plans are one way to develop capacity and therefore many challenges that relate to CD for DRR are applicable to AP implementation e.g., terminology and long-term planning. Therefore, if suggestions are found on how to overcome challenges in CD for DRR, action plan implementation challenges could also be solved.

Sammanfattning (Summary in Swedish)

Det är svårt att vara förberedd inför kriser med låg sannolikhet och stora konsekvenser. Simuleringsövningar (SimEx) tillgodoser möjligheter att förbättra krissystem i en säker miljö, och om brister identifierats, så är det möjligt att adressera bristerna innan en kris faktiskt sker. För att förbättra den förberedande förmågan så är det viktigt att simuleringsövningen är utvärderad och att identifierade brister i SimEx adresseras. En åtgärdsplan (AP) bestämmer rekommendationerna som ska implementeras för att adressera bristerna i simuleringsövningen. Åtgärdsplanen bör inkludera: rekommendationer (både kortsiktiga och långsiktiga), specifika aktiviteter för implementering, implementeringstyp, ansvarig person/enhet, tidsplan, samt anmärkningar. Dock implementeras inte alltid åtgärdsplanen till fullo trots att en SimEx kan vara väldigt dyr och tidskrävande. Syftet med det här examensarbetet var att identifiera nyckelfaktorer som begränsar och stödjer implementering av åtgärdsplaner efter en simuleringsövning. Syftet var också att bättre förstå hur utmaningar relaterade till åtgärdsplanimplementering kan lösas. Följande forskningsfrågor har adresserats:

- Vad finns det för nyckelfaktorer som begränsar och stödjer implementering av åtgärdsplaner baserat på simuleringsövningar?
- Vad kan göras för att lösa utmaningarna relaterade till implementering av åtgärdsplaner?

För att adressera forskningsfrågorna har en litteraturgranskning och en intervjustudie genomförts. Detta resulterade i 11 identifierade nyckelfaktorer som stödjer och begränsar implementering av åtgärdsplaner, som kategoriserades till fem teman: Planering, Resurser, Lärande, Realism, och Prioritet. Det är svårt att bestämma om ett tema är viktigare än ett annat, eftersom ett tema kan påverka så pass mycket att åtgärdsplanen inte implementeras. Därtill fanns det inga större skillnader mellan litteraturgranskningen och intervjustudien. Båda diskuterade att aktiv involvering är nödvändigt för AP implementering, och att det bör finnas ett tydligt syfte och mål samt omfattning med simuleringsövningen. Därtill, för att lösa utmaningar relaterade till AP implementering så är god kulturell förståelse rekommenderat. Det finns många utmaningar och olika sätt att lösa dem. Ifall att bra idéer är identifierade för att lösa utmaningar, bör dessa idéer dokumenteras, så att individer som inte var med i SimEx fortfarande får en bättre förståelse av utmaningarna och hur de kan lösas. Detta förväntas reducera påverkan av exempelvis personalomsättning som begränsar AP implementering.

Analysen av forskningsfrågorna resulterade i att samband mellan AP implementering och kapacitetsutveckling (CD) för katastrofriskreducering (DRR) kunde identifieras. Åtgärdsplaner är ett sätt att utveckla kapacitet och därför är många utmaningar relaterade till CD för DRR tillämpbara på AP implementering, till exempel terminologi och långsiktig planering. Därför, om förslag identifieras för att lösa utmaningar inom CD för DRR, skulle även utmaningar relaterade till AP implementering kunna lösas.

Acknowledgements

List of Acronyms and Abbreviations

AB   Abstract

AP   Action Plan

CD   Capacity Development

DLL   Double-loop learning

DR   Drill

DRM   Disaster Risk Management

DRR   Disaster Risk Reduction

EU   European Union

FOI   Swedish Defence Research Agency

FSX   Field/Full-scale exercise

FX   Functional exercise

LU   Lund University

MSB   Swedish Civil Contingencies Agency

NAPHS   National Action Plans for Health Security

NGO   Non-governmental organization

NIPV   Netherlands Institute for Public Safety

SLL   Single-loop learning

SimEx   Simulation Exercise

SOP   Standard Operating Procedure

TI   Title

TTX   Tabletop exercise

UN   United Nations

WHO   World Health Organisation

WFP   World Food Programme

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1. Introduction

It is difficult to prepare for future events with large-scale consequences and low probability (McConnell & Drennan, 2006). To better prepare for the future, it is important to draw lessons from past experiences and continuously develop emergency response systems and improve preparedness. Due to the complexity and uncertainty of low-probability events, it is difficult to predict the current preparedness level of the response systems (Abrahamsson et al., 2010). This is different compared to routine events with historical data that provides a more complete picture of the problem and relevant measures to implement (Beerens, 2021). Furthermore, the level of preparedness for an undesired event with detrimental consequences and low probability is not clear until the event has occurred.

Simulation exercises (SimEx) provide opportunities to improve response systems and preparedness in a safe environment and there are various objectives for conducting simulation exercises (Biddinger et al., 2008). One objective of the SimEx could be to identify the strengths and weaknesses of tested capabilities. If it is found that a simulated capability is not fulfilling its aim and objectives, it is possible to address this issue before an actual emergency. The obtained information from the SimEx could therefore support decision-making processes and improve the resilience of tested capabilities (World Health Organization, 2018). Furthermore, there is a wide spectrum of suitable areas for simulation exercises (Covaciu et al., 2021). This indicates that different sectors could share important lessons from their respective SimEx, and support development and learning. In addition, simulation exercises could identify gaps in various plans and procedures, and clarify responsibilities (Biddinger et al., 2008).

One goal of the Sendai Framework is to improve resilience, and simulation exercises contribute to achieving this goal (UNISDR, 2015). There are generally two different types of SimEx: discussion-based exercises and operations-based exercises. The latter could be subcategorized into drills (DR), functional exercises (FX), and full-scale exercises (FSX), see section 3 for definitions. The duration of discussion-based exercises, such as tabletop exercises, is generally three to eight hours, whilst operations-based exercises could last up to several days (World Health Organisation, 2017). Furthermore, the cost of a FSX SimEx could be very expensive (European Commission, 2021, p. 10). Corrective actions to reduce vulnerabilities of tested capabilities should be implemented effectively to reduce the impact of an undesired event. However, this is not always the case and action plans with recommendations from a simulation exercise are not always implemented (Peterson & Perry, 1999).

To reduce consequences from a future large-scale emergency, it is important to allocate time for the SimEx evaluation process and determine effective response phase measures to be implemented (Hunter et al., 2012; World Health Organisation, 2017). Furthermore, there is uncertainty about the extent to which SimEx evaluations are utilized and implemented (Ledbury et al., 2022). There is also uncertainty if the action plan with recommendations from the evaluation leads to actual change (Torres & Preskill, 2001). To bring focus to this area, this master's thesis investigated factors that limit and support action plan implementation and

what can be done to overcome challenges related to the implementation of the action plan. The project was based on a literature review and interviews with professionals in the SimEx field. The information from the literature review and interview study have been compared and discussed.

1.1 Aim and Research Questions

The overall aim of this thesis was to identify key factors that limit and support the implementation of action plans developed based on simulation exercises. The aim was also to better understand if and how the identified challenges can be overcome. The research questions that have been addressed are:

- What are the key factors that limit and support the implementation of action plans based on simulation exercises?
- What can be done to overcome the challenges related to the implementation of the action plan?

This master's thesis was based on the development of an action plan after a simulation exercise.

1.2 Boundaries and Limitations

This thesis was subject to boundaries and limitations. One boundary was that the informants in the interview study were anonymous. This could have resulted in more honest responses from the informants. However, anonymity could make it more difficult to follow up and verify the provided information. Another boundary was the data collection. This thesis was based on a literature review and interview study, but there are other ways to gather data e.g., surveys and case studies. Each data collection method has strengths and weaknesses, and the chosen method for this thesis depended on the research context e.g., research questions and available time.

The limitations of this master's thesis include:

- This thesis was limited to interviews with SimEx professionals. The perspective of the professionals could be different compared to for instance, participants of simulation exercises.
- The interviews required time and resources e.g., scheduling appointments, transcription, and analysis of obtained data. This limited the number of interviewed informants.
- The interviewed informants may not accurately recall SimEx experiences. The last time one informant worked on simulation exercises was ten years ago.
- Action plan implementation based on simulation exercises is a broad subject, and important studies could have been missed in the literature review.

2. Method and Materials

This section describes the method and materials used for the literature review and interview study, see sections 2.1 and 2.2. A schematic work process for this thesis is displayed at the end of section 2.

2.1 Literature review

There are many advantages from conducting a literature review. First, the risk of researching well-known knowledge decrease (Höst et al., 2006). Second, the probability that the master's thesis actually provides new valuable research increases (ibid). Höst et al (2006) also emphasize that a thorough literature review can help the reader better understand the research questions, results, and discussion. Finally, a systematic literature review allows the author to gain an understanding of the research area at an early stage of the thesis.

The aim of this literature review was to better understand the research area at an early stage and be better understand for the interviews (Höst et al., 2006). This included identifying factors that support and limit action plan implementation and gathering information on action plan implementation challenges. The search engine, LUBsearch, was used to find relevant articles for the literature review. Simulation exercises are carried out in various settings, and the advanced search settings in LUBsearch was used to increase the relevance of the articles. First, the selected settings only searched for articles that were peer-reviewed to increase the quality of the literature review (ibid, p. 64). Second, the language of the articles was limited to English or Swedish. Third, the search engine only looked for articles that contained the keywords in the abstract (AB). The scope of the search was reduced if the search string resulted in more than 100 search results. This was done by changing one search field from abstract (AB) to title (TI). Finally, the AND option was utilised that made it possible to combine the keywords in the search. Three examples of how the keywords were combined in the search engine are shown below, and more details are provided in Appendix B.

I. Simulation exercise (AB) AND evaluation (AB).
II. Simulation exercise (TI) AND evaluation (AB).
III. Simulation exercise (TI) AND evaluation (TI).

The relevance of the listed articles in LUBsearch was decided by first reading the title. Based on this information, the article was either further analysed by reading the abstract, introduction and conclusion or discarded. Articles that were out of context that e.g., discussed mathematical computer simulations were not analysed. The article was fully analysed if the information from the title, abstract, introduction and conclusion was expected to bring value to the thesis. In total, ten articles were fully analysed. The reference list of the relevant articles was examined to identify additional sources for the literature review. Moreover, some articles investigated the design of simulation exercises but did not elaborate on how the action plan should be implemented. These latter articles were still analysed in the literature review and helped develop sections 1 and 3 of this thesis.

Four out of the eight contacted informants also provided articles on simulation exercises that assisted the literature review and the thesis process. A total of 20 articles were received, and four of articles are referenced in this thesis. Many of the articles provided background information on simulation exercises in various contexts. One informant explained that the aim of the articles was gain a better general understanding of simulation exercises and be better prepared for the interviews. Moreover, the literature from the informants resulted in a better understanding of the subject and that simulation exercises could be connected to capacity development. To this end, additional keywords were inserted to the LUBsearch engine with the identical LUBsearch settings. Three examples are shown below and more details are provided in Appendix B.

I. Simulation exercise (AB) AND capacity development (AB).
II. Simulation exercise (TI) AND capacity development (AB).
III. Simulation exercise (AB) AND emergency preparedness (AB).
IV. Simulation exercise (TI) AND emergency preparedness (AB).

The next step of the literature review was to summarize and categorize the gathered information using the software NVivo (NVivo, 2022). The aim of this was to acquire a more complete picture of the available research relating to the topic (Höst et al., 2006), in this case action plan implementation. Another aim was to find patterns and connections between analysed articles and be better prepared for the interviews.

2.2 Interview study

The purpose of the interview study was to gain a more complete picture of the research questions listed in section 1.1. To achieve this, the theme of the interview study had to be clarified. According to Kvale and Brinkmann (2017, p. 147) the theme of an interview study could be discovered by stating the purpose of the interview study, gaining an understanding of established knowledge in the research area, and determining how the interviews should be conducted.

After the purpose of the interview study had been stated, and the literature review had been carried out, a semi-structured interview guide was developed. The interview guide consisted of three phases and the first phase could be perceived as an introduction to the interview. The aim of this phase was to establish a sense of comfort and increase the probability of acquiring authentic and genuine answers throughout the interview (ibid, p. 176), e.g. experiences on facilitated simulation exercises. The second phase of the interview guide consisted of semi-structured questions that related to action plan implementation and action plan challenges. The advantage of semi-structured questions is the possibility to ask follow-up questions that allow the interviewer to confirm provided information. The last phase of the interview concluded the interview, and a snowball sampling strategy was applied to identify additional informants (Silverman & Patterson, 2022, p. 75). More details on the interview guide are provided in Appendix A.

Informants were identified using purposive sampling. After discussions with the supervisors of this thesis, a few informants were invited to participate for their SimEx facilitation

experiences and expertise. All informants accepted the invitation to participate in the interview study and four informants provided literature that assisted the literature review of this thesis. Furthermore, all interview participants received the interview guide a couple of days before the interview. The aim was that the participants would feel prepared coming into the interviews and better understand the overall aim of this master's thesis. The details of the interview participants are listed in Table 1.

Table 1: The informants have different roles and work experiences

Informant	Role	Interview type
A	Senior Expert and Associate Professor with a focus on simulation exercises.	Face-to-face
B	Capacity Strengthening/Development Expert with experiences across the world.	Zoom
C	Researcher on the People, Technology, Organization, and Risk Management subject. This informant has experiences of simulation exercises from work at a Swedish Fire Brigade and Municipality.	Skype
D	Senior Executive Officer Exercises. This informant has written guidelines on action plan implementation for a Swedish authority.	Face-to-face
E	Evaluation Expert, Researcher, Lecturer, and Crisis Manager.	Zoom
F	Humanitarian Preparedness & Response Consultant with more than 35 years of experience in the humanitarian preparedness field.	Zoom
G	Technical Officer on SimEx, especially in the health sector.	Zoom
H	Technical Officer on SimEx and Reviews.	Zoom

The informants in the interview study consisted of SimEx professionals that represented the following organisations:

- Swedish Civil Contingencies Agency (MSB)
- Lund University (LU)
- Swedish Fire Brigade
- Swedish Defence Research Agency (FOI)
- World Health Organisation (WHO)
- World Food Programme (WFP)
- Netherlands Institute for Public Safety (NIPV).

All informants were contacted approximately one week before the interview and the interviews were conducted at Lund University, MSB, Zoom, and Skype. The interviews were recorded with the informants' consent and with at least two recording devices to reduce the risk of technical issues. To increase the chance of receiving detailed answers from the informants all interviews were anonymous. The average duration of all interviews were approximately 45 minutes. After an interview was completed, the gathered information was transcribed using the NVivo transcription tool. The accuracy of this tool was not 100 % and major misinterpretations by the transcription tool were corrected manually. Furthermore, some interviews were held in Swedish whilst the report was written in English. To ensure the accuracy of the obtained information, a translated quote, or a quote suitable for the report was sent to the relevant informant for approval. Otherwise, there was a risk that a quote has a different meaning than intended.

In total, eight informants were interviewed and the NVivo software made it possible to code the transcribed material. The codes in NVivo supported the key factor identification process and the key factors were later categorized into different themes. Furthermore, if several informants discussed the same key factor for AP implementation, the information was summarized, coded, and inserted into the thesis. In case that a key factor was mentioned by only one or two informants, this information was still considered and helped provide ideas for the discussion of this master's thesis. As an effect of word count restrictions only the most frequent results from the interviews have been elaborated. An overview of the method is shown in Figure 1.
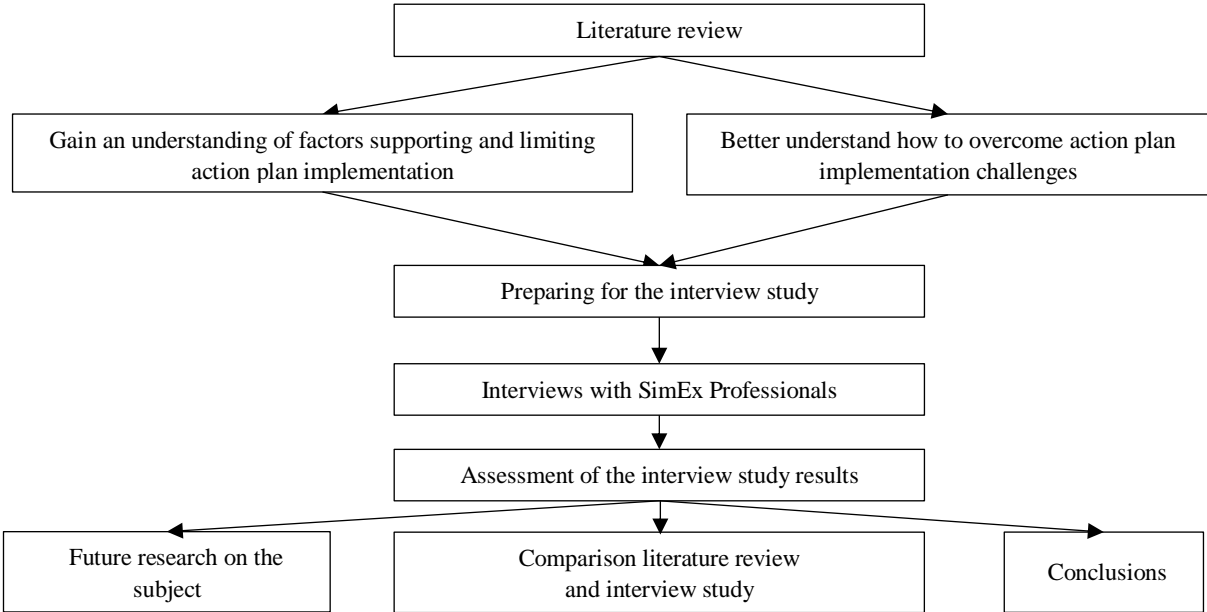
Figure 1: Schematic figure of the work process

3. Conceptual Framework

The aim of this section is to assist the reader to better understand concepts and models that are presented in this thesis. The aim of this conceptual framework is also to serve as a reference throughout this thesis.

3.1 Simulation exercises

A simulation exercise is according to the UNDRR (2020, p. 19) "*an imitation of operations in a real-world process or system during a specific time*" or "*an event that replicates selected aspects of a real emergency to provide an opportunity for testing procedures in place and raising awareness of preparedness and response requirements and actions*" (ibid, p. 19). There are many advantages of utilizing simulation exercises, and WHO (2017, p. 4) lists:

- *Reveal planning weaknesses in a controlled environment*
- *Reveal resource gaps*
- *Improve coordination*
- *Clarify roles and responsibilities, including the chain of command*
- *Develop enthusiasm, knowledge, skills, and willingness to participate in emergency response*
- *Familiarize staff with new functions*
- *Gain public recognition and trust for the emergency management process*
- *Test equipment*
- *Test and evaluate plans and procedures, including operational guidelines and standard operating procedures (SOPs).*

SimEx could be divided into two categories: discussion-based and operations-based exercises.

3.1.1 Discussion-based exercises

A discussion-based exercise aim to "*familiarize participants with, develop, or refine current plans, policies, agreements and procedures*" (World Health Organisation, 2017, p. 4). Tabletop exercises (TTX) are discussion-based and defined as follows:

> *A tabletop exercise is a facilitated discussion of an emergency situation, generally in an informal, low-stress environment. It is designed to elicit constructive discussion between participants; to identify and resolve problems; and to refine existing operational plans. This is the only type of simulation exercise that does not require an existing response plan in place (ibid, p. 4).*

One advantage of TTX is that expensive equipment is not required to carry out the simulation exercise. Another advantage is that TTX generally require less planning and resources compared to operations-based exercises (UNDRR, 2020). However, discussion-based exercises are in general less realistic compared to operations-based exercises.

3.1.2 Operations-based exercises

The aim of operations-based exercises is to "*validate plans, policies, agreements, procedures and system functionality; clarify roles and responsibilities; and identify resource gaps in operational environments*" (World Health Organisation, 2017, p. 4). There are normally three types of operations-based exercises:

- Drills
- Functional exercises
- Field/Full-scale exercises

A drill according to the WHO (2017, p. 4) is defined as follow:

> "*A drill is a coordinated, supervised exercise activity, normally used to test or train a single specific operation or function in a repeated fashion. A drill aims to practice and perfect one small part of a response plan, and should be as realistic as possible, employing any equipment or apparatus necessary for that part.*"

A functional exercise according to the WHO (2017, p. 4) is defined as follows:

> "*A functional exercise is a fully simulated interactive exercise that tests the capability of an organization to respond to a simulated event. The exercise tests multiple functions of the organization's operational plan. It is a coordinated response to a situation in a time pressured, realistic situation. A functional exercise focuses on the coordination, integration, and interaction of an organization's policies, procedures, roles and responsibilities before, during, or after the simulated event.*"

A field/full-scale exercise according to the WHO (2017, p. 5) is defined as follows:

> "*A full-scale exercise simulates a real event as closely as possible and is designed to evaluate the operational capability of emergency management systems in a highly stressful environment, simulating actual response conditions. This includes the mobilization and movement of emergency personnel, equipment and resources. Ideally, the full-scale exercise should test and evaluate most functions of the emergency management plan or operational plan. Differing from the FX, a full-scale exercise typically involves multiple agencies and participants physically deployed in a field location.*"

This master's thesis has not focused on SimEx drills, since this type of exercises are usually less complex compared to TTX, FX, and FSX. The action plan implementation is therefore expected to be more straight-forward for drills.

3.2 Evaluation

Once the SimEx, either discussion-based or operations-based, have been completed it must be evaluated. An evaluation is defined according to the World Health Organisation (2017, p. 6) as a "*Systematic process of observing and recording all exercise activities, comparing*

performance and outcomes against exercise objectives, and identifying strengths and weaknesses."

3.2.1 Hot wash

One part of the evaluation is the hot wash that is defined as: "*Immediate feedback or debriefing event involving the participants and the exercise management team. Individuals share perspectives on strengths, weaknesses, and areas for improvement. These contributions are subsequently incorporated in the exercise report*" (ibid, p. 7)

3.2.2 Exercise report

The definition of an exercise report is:

> "*A report that records, describes and analyses the exercise, drawing on the evaluation, including debriefs and observations. The report should include all relevant information, including exercise description; type; scenario; outcomes; participating organizations; and recommendations to assist in the design of future exercises.*" (ibid, p. 7).

Once the exercise report has been created an action plan should be developed.

3.2.3 Action Plan

An action plan according to the WHO (2017, p. 6) identify

> "*corrective action/activities to be undertaken following the recommendations of an exercise report. The plan should include timelines for implementation, the identities of the officers responsible, and often the associated costs. This will ultimately contribute to continual improvement in response capabilities, and hence to preparedness.*".

An action plan template that has been developed by the World Health Organisation (2018, p. 15) include the following headings:

- Recommendations (both short-term and long-term)
- Specific activities for implementation
- Implementation type
- Responsible person/unit
- Timeline, and
- Remarks

One suggestion by WHO (2018, p. 15) is to formulate a table or checklist of the six bullet points so that the action plan is easily understood and systematic.

3.3 Learning theory

A thorough SimEx evaluation could increase knowledge and learning among participants (WHO, 2017). To achieve effective learning, it is important to draw lessons from past SimEx

experiences, and Kolb (2007, pp. 7-8) have designed a learning cycle that could result in a more complete picture of how experiential learning works.

3.3.1   Kolb's learning cycle i.e., experiential learning

This cycle consists of four elements: Concrete experience, reflective observation, abstract conceptualisation, and active experimentation (Kolb, 2007; MSB, 2011). In case of a SimEx, the participants have first carried out the simulation exercise in a safe environment. This should have provided the participants with concrete experience (MSB, 2011). The second element i.e., reflective observation could be considered as a reflective discussion of the SimEx (ibid). This could be the hot wash of the SimEx and during this phase development areas and strengths are identified. The third element, abstract conceptualisation, consist of interpreting the results of an exercise and relating the results to concepts and theories (Kolb, 2007). During this element an exercise report and action plan could be created. Once the action plan has been written it is time for the fourth element, active experimentation. Active experimentation involve implementing learning into practice (ibid) e.g., implementation of action plan recommendations.

3.4 Organizational learning

Organizational learning assists an organization to adapt to its environment, reach goals, and improve (Akselsson, 2014). Single loop learning (SLL) and double loop learning (DLL) are two types of learning that could occur within an organization and help the organization improve. The two levels of learning are elaborated in sections 3.4.1 and 3.4.2.

3.4.1   Single Loop Learning

Argyris (1977, pp. 113-114) differentiated double loop learning from single loop learning and explained that the latter identify an error and implement corrective actions based on this information to help an organization reach its goals. Hence, SLL identify a problem and find a solution to fix this specific problem. In the context of action plan development, one gap could be that the login details to web-based information system is not available. If SLL is utilised, the recommendation could be to fix login details until the next SimEx.

3.4.2   Double Loop Learning

The main difference between SLL and DLL is that the latter is a form of learning that questions the underlying objectives or assumptions (Akselsson, 2014, p. 118). In relation to action plan implementation, double loop learning involves questioning why a recommendation was suggested, for instance could there be other ways to fulfil the purpose of the web-based information system. DLL help an organization examine its approach to reach its goals and increase its adaptability (ibid). Both DLL and SLL are important for organizational learning and whilst SLL help address specific issues, DLL could lead to implementation of long-term change (Argyris, 1977).

3.5 Capacity development

Simulation exercises could be a part of capacity development (CD) for disaster risk reduction (DRR). Hence, factors and challenges related to action plan implementation could be better

understood if CD for DRR is assessed. One definition of CD according to Hagelsteen and Burke (2016, p. 44) is:

> *"a locally driven change process through which individuals, organisations and institutions obtain, strengthen, maintain and adapt their capacities to set and achieve their own development objectives over time and learn from their effort"*

There are numerous factors that affect capacity development for DRR (Hagelsteen & Burke, 2016) and some factors are more applicable than others for this research. Factors that limit and support CD for DRR and suggestions on how to overcome challenges related to the subject are elaborated in sections 3.5.1 and 3.5.2.

3.5.1   Factors that limit and support CD for DRR

Hagelsteen and Burke (2016) explained that terminology in capacity development for DRR reports tends to be inconsistent. It was discussed that the capacity building and capacity development terms have been used interchangeably in reports. The authors also found that clear definitions are important to avoid confusion among people. For instance, two stakeholders could have very different perceptions regarding the definition of resources if it is not clearly defined. Further, the consistency of the capacity development term has increased since 2010 (ibid, p. 47).

3.5.2   Overcoming challenges related to CD for DRR

The results found by Hagelsteen and Burke (2016) showed that capacity development for DRR reports occasionally lack clear definitions e.g., definitions of capacity development, capacity building, and roles and responsibilities. To overcome this challenge, it is suggested to include a terminology section to evaluation reports. For the roles and responsibilities term there should be details of the task that will be carried out and the person responsible. If not, there is a risk that the implementation activities are negatively affected.

One challenge that is related to CD for DRR is to determine the purpose of the project and to set realistic goals (Hagelsteen & Burke, 2016). To overcome this challenge, it is recommended to have thorough and long-term plan of the project (UNDG, 2017). In CD for DRR, many projects are short-term due to e.g., funding conditionalities, whilst many projects would benefit from a long-term plan (Hagelsteen & Becker, 2019). This could assist sustainability of projects and resilience (Hagelsteen & Burke, 2016).

4. Literature Review

The aim of the literature review was to better understand the research area at an early stage. The aim was also to be better prepared for the interviews with SimEx professionals. The assessed articles discussed simulation exercises in various contexts and the literature review is presented below.

4.1.1 Clarity

The usefulness of the exercise report increases significantly if the purpose, object description, analysis, and conclusion components are documented properly (Beerens et al., 2020, p. 578). This could have a positive effect on action plan implementation. The empirical study was based on the response of 84 evaluation professionals in the Netherlands (ibid). Moreover, it was found in this study that the usefulness of the exercise report was negatively affected if the four components lacked connection and clarity (ibid). The underlying reason was that if the purpose *(why was the evaluation conducted?)* is not well-defined, the object *(what or who was evaluated?)*, analysis *(what happened during the exercise and why?)* and conclusions *(how well did the object of the evaluation perform?)* lack credibility. It was also determined in the study that the clarity of the analysis had a positive effect on learning and that the clarity of conclusions had a positive effect on both learning and accountability (ibid).

4.1.2 Terminology

The Swedish Civil Contingencies Agency, MSB, have carried out numerous simulation exercises e.g., the SAMÖ SimEx series. In 2011, the SAMÖ-KKÖ SimEx aimed to identify weaknesses in the Swedish crisis management system, and more than 190 development areas were identified (Eriksson & Trané, 2014a). Three years later another SimEx, SAMÖ Fokus 2014, was carried out to evaluate and determine how SimEx participants in 2011 had worked with the development areas. The results from SAMÖ 2014 showed that actors had worked on the development areas but that 77 % of the development areas were already known before 2011.

The results from the evaluation survey in 2014 showed that the 'development area' definition was not stated. This led to that a few actors identified more than 100 development areas each and the SimEx in 2011 consisted of approximately 60 actors. This resulted in a consuming exercise report and vague action plan recommendations (ibid). For instance, one action plan recommendation stated: "Provide staff with PPE" and did not include the actor responsible for implementation or timeframe. To increase the chance of action plan implementation it was first recommended to define the 'development area' concept (ibid, p. 57). Second, consider which development areas that are of high priority and if the subject areas are on national, regional, or local level. Lastly, it should be considered how the development area is framed and described.

4.1.3 Storytelling

KOMET is a research project that spanned between 2016-2021 with the overarching aim to develop the emergency preparedness in Sweden. This project has developed concepts and methods to increase organizational learning, and the results from KOMET shows that exercise

reports generally lack clarity (Hallberg et al., 2021), as discussed in section 4.1.1. This conclusion was based on the assessment of 17 evaluation reports and it was acknowledged that this negatively affected action plan implementation (ibid). It was discussed that unclear exercise reports made it difficult for external stakeholders to understand the relevance of the recommendations and conclusions. To overcome the challenge, it was suggested that storytelling could be utilized. Storytelling is a communication tool that help share experiences from a SimEx, and Hallberg et al (2021, pp. 11-12) discussed that storytelling is an effective tool to share lessons and experiences that are generally left out in the exercise report. This communication tool also help people share values, knowledge, norms and build trust between people within an organization (ibid). Another advantage is that storytelling could assist communication between various organizations and reduce the risk of misinterpretation. However, the risk of utilizing storytelling is that the most confident and convincing person is perceived as the one telling the truth. This may not be the case and could lead to other people getting blamed for not sharing the same story. This should be considered when utilizing storytelling and that the aim is to improve the emergency preparedness of organisations (ibid).

4.1.4 Scape goats

Evaluations require active involvement from people to be useful and some recommendations in action plans are complex and take years to implement (Beerens, 2021; World Health Organization, 2018). According to the WHO (2018, p. 7), there are three types of action plan recommendations:

- Priority recommendations (recommendations that need to be implemented urgently)
- Quick wins (recommendations with low complexity that can be implemented within a month)
- Longer-term recommendations (recommendations, that are more strategic and complex, to address root causes)

There are different explanations to why exercise reports lack involvement from people. For instance, if the purpose of the evaluation is to identify scapegoats for the gaps in the simulation exercise, it is likely that people will revise information or be reluctant to share findings (Heath, 1998). This could create an incomplete picture of the SimEx evaluation. Hence, the aim of the evaluation should be determined and it should be stated that a SimEx is safe environment and will not identify scape goats (Haddeland et al., 2021; Ju et al., 2022). This could increase the probability of active involvement from people and AP implementation.

4.1.5 Fantasy documents

In many cases exercise reports do not address the real issues and are therefore considered fantasy documents (Birkland, 2009). It is described that exercise reports tend to be produced for the sake of producing exercise reports, and that the reports therefore does not emphasise effective learning (van Haperen, 2001, p. 46), and consequently generally ignored after publishing (Birkland, 2009, p. 146). If exercise reports are ignored the probability of implementation is small. Furthermore, Ju et al (2022) described that a key factor for action

plan implementation is reflection from SimEx participants during the debrief session. This could assist participants to create exercise reports that are meaningful and actively worked on after the simulation. During the debrief all participants should be involved as this is expected to increase successful AP implementation (Haddeland et al., 2021; Niekerk et al., 2015).

4.1.6 Planning cycles

Planning cycles could increase the probability of action plan implementation (WHO, 2018). There are different types of planning cycles e.g., National Action Plans for Health Security (NAPHS) and organizational planning. Three potential advantages of planning cycles according to Kambi and Mohamed (2018, p. 27) are:

I.   An effective way to assign action plan items to people.
II. Help track the progress of the action plan implementation.
III. Effective information sharing from the SimEx.

Furthermore to increase the probability that action plan recommendations are implemented, Reddin et al (2021) describe that recommendations should be useful, relevant, and practical. The recommendations should also be timebound, and assign responsibility and accountability (Hockaday et al., 2013; Niekerk et al., 2015).

Literature Review Summary

The aim of this literature review was to better understand the research area at an early stage. The aim was also to be better prepared for the interviews with SimEx professionals. The findings from this section are:

- If the purpose, objectives, analysis, and conclusion of the exercise is clear, the probability of action plan implementation increase.
- Terminology should have clear definitions in exercise reports e.g., development areas. Otherwise, the risk of misunderstanding between people increase.
- Storytelling could be advantageous in case that an exercise report is vague and if important aspects are left out. This communication tool help people share values, knowledge, norms from a SimEx and could assist communication between various organizations and reduce the risk of misinterpretation.
- A safe learning environment should be established during and after the SimEx. This will reduce the risk of scape goat identification and increase involvement of participants.
- In case that the exercise report is considered a paper-pushing exercise, there is an increased risk that the AP will not be implemented.
- Incorporating action plan items into the organizational planning assist tracking the progress on AP implementation. In addition, action plan items should be timebound and assigned to people.

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5. Interview Study

This section shows the results from the interview study that consisted of eight interviews and one site visit at the Swedish Civil Contingencies Agency (MSB). The aim of this study was to interview people with great knowledge and facilitation experiences in the SimEx field. The material from the interviews have been summarized and coded, and key implementation factors have been identified using NVivo. Once the key factors were identified, five themes could be discovered in NVivo that affect action plan implementation, see Figure 2.
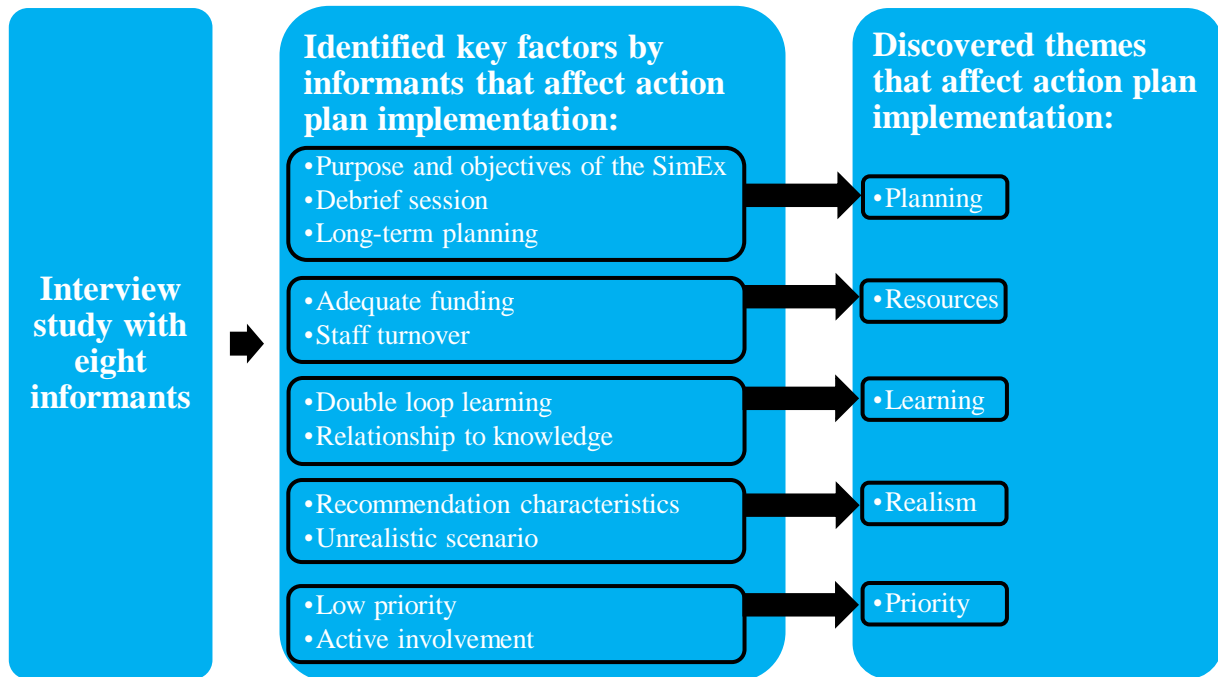
Figure 2: Schematic work process on how the themes were discovered in the interview study.

Each theme consists of two to three key implementation factors and each factor have been elaborated below. The informants proposed solutions on how to overcome some of the challenges related to each theme and the solutions are shown towards the end of each section. The discovered themes are presented in the following order: Planning, Resources, Learning, Realism, and Priority.

5.1 Theme: Planning

The Planning theme consist of three factors: "Purpose and objectives of the SimEx", "Debrief session" and "Long-term planning". Section 5.1.4 elaborates on how challenges related to the implementation factors could be overcome.

5.1.1   Purpose and objectives of the SimEx

Almost all informants discussed the value of stating the purpose, scope, and objectives of a SimEx to avoid that the exercise and action plan becomes overwhelming and not implemented. One informant explained that this is even more important than the scenario construction and injects:

I always go through purpose, scope, objectives. Every exercise relies on your purpose, your scope, your objectives. The scenario is not [as] important, the injects are not [as] important, what's really important is being able to develop a simulation exercise that has clear, well-defined objectives. People often come with a predefined scenario in mind and forget that they need to test objectives.

One explanation is that if there are well-defined objectives it is easy to identify which objectives that have been achieved during the SimEx and address the unfulfilled objectives in the action plan. Furthermore, it is not unusual for the simulation exercise to take another path than the scenario that results in participants and facilitators discover other gaps than expected. The gaps could also be managed in the action plan or addressed in a future SimEx. To identify unintentional gaps is not detrimental. One informant stated that the overarching aim of exercises is to explore ideas, think, discuss, learn, and to identify new vulnerabilities, which could in the end improve preparedness.

5.1.2 Debrief session

From the assessment of the coded interview material, it was understood that the debrief session is a key factor for successful action plan implementation. However, one informant explained that the debrief is often separated from the SimEx that makes it difficult to clarify roles and to formulate specific, targeted, measurable recommendations.

The biggest problem that I always have is trying to get people to allocate enough time for the debriefing and action planning process because they think that once we finished the exercise and they've done the last inject that the exercise is finished and then they seem to wonder why I want them to sit around for another 2 hours doing debriefing and action planning and all the rest of it.

There is a general reluctance to accepting the accountability and responsibility role during the debrief session and it is not because people are lazy and unwilling to change the situation. Several informants stated that additional workload, lack of time, and the fear of blame and criticism cause the reluctance to accept accountability and responsibility. Furthermore, it is important to pay attention to contextual factors as well during the debrief session. One informant participated in a debrief with people that had English as a first and second language. The results from this debrief was that mostly people that have English as first language were active in the discussions. People that had English as second language felt their English was not sufficient.

5.1.3 Long-term planning

Five informants discussed that long-term planning is important for successful action plan implementation. It was discussed that countries should establish a two-year or five-year national SimEx plan for e.g., the health sector or emergency preparedness sector. This way people could continuously build on previous simulation exercises. One informant provided an example that in January a country or sector may conduct a basic workshop or discussion-based exercise, draw lessons, and implement the action plan. Later, in September

the same country or sector could conduct a full tabletop exercise and continue improving preparedness by implementing a new updated action plan.

5.1.4 Overcoming the challenges related to the planning theme

The challenges related to this theme could be overcome by thorough planning of the SimEx that include understanding the context, determining the purpose, scope, objectives of the exercise. One informant stated also that it is also recommended to start the debrief session shortly after the SimEx has been conducted. This could be done by planning in time with the participants for the debrief session and making people understand the value of the debrief and action planning.

Summary

The main takeaways from the planning theme are:

- Determine the purpose, scope, objectives of the simulation exercise.
- Allocate time for the debrief session and consider contextual factors.
- Formulate targeted, specific, simple, straight-forward, measurable, and timebound action plan recommendations.
- Establish a long-term plan and build on previous conducted simulation exercises to further improve preparedness.

5.2 Theme: Resources

The Resources theme consist of the following key factors: "Adequate funding" and "Staff turnover". Section 5.2.3 elaborates on how challenges related to the two key factors could be overcome.

5.2.1   Adequate funding

Five informants discussed that resources have an impact on action plan implementation. In this case resources include money, specialist knowledge, and time. It was discussed by one informant that countries such as the United Kingdom, Australia, and Sweden generally possess resources to implement change and action plans. However, one informant discussed that recommendations in an action plan could still be very expensive. This informant explained that an action plan recommendation could be to construct a water backup reserve that cost one billion Swedish SEK.

5.2.2   Staff turnover

Four informants stated that staff turnover could hinder successful implementation of the action plan. It was discussed that if a SimEx had been carried out a couple of months ago and an actor had been allocated to carry out a certain number of items on the action plan, there is a risk that the action plan implementation will lose momentum due to staff turnover. One informant explained that staff in the humanitarian field usually have a lot of responsibility. Therefore, if an actor gets promoted or leave, there is a risk that items on the action plan that are allocated to this actor are forgotten or not implemented. One informant estimated that international staff in the humanitarian field work for five years before getting transferred or promoted to another job.

5.2.3   Overcoming the challenges related to the resources theme

To overcome the challenges related to funding, one interviewee suggested that people should not necessarily be constrained by resources. There are generally ways to find the needed resources e.g., reach out to organizations, people, and governments. One informant elaborated that if there are strong and detailed arguments for the resources people can usually find it:

> *I don't like to say it's constrained by resources, it's the perception of them. So you can usually undertake some key activities with minimal financial outlay. It just requires moving past this idea of we're a poor country, we don't have any money, so we can't do it. Because in my experience, you can usually find a way to address some constraints, such as reorganising teams or placing a greater focus on areas that don't require significant cost implications. Good preparedness is often more about organisation and less about 'stuff'. You can usually find a resource somewhere. Maybe not all the resources you need, but you can at least make a start on it.*

To overcome the challenges related to staff turnover, it was recommended to allocate action plan items to the national staff at the local level. The people on the local level are expected to

stay longer compared to the international staff. Hence, it should be more beneficial to allocate action plan items to people at this level.

Furthermore, if it is found that the expected cost of the SimEx exceed the available resources, an idea is that participants could start with conducting tabletop exercises because they are less expensive than full-scale exercises. If adequate resources for the SimEx is not secured, the SimEx is not expected to be completed, and an action plan cannot be created.

Summary

The main takeaways from the resources theme are:

- Adequate funding should be secured before conducting the simulation exercise.
- People should not necessarily be constrained by resources. If there are strong and detailed arguments, people can usually find resources.
- If there are not sufficient resources for a full-scale exercise, an idea could be to start with a tabletop exercise.
- Due to staff turnover, it is recommended to allocate action plan items to the national staff at the local level.

5.3 Theme: Learning

The Learning theme consist of the following key factors: "Double loop learning", and "Relationship to knowledge". Section 5.3.3 elaborates on how challenges related to the two key factors could be overcome.

5.3.1 Double loop learning

From the interviews it was understood that double loop learning has a positive effect on action plan implementation. According to several informants, double loop learning increased the efficiency of action plan recommendations and help participants reach the objectives of the SimEx. It was explained that simulation exercises are great at highlighting gaps, but not very informative on determining how the gaps should be addressed and its root causes. An interviewee elaborated that:

> *I think that it would be much more efficient to have that another loop or another round of digging deeper into some of the key gaps as well. And then you can look at what are some of the obstacles or things that are hindering us from having A, B and C in place. [...] I think the simulations are good at highlighting gaps, articulating and building consensus on what are the key gaps. But they are not very good at identifying what we should do about the gaps and why the gaps are there in the first place, and so the root causes.*

Hence, the application of double loop learning is advantageous during the action planning process, so that the recommendations are meaningful and increase the probability of reaching the SimEx objectives. Three informants elaborated that double loop learning or single loop learning are occasionally not considered, e.g., the recommendations are out of context. It was also discussed that SLL are more frequently utilised since it is easier to apply compared to DLL, but that the latter lead to more efficient AP recommendations.

5.3.2 Relationship to knowledge

One informant explained that the relationship to knowledge is a critical factor for successful action plan implementation. This informant has experience from working in a Swedish Authority and discussed that there is a risk that people are unwilling to read the exercise report if it is too comprehensive. The number of pages in the exercise report could be more than 50, and to reduce and cut information to make the report easier to comprehend is a problem. An example is that some gaps that have been identified in the simulation exercise are complex, and some of those gaps cannot be simplified.

5.3.3 Overcoming the challenges related to the learning theme

Three informants elaborated there are other processes than action plans for effective implementation of change. One informant discussed that if participants identify major gaps in a SimEx it is likely that people will change their behaviour to address the gaps without constructing an action plan. This intangible learning or learning-by-doing at the individual level is important to consider:

I think what's even more important is what happens during the exercise. The learning at the individual level, the experiencing that this is not working. The realization that these specific areas are the main hurdles. I think that's the intangible learning. It's almost more important than the Blueprint Action Plans. This is something that I didn't realize when I was organizing simulations myself, but now when I've been working longer and learned how we learn things and how we actually buy into processes and change happens.

Another benefit of this intangible learning is that participants gain confidence. It is not unusual that participants are nervous during the SimEx because there is a general idea that it is the participants that are being tested and not the plans. To continuously participate in simulation exercises according to three informants help people better understand how to play the SimEx and that it is a safe learning environment. For instance, people will not get blamed if mistakes are made. The gained confidence from participation in simulation exercises is expected to increase the probability of people carrying out correct actions during an actual crisis. One informant gave an example of a SimEx that was conducted in Africa where the master scenario was a drought whilst an actual emergency, not drought related, occurred not long after. The people that responded to the emergency dealt with media, government, security issues very well since they had walked through the motions and had gained the ability to respond with a high level of speed.

It was discussed by several informants how the information flow from the simulation exercise should be best communicated to senior management in case people are reluctant to read the full exercise report. One informant discussed it could be beneficial to put an executive summary on the front page of the report that capture the key takeaways from the SimEx. The reports could be long and senior management are usually very busy. Hence, it was recommended to show the most critical areas early. This informant continued and discussed that to include quick win recommendations in the executive summary have been successful because it usually increase motivation and therefore increase the probability that the action plan is implemented. However, in some cultures the senior management will not read the exercise report at all. In this case it could be beneficial to arrange a meeting to explain that e.g., it is important to implement items A, B, C and D.

Summary

The main takeaways from the learning theme are:

- In some cases, the action plan recommendations are out of context. To apply single loop learning and double loop learning could help people reach the objectives of the SimEx.
- To continuously participate in SimEx gives people confidence. It takes time to learn how the SimEx works and that it is a safe environment.
- In case that people are reluctant to read the full exercise report, it could be beneficial to put an executive summary on the front page that capture the key takeaways from the SimEx.
- If people are totally unwilling to read the exercise report, it could be beneficial to arrange a meeting to explain that e.g., it is important to implement items A, B, C and D.

5.4 Theme: Realism

The Realism theme consists of the following key factors: "Recommendation characteristics", and "Unrealistic scenario" Section 5.4.3 elaborates on how challenges related to the two key factors could be overcome.

5.4.1   Recommendation characteristics

Four informants discussed that the characteristics of action plan recommendations are important to consider for successful implementation. It is not unusual that action plan recommendations are complicated and paragraphs long, whilst the subject recommendations should aim to be realistic, short, concise, and easy to understand. One benefit of creating realistic action plan recommendations is that motivation among participants is expected to be maintained. One informant explained that enthusiasm among people is very high at the beginning of the SimEx, but that it is difficult to maintain the same level of motivation, interest, and urgency after a week or a month. Furthermore, according to almost all informants, the probability of action plan implementation increased if the formulated recommendations assign responsibility, accountability, and a timeframe.

5.4.2   Unrealistic scenario

It was discussed by four informants that the master scenario of the simulation exercise could occasionally be unrealistic. However, one informant explained that even if a scenario is unrealistic people are still expected to gain valuable outputs from the exercise e.g., better understanding of roles and a sense of readiness. Moreover, if the scenario is very unrealistic this could be problematic. One informant participated in a SimEx on chemicals and the chemical properties were not scientific. During this exercise it was discussed whether participants should evacuate the building since in the scenario people were struggling breathing inside. Therefore, people evacuated but if calculations are undertaken, the concentrations of the chemicals are very high outside and low inside. Hence, in real life people should not have evacuated the building and this informant emphasise on the importance of constructing the scenario on scientific material. The aim of this SimEx was to get people to cooperate and therefore the organisers constructed fictional chemical properties, but this could become problematic in the future. Especially during the action planning, because if the recommendations are misleading there is a risk that people are unwilling to implement the listed items.

5.4.3   Overcoming the challenges related to the realism theme

To overcome challenges related to recommendations characteristics, it is recommended to split complicated and long action plan items into more manageable pieces. Short, concise, and easy action plan items are expected to help people stay motivated. To overcome challenges related to motivation, one informant explained that leaving an action plan copy in the office have a positive effect. "*And if you leave it [the action plan] in black and white with the head of the office, there is something that you can go back to after a month and it's auditable*". This way people could easily understand the implementation progress and clearly identify which

items that have been completed e.g., order a fire extinguisher, and that 11 out of 13 items on the list have been completed from the SimEx that was carried out six months ago.

Summary

The main takeaways from the realism theme are:

- Aim for easy, short, and concise action plan items and try to split the recommendations if they are paragraphs long and complicated.
- Clarify roles i.e., determine who is responsible and accountable for the implementation of action plan items.
- To maintain motivation among people it could be beneficial to leave an action plan copy in the office to easily see progress.
- The SimEx scenario should be based on scientific material to avoid misleading action plans.

5.5 Theme: Priority

The Priority theme consist of the following key factors: "Low priority" and "Active involvement". Section 5.5.3 elaborates on how challenges related to the two key factors could be overcome.

5.5.1   Low priority

Five out of eight informants discussed that the action plan priority influences the implementation probability. One informant explained that there are many urgent issues that require time and money in the public sector, and it is therefore difficult to get long-term recommendations implemented. It was discussed that pandemics have been on the vulnerability list in Sweden since approximately 2010 or 2011, and that all Swedish Authorities were required to conduct a risk assessment on pandemics back then. Therefore, several informants explained that low priority could be the biggest challenge that is related to action plan implementation.

> *I think if you're the one who's written the exercise and you're the one that's written the report, your biggest challenge is simply getting those recommendations or lessons, whatever it is implemented by the CEO or your senior manager or your wider organisation. I think that's probably the biggest challenge because there are so many competing issues for money and time and things these days, particularly within the health sector.*

However, it is wrong to state that action plans do not make a difference because of the low priority. A couple of years before the swine flu, one of the informants were involved in preparing a SimEx to improve the hospital capacity in case of a pandemic flu. The SimEx were not conducted since the swine flu occurred during the planning phase. It was therefore decided to undertake an evaluation interaction review instead. The final product had approximately 40 recommendations and the action plan were later assessed by the European Union. The informant explained that not all recommendations in the action were implemented by the EU but emphasised that action plans still make a difference.

5.5.2   Active involvement

Four informants elaborated that active involvement from people is necessary for successful action plan implementation. It was described by one informant that during a SimEx with the aim to improve emergency preparedness numerous gaps were identified. The senior management were observing the SimEx and one of the directors decided to disengage from the simulation exercise. This director decided to disengage from the SimEx because he felt uncomfortable that there were too many identified gaps. The informant explained that the action plan is not likely to be implemented in this case because there were lack of enthusiasm, endorsement, and active involvement from the senior management and people.

One informant explained that priority of action plans is connected to resources and discussed that management in countries could state that there will not be any emergencies for the next five years, unless the Government says there is one. This could have an impact on the

involvement from SimEx participants that is a key factor for successful action plan implementation.

5.5.3 Overcoming the challenges related to the priority theme

To overcome challenges related to the priority theme it was recommended to start the evaluation process early and decide who is responsible for implementing action plan items. It was explained that as a facilitator of the SimEx, one goal is to delegate action plan items to actors quickly after the exercise.

> *The exercise is done. Your mission is done and completed, and now it is time for someone to address the action plan items and a success factor that many actors agree with me is to incorporate items into the organizational planning.*

It was mentioned that if recommendations are incorporated to the organizational planning the action plan items are required to be continuously revisited. Another advantage to incorporate items into planning cycles is that the gaps from the exercise are highlighted to senior management effectively. In addition, organizational planning also often includes budget planning, and a simulation exercise could help provide arguments to avoid cuts. One informant explained if the SimEx showed that a department is effective, this is a strong argument that "*You can't cut us out because look at how effective we are*". Simulation exercises are very effective at highlighting gaps and if it possible to show that a department work well during a SimEx, this could affect the SimEx priority and action plan implementation positively.

To overcome the challenge related to lack of involvement from people, it is recommended to state the purpose, scope, and objectives of the SimEx. This include stating that it is not detrimental to identify gaps during the exercise, and that it is a safe environment so that people will not get blamed for the identified gaps.

Summary

The main takeaways from the priority theme are:

- There are many urgent issues in different sectors that require money and time. The action plan implementation is not always the highest priority. However, action plans still makes a difference.
- Active involvement and enthusiasm from people are necessary for successful action plan implementation.
- To identify gaps during a SimEx should not be considered failure, and a reason to disengage from the exercise. This should be stated in the purpose, scope, and objectives of the SimEx.
- To include items into organizational planning has showed to be effective for action plan implementation.
- Simulation exercises could also help provide arguments to avoid financial cuts during organizational planning.

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6. Discussion

This section compares the findings in the literature review with the interview study, and analysed if there are connections between CD for DRR and AP implementation. In addition, improvements of the interview study and literature review were discussed. Section 6.5 discussed future research on the subject.

6.1 Comparison of the literature review and interview study

The informants generally agreed on the key factors that support and limit action plan implementation e.g., double loop learning. One explanation that informants share similar perspectives on action plan implementation could be that the informants are SimEx professionals and have years of experience. One informant has worked over 35 years in the Humanitarian and SimEx field. Furthermore, the literature review identified important lessons from the SAMÖ SimEx series for successful action plan implementation. This SimEx series have been thoroughly analysed and therefore it is reasonable to assume that the identified key factors in this master's thesis are relevant for successful AP implementation. The key findings are discussed below:

6.1.1   The themes

The interview study resulted in five discovered themes that affect action plan implementation. The themes are Planning, Resources, Learning, Realism, Priority, and the themes should not be treated in isolation. One example is that the Resources theme concluded that adequate funding should be secured before conducting the exercise. This should require good planning of the SimEx and therefore the Planning theme should be taken into consideration. Hence, adequate resources alone are not expected to solve all challenges related to action plan implementation and all five themes should be considered for increased probability of successful AP implementation.

The Planning theme results showed that contextual factors should be considered, and it was discussed by informants that the applicability of the key factors could vary in different contexts and cultures. It was explained during one interview that one communication strategy could be very successful in Sweden but may not work in other countries or cultures. For instance, in one culture it could be very advantageous to utilize storytelling that was discussed in the literature review whilst in another it may be more beneficial to arrange a meeting to discuss the action plan. Similarly, in one culture it may not be necessary to write action plan recommendations, if the analysis section of the exercise report is detailed and comprehensive. The reason is that the reader will understand relevant actions to be implemented after assessing the report or learn through learning-by-doing that was elaborated in section 5.3.3.

6.1.2   Similarities and differences

The interview study showed that informants have various SimEx experiences but still generally agree on key factors. The literature review supports the interview study, and an example is that both emphasise on active involvement from SimEx participants and that a safe environment should be established. Both also discuss that the framing of recommendations

and accountability have an effect on AP implementation. Moreover, it is difficult to determine which of the discovered themes, that include key implementation factor, is the most critical for action plan implementation and to decide if one key factor is more important than the other. There is interdependency between the factors and failure of one factor could result in action plan implementation failure.

The interview study showed that double loop learning could have a positive effect on AP implementation. However, DLL was not emphasised in the literature review. One explanation could be that many of the analysed articles focused on for instance the evaluation and not AP implementation. Another explanation could be that the research area is not very well researched. Some articles that discussed evaluations after a SimEx emphasised that more research on the subject is recommended.

There were no major discrepancies between the informants and one explanation are that the informants are professionals and have accumulated information on key factors that support and limit action plan implementation over the years. The provided information therefore aligns with the available literature. However, one dilemma was identified between informants. It was discussed by one informant that the more people are aware of SimEx gaps, there is an increased probability that change will occur. Another informant explained that due to confidential information, there is a general unwillingness to share vulnerabilities and gaps from a SimEx. For this reason, some countries have removed exercise reports from the past. The confidentiality factor has a negative effect on AP implementation since it hinders efficient communication and coordination e.g., it is not possible to email the action plan. This reduces the speed of the implementation process since only a few people have access to the complete picture of the situation.

6.1.3   Suggestions on how to overcome challenges related to AP implementation

In the interview study, one informant discussed that three factors are important to consider to overcome action plan implementation challenges. First, it is important to have the participants actively involved in the SimEx. Second, the individuals are convinced and open to change their behaviour to address gaps. Finally, an action plan. It was discussed that action plan is great but more of a formal product and that there are other processes for implementing change as well.

Another informant discussed that planning the SimEx by determining purpose, scope, and objectives is a way to overcome implementation challenges. One Professional that was interviewed have worked internationally and discussed that simulation exercises could be scripted to some extent. This meant that the aim of the SimEx was not clear. However, this challenge should not mean that the exercise was worthless. Through good cultural understanding and thorough planning of the SimEx, some SimEx gaps could be identified and addressed in an action plan.

A blueprint on how to exactly overcome action plan implementation challenges has not been identified, but rather ideas. The ideas are presented in the interview study and literature review, and these ideas are not written in stone, but rather tools that could be advantageous. In

case that good ideas are identified to overcome AP implementation challenges, the ideas should be documented, so that individuals that were not part of the SimEx still gain an understanding of the challenges and how to overcome them.

6.2 Similarities between CD for DRR and AP implementation

The literature review and interview study material showed that there are similarities between action plan implementation and CD for DRR. One explanation is that AP implementation is a part of capacity development for DRR, see its definition in section 3.5. An enhanced understanding of one subject could therefore enhance the other and details are provided below.

6.2.1   Short-termism

Similarly, the literature on CD for DRR and interview study elaborated that long-term planning is important but difficult to implement. For instance, one informant in the interview study discussed that in the emergency preparedness sector there are systemic issues that limit long-term planning e.g., reluctance to invest in equipment that may be useful in the future. This reduce effectiveness and similarly in CD for DRR, it is stated that projects are affected by short-termism due to e.g., funding conditionalities. Furthermore, both AP implementation and CD for DRR are also affected by the current staff turnover rate and in both cases, it is recommended to develop local capacities. For instance, assign action plan items to the people at the local level instead of international staff for AP implementation and develop local universities for CD for DRR projects.

6.3 Improvements of the literature review

After conducting the literature review and analysing the material, potential improvements were identified. The improvement areas are discussed below.

6.3.1   Keywords

The keywords that were used in LUBsearch: "simulation exercise", "evaluation", "action plan", "implementation", "challenges", "usefulness", "improve", "learning", "lessons learnt", "debrief session", "capacity development", "capacity strengthening", "capacity building", "disaster risk management", "disaster risk reduction", "emergency preparedness", and "disaster preparedness" could have been affected to some extent by confirmation bias i.e., "*seeking or interpreting evidence in ways that are preferential to existing beliefs, expectations, or hypotheses*" (Nickerson, 1998, p. 175). In this case, the literature review was conducted before the interview study to reduce the risk of this bias. However, initial ideas on the key factors that support and limit action plan implementation could still have affected the results.

Another improvement of the literature review could be to broaden the search scope. In this literature review it was found that capacity development for DRR could be connected to AP implementation. There could be other areas as well that could be connected to AP implementation, e.g., implementation research. The keyword "implementation" was included in the search scope, but a wider search is recommended.

6.4 Improvements of the interview study

There are several suggestions for improvements for the interview study. The key takeaways are discussed below in sections 6.4.1, 6.4.2, 6.4.3, and 6.4.4.

6.4.1 Transcription of the interviews

Höst et al (2006, p. 92) described that to transcribe an interview is a prerequisite for in-depth analysis, and that one hour of interview material would take approximately 8-10 hours of work. This interview study utilized the NVivo Transcription tool instead of manual transcription to reduce the subject number of hours. Furthermore, the audio quality from the recording devices during the interviews varied and for the NVivo Transcription tool to provide accurate results, it is recommended to avoid disruptions among participants and reduce background noise. It was acknowledged that the Zoom audio recording resulted in clearer audio compared to the phone recording. This is one explanation that five out of eight interviews were conducted over Zoom. An unexpected advantage of the NVivo Transcription tool was that the accuracy was better if the interview language was in English compared to Swedish, and five out of eight interviews were held in English.

In the future, it is recommended to obtain professional recording devices since two interviews were carried out face-to-face and required more edits compared to the Zoom interviews. In addition, to reduce the number of hours put into editing interview materials in the future it is also recommended to investigate if there are other transcription tools that have more than 90 % accuracy.

6.4.2 Interview guide

The interview guide that was developed was not fully utilized. The reason was that the interviews were more open-ended and less structured than expected. To avoid interviews that spanned over an hour all informants received four questions instead:

1. What is your current position?
2. Can you describe some of your experiences regarding participating and/or facilitating in a simulation exercise?
3. What are the key factors that support and limit action plan implementation?
4. What can be done to overcome the challenges related to action plan implementation?

For the third and fourth question, follow-up questions were asked to better understand the key factors and how to overcome challenges. The four questions took approximately 45 minutes to answer and even if the interview guide was not strictly followed, the gathered material on the subject was valuable. The informants had a clear picture of the barriers related to the subject. Furthermore, it is not recommended to conduct any major revisions to the interview guide. The interview guide helped the informants understand the research area and served as a complementary brief to the email cover letter. This was an unexpected advantage both to the interviewer and the informants.

It is also important to acknowledge that the terminology of the informants differed during the interviews e.g., one informant discussed a key implementation factor and named it culture whilst another informant discussed the same factor but applied another name. From the assessed data and the codes in NVivo it could displayed that it is the same factors that are elaborated.

6.4.3 Double coding

One cavity of the interview study was that the analysed material was not subject to double coding i.e., another person that also code the interview material and compare the findings (Chandler & Munday, 2011). Therefore, there is a risk that personal biases have affected the outcome of the interview study. However, field notes were taken during the interviews and quotations have been provided throughout the interview study to address this issue. The interview material has also been thoroughly assessed and this is one reason that the number of informants was rather low. More informants could have been interviewed but this would require additional time. One advantage of the in-depth interview analysis was that more informants discussed, for instance, double loop learning than first anticipated after solely conducting the interview and going through the field notes. The reason was that the informant did not explicitly mention double loop learning but discussed the learning level using other words. This would not have been understood if not for the AI generated interview transcriptions.

6.4.4 Interview skills

This was the first time the author of this thesis carried out interviews with SimEx professionals. The interview skills were developed over time and the interviews in October 2022 were probably more professional compared to the interviews in September 2022. One explanation was that the author better understood the subject as time passed and gained confidence. During the October interviews, the interviewer could listen more to the informants, formulate better follow-up questions, and stay better focused on the research subject. In the first couple of interviews, there was a nervous feeling that the recording devices would not work properly, and that the duration of the interviews would be more than 60 minutes. One objective of the interviews was that the duration should not exceed one hour.

6.5 Future research

After the assessment of the two research questions, it was found that to gain a better understanding of the subject, additional research is recommended. This thesis is subject to boundaries and limitations and future research is needed. The recommended additional research origin from the analysis of literature review and interview study data but also ideas from informants. There are four areas of research that should be further investigated:

- impact assessment of key implementation factors,
- context and applicability,
- differences between operations-based and discussion-based action plans, and
- change management.

6.5.1 Impact assessment of key implementation factors

An impact assessment of the key factors listed in this master's thesis could determine the real effect that each factor has on AP implementation. This is done by comparing the outcome of an action plan, with the application of one key factor, and an identical action plan without this key factor (Eriksson & Trané, 2014b, p. 6). The relation between a key factor and AP implementation could then be clarified. However, there are several challenges related to impact assessment. One challenge is to avoid confounders and another challenge is to determine the exact impact that one key factor has on AP implementation. Furthermore, many of the professional informants discussed that the identified key factors are based on personal experience, and that there could be a difference between the expected and real effect. Increased reliability and more validation of the results is recommended.

6.5.2 Context and applicability

An informant discussed that it should be determined if there are differences of applicability regarding the key factors in Sweden on different levels in crisis management i.e., local level, regional level, higher regional level, central level, and national level. Due to confidentiality of this thesis, conclusions have not been made if some of the key factors are more relevant to one level or organisation than another.

6.5.3 Action plan implementation differences between TTX, DR, FX, and FSX

The interview study and literature review analysed both operations-based exercises and discussion-based exercises. In this thesis it was assumed that action plan implementation factors apply to both categories. This assumption should be further investigated.

6.5.4 Change management

It was discussed that implementation of change in a system could happen without an action plan simply through intangible learning or learning-by-doing. This is a subject that could provide a more complete picture of how to implement change in a system since action plans are not always successful. Hence, change management tools and processes should be further analysed.

7. Conclusions

The assessment of the research questions listed in section 1.1 have resulted in the following conclusions.

7.1 What are the key factors that support and limit action plan implementation?

In total, 11 key factors that support and limit action plan implementation have been identified. The subject factors have been categorized into five themes that should be considered for increased probability of AP implementation: Planning, Resources, Learning, Realism, and Priority. Further, there are no major differences between the literature review and interview study. For instance, both agree that a safe environment should be established and that clear roles are important for AP implementation. All discovered themes are recommended to be considered during action plan implementation to increase the probability of successful AP implementation. Further research is recommended on the applicability of the themes in different cultural settings.

7.2 What can be done to overcome action plan implementation challenges?

The literature review and interview study provided several suggestions on how to overcome AP implementation challenges e.g., follow-up strategies and storytelling. The applicability of the suggestions varies in different cultures. The interviewed SimEx professionals have different experiences and one suggestion that work very well in one cultural setting may not work in another. Furthermore, one suggestion that several informants generally agreed upon was that many AP implementation challenges could be solved through intangible learning. The reason was that when people experience a major gap and learn that this gap must be addressed, an action plan may not be necessary since the people will address the gap anyways. One cannot rely that intangible learning will solve all the AP implementation challenges but future research on change management processes and tools is recommended. This could reduce the impact of limiting factors.

To better understand the challenges related to AP implementation it is recommended to look further into CD for DRR. One aim of action plans is to develop capacity and many challenges for CD for DRR are therefore applicable to AP implementation e.g., terminology and short-term perspective. Further research on connections between CD for DRR and AP implementation is recommended.

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Appendix A – Interview Guide

The following research questions will be addressed in this Degree Project:

- *What are the key factors that limit and support the implementation of action plans?*
- *What can be done to overcome the challenges related to the implementation of the action plan?*

Introduction

The interviews for this Degree Project will be qualitative and semi-structured. One advantage of a semi-structured interview is the possibility to slightly rephrase a question that allows the interviewer to confirm provided information. This advantage increases the accuracy of the interviews and reduces the risk of misunderstandings. To minimize the risk of bias and further increase accuracy, the interviews will be recorded.

Phase 1

The interviews will consist of three phases and Phase 1 will discuss simulation exercises (SimEx). Please note that the follow up questions may not be asked during the interviews.

- What is your current position?
- Can you describe some of your experiences regarding participating and/or facilitating in a simulation exercise?
- Could you please describe how the results of a simulation exercise is affecting the action plan? *Follow up question(s): How is the facilitator and/or participants from a SimEx involved in the action plan development?*
- What recommendations are usually incorporated to the action plan after a SimEx? Why?

Phase 2

The second part of the interviews will discuss action plans. The proposed questions for Phase 2 are listed below:

- Could you please discuss the key factors that limit and support the implementation of action plans? *Follow up question(s): Based on your experience, why is the action plan not always implemented?*
- What do you think can be done to address the action plan challenges? *Follow up: why do you think this problem exists?*
- How do you evaluate supporting and challenging factors?

Phase 3

Finally, Phase 3 will conclude the interviews and ask the participants if there is anything they would like to add to the interview.

- Summary of key factors that limit and support the implementation of action plans.
- Is there anything else you would like to add?
- Do you think there is anyone with relevant background that you think would like to participate in this Degree Project?

Appendix B – Keywords

The following keywords were inserted to the LUBsearch engine in the systematic literature review: "simulation exercise", "evaluation", "action plan", "implementation", "challenges", "usefulness", "improve", "learning", "lessons learnt", "debrief session", "capacity development", "capacity strengthening", "capacity building", "disaster risk management", "disaster risk reduction", "emergency preparedness", and "disaster preparedness".

1. Simulation exercise (AB) AND evaluation (AB)
2. Simulation exercise (TI) AND evaluation (AB)
3. Simulation exercise (TI) AND evaluation (TI)
4. Simulation exercise (AB) AND action plan (AB)
5. Simulation exercise (AB) AND implementation (AB)
6. Simulation exercise (TI) AND implementation (AB)
7. Simulation exercise (AB) AND challenges (AB)
8. Simulation exercise (TI) AND challenges (AB)
9. Simulation exercise (AB) AND usefulness (AB)
10. Simulation exercise (TI) AND usefulness (AB)
11. Simulation exercise (AB) AND improve (AB)
12. Simulation exercise (TI) AND improve (AB)
13. Simulation exercise (TI) AND improve (TI)
14. Simulation exercise (AB) AND learning (AB)
15. Simulation exercise (TI) AND learning (AB)
16. Simulation exercise (TI) AND learning (TI)
17. Simulation exercise (AB) AND lessons learnt (AB)
18. Simulation exercise (TI) AND lessons learnt (AB)
19. Simulation exercise (AB) AND debrief session (AB)
20. Simulation exercise (AB) AND capacity development (AB)
21. Simulation exercise (TI) AND capacity development (AB)
22. Simulation exercise (AB) AND capacity strengthening (AB)
23. Simulation exercise (AB) AND capacity building (AB)
24. Simulation exercise (AB) AND disaster risk management (AB)
25. Simulation exercise (AB) AND disaster risk reduction (AB)
26. Simulation exercise (AB) AND emergency preparedness (AB)
27. Simulation exercise (TI) AND emergency preparedness (AB)
28. Simulation exercise (AB) AND disaster preparedness (AB)
29. Simulation exercise (TI) AND disaster preparedness (AB)