A qualitative study on CBRN communication and culture in Finnish authorities

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Laurea University of Applied Sciences **Abstract**
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The aim of this study is to increase Finland's general safety by improving the quality of the Finnish chemical, biological, radiological, and nuclear (CBRN) related culture and communication between the Finnish Defence Forces, the Police of Finland, and the Finnish Rescue services, by updating their cooperating methods, and by finding practical solutions through a better and more appropriate overall understanding of the scene. The objective of this study is to understand what it takes to become a CBRN expert in these organizations, as well as to understand the national CBRN communication culture prevailing in them, and its effects on reality. In addition, the developmental elements that can take the field forward is discussed.

The theoretical framework is built on current academic articles and textbooks, supported by relevant sources. At the time of this study, no CBRN communication research publications were found, which is why the structure of this study is based on different theories, models, and frameworks of crisis communication.

Qualitative phenomenological approach and individual key-informant interviews were used to collect the experiences and views of the CBRN specialists working in the target organizations. The sample consisted of five CBRN specialists with information power. A semi-structured query based on the theoretical framework was created during the study. The content analysis was carried out by the researcher alone with a tabular tool and the reliability was increased with the use of Atlas.ti research tool.

The key findings pertained to success in CBRN, which requires high competence, and the non-traditional culture of interaction between the CBRN authority organizations, as well as the role of CBRN in these organizations.

In conclusion, CBRN is a complex topic that requires a high level of diverse knowledge, skills, and attitudes. It is a topic that increases cooperation in different sectors of society.

The study recommends that the topic of CBRN and related communication should be constantly updated in different ways in different fields. New terminology is also proposed.

Keywords: CBRN, Crisis communication, Qualitative, Ceberne, Authority

Contents

1 Introduction

In late 2024 and early 2025 there are dozens of ongoing conflicts in the World (World Economic Forum 2024; World Economic Forum 2023; Council on Foreign Relations 2024) and the nearest high-stake hotspot to Finland, is the illegal full-scale war, that Russia started with its invasion of Ukraine in 2022 (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; World Economic Forum 2024; World Economic Forum 2023; Council on Foreign Relations 2024). Global concentration on risk reduction and preparedness should take chemical, biological, and nuclear hazards into special focus. Development of treaties and agreements on these hazards, linking them to localized strategies, and coordinated collective actions nationally and cross-border level, are seen as the most important drivers to reduce the impact of globally wide scale risks during the next decade. (World Economic Forum 2024, 91-92.) From the perspective of multi-stakeholder involvement, the topic of "biological, chemical and nuclear threats" is considered to be the sixth most potential approach to organizing the exchange of information and best practices globally over the next 10 years. They are even valued over "erosion of human rights", "technological power concentration" and current megatrend "adverse outcomes of AI technologies". (World Economic Forum 2024, 114.)

CBRN is originally an abbreviation, but an established term today, that describes intentional use, or accidental incidents related to chemical (C), biological (B), Radiological (R) and/or Nuclear (N) weapons or materials. Sometimes the letter E can be seen connected in the same abbreviation (CBRNE or CBRNe) – it stands for high yield explosives. (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; Kegyes, Süle & Abonyi 2024; European Union 2022; Maavoimien Esikunta 2014; Baka et al. 2008.) In Ukraine, the use of biological, chemical or nuclear weapons, is in third place in the top five list of national risks, identified by World Economic Forum (2024, 110). Every nation should be prepared for CBRN incidents as well as possible (European Union 2022). It is possible that even individuals can produce certain weapons of mass destruction in the future (World Economic Forum 2023, 41). European Commission (2025) considers that chemical, biological, radiological, and nuclear emergency response materials and equipment are needed more in the rescEU project in the future, because epidemics, natural disasters like floods, storms, wildfires, earthquakes, as well as man-made disasters, endlessly stresses the countries' emergency capacities. The occurrence of disasters is expected to become more frequent and more serious as climate change progresses and security concerns increase.

CBRN terror and crises are low-frequency, but high-impact events when they occur (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; University of Maryland 2022;

Tin, Granholm, Hart & Ciottone 2021) and can be difficult to respond to. Even the CBRN threat can cause severe negative actions in the societies, among economy field and politics, and in individual level decrease of health for example through strong psychological fear (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). They usually require specialized professionals from different fields for the response to be successful (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; Kegyes, Süle & Abonyi 2024; European Union 2022; Tin et al. 2021; Maavoimien Esikunta 2014). CBRN communication has faced significant challenges globally since the First World War and needs to be continuously improved (NATO 2018). The Finnish National Counter-Terrorism Strategy 2022-2025 announces that for the sake of economic profitability, counter-terrorism parties should create the conditions for success through their systematic and long-term joint activities (Ministry of the Interior Finland 2022, 7).

The Ministry of Defence Finland (2020, 7; 2024a; 2024b) states that general development, and national cooperation between non-military and military stakeholders should be tighter, but at the same time financial savings should be made, especially in terms of materials. This means, that in the future the practical practices must be developed and better compatible both nationally and internationally and that information and practical models must be developed together with other authorities (Ministry of Defence Finland 2020, 7-9).

The Ministry of Defence published an updated “CBRNE-strategy 2024” for Finland in December 2024, and CBRN communication is one topic that needs to receive more national attention, especially now that Finland is a member of NATO (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). This was also stated in the emails from the Chair of the National CBRNE Committee to the author, during autumn 2024, before the official CBRNE-strategy 2024 was published (Raijas 2024. Personal communication.) Coleman (2023, 24) notifies that the aim during crises is to build a consistent narrative and messaging, for which each party must have an understanding of each other’s actions during the crisis response, so that both the parties responding and the wider public receive the best support.

This study is dealing with the crisis communication theories and aim to enhance general safety and national security by strengthening the CBRN communication culture between the national CBRN responsive authorities of the Finnish Defence Forces, the Police of Finland and the Finnish Rescue Services. Pearson, Roux-Dufort and Clair (2007, 108) state, that police forces, and fire and rescue services are excellent organizations to deal with when the topic concerns crises, because the nature of these emergency-response organizations is to deal with crises on their daily basis.

A professional crisis communicator is also not only able to theoretically understand the existence of different people’s needs (Ahlqvist, Nurmeksela & Kvist 2023) but also reactions

to exceptional circumstances and crises, and how these reactions should be responded to in real life (Coleman 2023). This document presents a qualitative study report for the author's thesis process in Laurea University of Applied Sciences Master's Degree Programme in Global Health and Crisis Management (Laurea University of Applied Sciences 2023). The author suggests that Finland's national situation should be clarified among authorities using communicative methods in the field of CBRN in their everyday work, in order to better understand these professionals, their organizations, and what it takes from an individual to become successful and effective communicator in the context of CBRN. As the aim of this study is to increase Finland's general safety, three of the five main finding categories have been censored due to the sensitivity of their contents. Some contents in chapter 6. Discussion and 7. Conclusion are also censored due to the same reason.

The author uses various methods of interpersonal communication on a daily basis and has been dealing with CBRN issues since the summer of 2006, i.e. for almost 19 years. Communication has always been a pain point of its own in the context of CBRN, although the authors' experience is that it has never been at a level where it has completely blocked any action or operations. Empiric experience has taught, that this is since the topic of CBRN has mainly attracted individuals who bring with them exceptionally rich and high-quality know-how, and who have succeeded in any situation with the help of their creative problem-solving skills. When planning the topic of the thesis, the author thought that just because the shortcomings of CBRN communication do not prevent the operation completely, it does not mean that it cannot be streamlined, parsed and clarified through structures that each end-user group would have the opportunity to influence.

2 Crisis management and communication among authorities in the event of CBRN threats

World Economic Forum (2024) listed 34 different identified global risks where communication related issues, more precisely misinformation and disinformation, are identified as the most severe short-term risks during the next two years, and fifth severe in long-term (10 years) estimations. Extreme weather events are ranked as second severe in short-term, and most severe in long-term estimations. Biological, chemical or nuclear hazards will climb from the short-term place of 31 to 26 during the next decade. Infectious diseases will most likely increase from the 23rd place to 19th in the long term and increase the risks of chronic health conditions related to them. In the risk influence scale of low-medium-high, both, interstate violence and disruptions to critical infrastructure connected to it, holds status of high, and terrorist attacks linked to them, medium. Extreme weather events are the most expected factors to cause material crises, and when, for example, the industrial sector is affected, incidents including uncontrolled biological, chemical or radiological releases can occur. (World Economic Forum 2024, 8-13.)

In the year 2017, World Health Organization (WHO) made an international health regulations report taking stance on Finnish national capabilities towards biohazards, chemical threats and radiation emergencies. The report pointed out, that in Finland, there have been success on these areas, but difficulties especially among the multi-sectorial coordination, especially with the actions related to communication. Ministry of Defence Finland (2024a; 2024b) still agrees, that this field needs enhancement. Because of the specific scientific CBRN responsible areas, many functions have been too often dependent on some specific individuals relatively more than professional roles. (WHO 2017.)

During crises it is possible that non-intentional false information is spread, and that phenomena and the data included is called misinformation (Meer & Jin 2022). It is important that misinformation is recognized, and counter-maneuvers and interventions made as fast as possible (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; Meer & Jin 2022), by using evidence-based systems backed up with commonly accepted theories (Meer & Jin 2022). Guidelines for instructional messaging can offer a way to tackle the spread of misinformation (Soares et al. 2022). Also, the existing laws should be suitable and on-the-date to support the counter-spread of false information and generally prevent the CBRN situations (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). This is why it is important to constantly perform research in the field of crisis communication. Specific guidelines for crisis communication, concerning what, when, in what way, under what conditions using which channel or medium, should be produced from and leaning to topical and relevant research (Avery, Lariscy, Kim & Hocke 2010; Claeys & Coombs 2020; Claeys & Waele 2022).

2.1 Crisis and crisis management

Consensus about terms crisis, crisis management and crisis communication are not strictly clear. There is a gap between the cultures of academic crisis communication and industry, or in other words, practical crisis communication. The dialogue between the representers of these two worlds should be enhanced. (Manias-Muñoz & Reber 2022, 28-29.) According to Chen, Coombs and Holladay (2022), modern problem met in academic setting concerning the study of crisis communication, is that the term crisis is used too loosely, especially on social media platforms, and therefore it suffers from a kind of inflation. The term crisis is no longer clearly conceptualized, leading to a situation where it has different meanings for different people even on the same platforms. The authors state that people “are far too willing to label a situation as a “crisis” when really it is an incident or a bad day” (Chen, Coombs & Holladay 2022, 118). Hammarén and Laajalahti (2019) noticed the same phenomena in their study, and they warn people not to over dramatize the ongoing unfortunate event.

Pearson, Roux-Dufort and Clair (2007, 109) refers to Aguilera (1990), Dutton (1986) and Quarantelli (1988) when agreeing on what comes to the definition of crisis, as an unlikely, but high-consequence event, that emerges particularly fast and involves unclear elements causing unknown effects. Tubb (2020) defines crisis to be a serious threat to the basic structures, values and norms of a system, where the nature of the event is highly uncertain and decisions are done under time pressure and contain uncertainty. Pedak (2018) agrees that the elements of negative impact, uncertainty and obscurity are present when situation is defined as a crisis. Coleman (2023, 34-35) suggests that the following five elements need to be present before a situation can be defined and classified as crisis:

1. Time of intense difficulty or danger
2. Situation requires difficult decisions of actions, and there might be several ways of responding
3. Situation must be only leading towards negative or at least potentially negative future
4. The situation occurs surprisingly and develops abruptly, or the signs of it are not recognized soon enough
5. Human impact is present — people's lives, communities, or even countries are affected.

In their article, Chen, Coombs and Holladay (2022) ponders the concept of paracrisis, which refers to a risk or a challenge, that for example society or organization can run into. According to the authors, the situation during paracrisis is not catastrophic yet, but on the edge to turn to be. Possible paracrises should be noticed when making an organizational crisis management plan and crisis response strategies. The authors handle the concept of paracrisis in six clusters, which are: Faux pas (violation of the social expectations in certain moment), Challenge, Guilt by association, Misinformation, Social media misuse, and Social media account hacking. Possible strategies to respond to paracrises are refusal, refutation, repression, recognition, revision, reference to organizational values, and disassociation. (Chen, Coombs & Holladay 2022.)

Three generic phases can be said to exist in each crisis: pre-crisis, ongoing crisis, and post-crisis. The ongoing crisis can be separated from emerging phase, developing phase, and the end phase (Coleman 2023, 4).

Crisis management is suitable set of right capacity flexible preparatory and response actions or tasks aiming to "effectively deal with societal risks and protect citizens from negative impacts of crises" (Tubb 2020, 8). The so-called PPRR model is generally known to be used in crisis management systems, and the letters stand for prevention, preparation, response and recovery. Crisis communication is a strategic practice aiming to effectively manage and

distribute timely and credible information under conditions of severe insecurities from and to all involved stakeholders. (Tubb 2020, 8-12.)

One way of categorizing the anatomy of crises is to observe them as 1) Operational crises, and 2) Reputational crises. Management approaches towards them are similar, but being able to formulate a suitable communication response, one must be able to analyze the ongoing event and recognize which type of crisis has occurred. 1) Operational crises happen in the environment around us. They can be for example natural disasters like wildfires or floods, health epidemics caused by spread of infectious pathogens, or manmade crises like terrorist attacks, accidently happened or intentionally made contaminations of goods, or riots. National and international primary responders usually deal with operational crises. 2) Reputational crises do not need anything physical to happen, but they still affect people's feelings, perceptions, and even way of acting towards some specific target, for example single person, or an organization. Reputational crises are more commonly seen in the digital or virtual world, and they usually concern business sector actors. The risks and reasons of these two types of crises may differ from each other, but the needed responses and the impact of the crises can be quite similar. (Coleman 2023, 36-39.)

2.2 Crisis communication

Frandsen and Johansen (2022) rely on communication theorist Robert T. Graig, when it comes to the definition of practicing the interpersonal phenomena, that is commonly known as communication: "set of activities that are commonly engaged in, and meaningful in particular ways, among people familiar with a certain culture" (Craig 2006, 38). Frandsen and Johansen (2022, 374) also add that specific way of thinking, processing and talking about the shared interest or activities are part of the practice, which can be realized either in conceptual and/or theoretical ways. Craig (2006, 40) ponders that:

> "Communication practices are not necessarily "good" ways of communicating, although, as practices, they must be recognizable activities and topics of critical discourse as ways of communicating. Pornography is a communication practice. Political terrorism is a communication practice (a way of sending a message). The ethical legitimacy of these forms of communication can be debated, but they are clearly communication practices, recognizable as such in our culture."

Coleman (2023, 212) sums about crisis communication:

> "People are the recipients of the communication and they will also be caught up in the crisis. Changing the way you consider crisis communication and its aims will build a more effective strategy and approach. Consider what crisis

> communication means to you, your communication colleagues, senior leaders and the organization as a whole. If you understand what their views and opinions are before an issue emerges then you will know how much work is required to change the perspective away from reputational management and towards a people-centred response."

It is important for crisis communicators to learn how to step into crisis, but also out of it. It means that if one expects to perform well in the activity of crisis communication during a respond to any kind of crisis, the person must be able to understand the emotions which can occur among different stakeholders during exceptional events. (Coleman 2023.)

Dialogue is an interaction concept that creates a microenvironment that maintains safe learning and information exchange for the participants. During dialogue, individuals do not oppose each other, but try to create understanding, knowledge and experience by sharing openly while maintaining a respectful way of interacting. During dialogue, efforts can be made to solve problems without individuals confronting each other. Dialogue should also develop each party and build a transparent, trust-based relationship between them. Openness, honesty, respect and mental maturity can contribute to the success of dialogue, as can sharing the common values of the parties. (Šemrl et al. 2024a; Šemrl et al. 2024b.)

Disaster response information must be accurate and offered timely (Liu & Ni 2022). There are four types of communication patterns in the so-called crisis communication matrix: (1) citizens to citizens (C2C), (2) authorities to citizens (A2C), (3) citizens to authorities (C2A), and (4) authorities to authorities (A2A) (Liu & Ni 2022, 350). The last one, A2A, covers both inter- and intra-organizational crisis management (Liu & Ni 2022). Crisis communication and risk communication are ways to inform and instruct, but crisis communication explains the ongoing processes' events, consequences, outcomes, and offer information to affected people aiming to reduce harm (Heath & O'Hair 2008). Reynold and Seeger's (2005) perception of risk communication is that it "associates with threat and involves the public messages of hazards". Coleman (2023, 166) sums, that the aim of all communication actions is to provide support to those who are most affected because of the ongoing incident.

2.2.1 Ethical approaches in crisis communication theories

In their article, Voges and Peters (2022) ponders ethical principles of communication in crisis situations from the perspective of communication practitioner. They highlight that understanding the ethical and legal aftereffects towards the influenced population is vital if one wants to give appropriate respond. Deontology and utilitarianism are found as suitable approaches to support ethical decision making in crisis communication settings. Deontology is presented through a refer to Immanual Kant's work: "…ethics can be seen as a responsibility of the actor's, a duty, to uphold moral principles like truth-telling" (Voges & Peters 2022,

38). Deontology evaluates “decisions by thinking through how they reflect agreed-upon moral principles” and the principles that communication practitioner should follow are advocacy, transparency, and honesty, and that is why crisis communication raises easily dilemmas (Voges & Peters 2022, 38). Utilitarianism is a perspective that evaluates ethical “…decision-making from the potential consequences of an action” and “…decisions are made by determining how much goodness (or happiness) the action will bring to others” (Voges & Peters 2022, 38).

Crisis situations are also recognized as a threat for these principes (Voges & Peters 2022). As an alternative for these philosophical approaches, the authors offer a more practical approach called The Potter Box. It can be used as a decision-making tool, holding in four separate quadrants, which are connected to each other. First (1) is definition — asking a question, “What is important to know?”, second (2) is values — asking a question, “What core ideas do you need to think about when making this decision?”, third (3) is principles — asking a question, “What framework will guide the practitioner to the best decision?”, and fourth (4) is loyalties — asking the questions, “Who matters in this decision?” and “Who does this situation affect?” (Voges & Peters 2022, 39, table 3.1).

2.2.2 Short presentations of different crisis communication theories

There are several theories in the field of crisis communication. In their article, Manias-Muñoz and Reber (2022) presents few of these: Situational Crisis Communication Theory (SCCT), Behavioral Crisis Communication Theory, Contingency Theory of Strategic Conflict Management, different theories concerning of crisis response narratives, Social-Mediated Crisis Communication Model (SMCC), and Image Repair Theory. This document briefly introduces some of these:

Situational Crisis Communication Theory (SCCT) suggest that crisis type, previous incidents, and past relational reputation between stakeholders should be evaluated by people responsible of organizational crisis communication (Manias-Muñoz & Reber 2022, 22). According to Chen, Coombs and Holladay (2022, 122), the SCCT is linking crisis response strategies to crisis types in a systematic way.

Behavioral Crisis Communication Theory is rather new framework represented by Claeys and Coombs (2020). It recognizes, for example, information overload and time pressure as factors determining the decision-making process. Analytical and intuitive crisis response strategy manners depend on the intensity of the moment and this theory tries to explain the bias of intuitive decisions. Manias-Muñoz and Reber (2022, 23) states that since people tend to be loss-averse, they don't always aim to maximize profits but rather minimize losses.

Contingency Theory of Strategic Conflict Management describes the changing traits of crisis communication. The theory describes a continuous process with endpoints of pure accommodation and pure advocacy, and it is more of a positive descriptive theory than regulative. (Manias-Muñoz & Reber 2022, 21.) When act accord to Contingency Theory of Strategic Conflict Management, the first strategic choice should be evaluated and tested in operation, and if necessary, adopt relevant strategic flexibility to ongoing crisis communication (Manias-Muñoz & Reber 2022).

Theory of Strategic Conflict Management strives to approach crisis communication situations in a coherent and systematic manner. The organization or other stakeholders move from everyday story mode to crisis narratives and then back to routine narratives when faced with a crisis. (Manias-Muñoz & Reber 2022, 22.)

Social-Mediated Crisis Communication Model (SMCC) identifies three different types of people: (1) Influential Social Media Creators, (2) Social Media Followers, and (3) Social Media Inactives. SMCC identify communication flows between different online and offline media and influential audiences, and it describes how messages flow directly, but also indirectly among concerned publics and from and to the organization and its publics. (Manias-Muñoz & Reber 2022, 22-23.)

Image Repair Theory "…assumes that (1) communication is goal-directed and that (2) positive reputation maintenance is a central goal of communication" (Manias-Muñoz & Reber 2022, 21).

Chen, Coombs and Holladay (2022, 123) also introduce the Attribution Theory, which is described to be "…a socio-cognitive approach that describes people's general tendencies – their sensemaking process – when ascribing causality of events". Especially negative events are under investigation.

Many existing crisis communication frameworks and models concentrate either electronic online communication studies or communication between organizations and everyday citizens. Cheng, Spruill and Dalton (2022) conducted quantitative content analysis research concerning crisis communication in different settings, but mostly somehow connected to social media. 135 articles from 15 journals were chosen, between the years of 2016 and 2020. The Situational Crisis Communication Theory (SCCT) was the most frequently used theoretical framework. The authors also mention theoretical frameworks grounded theory, and CERC (Crisis and Emergency Risk Communication) (Cheng, Spruill & Dalton 2022, 11).

Recently, the cultures inside different organizations are facing major changes, because the Gen Z and millennials are growing their numbers in the work sector (Eaddy, Gower & Reber 2022). Claeys and Waele (2022) claim that one-size-fits-all crisis response models are not

valid in the modern world, and that they can turn out to be even harmful for the communicator and the persons organization, even if communication activities are carried out with authenticity and transparency. Coleman (2023, 212) suggest that success in the crisis communication response is up to appropriate behaviour, sensitiveness, professional behaviour, and the use of inclusive language and vocabulary. Successful crisis communicators must have previous experience to lean to and it is necessary that the person knows the traits of different audiences and can adjust actions to be as effective as possible (Coleman 2023, 16).

Coleman (2023, 67-70) argues that the military and rescue services are organizations from which crisis communication is worth learning, as no other party faces crises as many and as diverse as them, and that the learning should happen in advance during peaceful times in safe environment. Military approach (Coleman 2023, 67) is illustrated in Figure 1, and it is an example including six key elements, aiming to assist the crisis communication plan preparations.

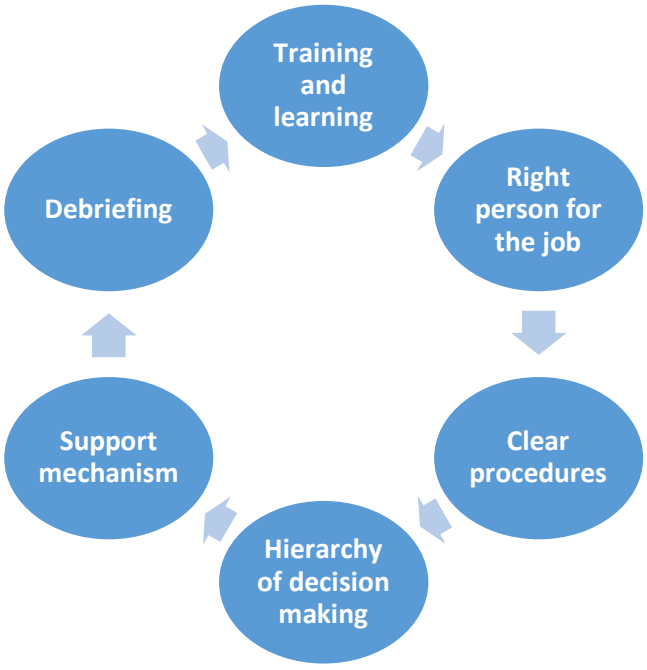

Figure 1: Military approach
(Coleman 2023, 67)

Anticipation of resources, materials, and existence of skilled specialized professionals in the preparation phase will probably turn to profit on several levels, if a crisis occurs. In advanced organizations, it is ensured that the staff is involved in preparations. (Coleman 2023, 70-71.) Especially from internal communication aspect, the staff wellbeing is essential particularly

during the crisis response phase (Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023, 131, 214). Approaches towards enhancing staff's wellbeing should be made in tailored ways in situations where only individuals or small groups need special support after an incident (Coleman 2023, 214).

Where the full potential of armed forces is more rarely needed, the emergency services, meaning the police, and fire and rescues services, face significant events and even crises more often. One model for emergency service-led crises is illustrated in Figure 2, which is the emergency services approach containing eight key elements for planning and preparations. (Coleman 2023, 72, 141.)

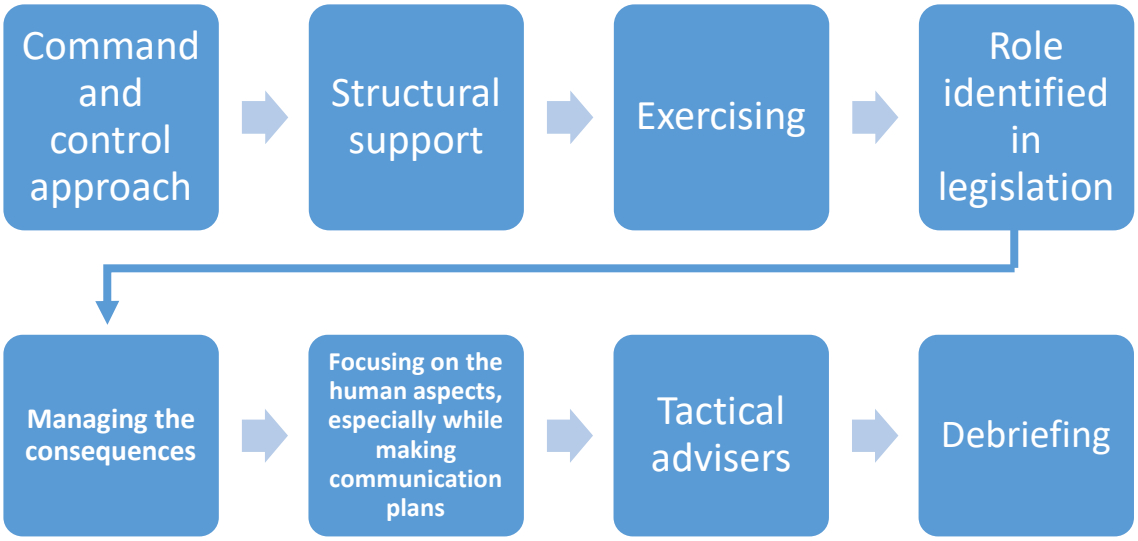

Figure 2: Emergency services approach
(Coleman 2023, 72, 141.)

In this model, there are actors in three levels, and each level has at least one person in charge, who is called a commander. The levels can be called Gold (strategical), Silver (tactical), and Bronze (operational), where Gold is the highest and Bronze the lowest in command hierarchy. Usually there is only one gold level commander, who is an organization's senior professional, holding overall control of the crisis response and who makes the most crucial decisions according to the strategy. Silver level commanders help the person above but also hold restricted decision-making rights. They coordinate individual plans towards the realization of the strategical goals. Bronze level commanders have their own operational area, where they can make decisions in the tactical and strategical limits but are still expected to prioritize their actions according to commands given by someone with higher

rank inside the organizations' hierarchy. This structure allows decision-making processes at every level, but regular contact, briefings, meetings, or information change are necessary. The prevailing laws and legislation should notice this structure and support the decision-making process especially in tricky situations. Situations where an emergency service approach is needed might be versatile and difficult as an entity. In general, many specialists with different areas of knowledge are usually needed and their knowledge, experience and abilities should be recognized, and their suggestions should be listened to by senior commanders when making decisions. This may lower the edge and make precise and accurate communication possible at every level, if each member still knows and acts according to hierarchy. Best possible decisions at the strategic level require timely and accurate information delivered from the operational level. (Coleman 2023, 72-76.)

2.2.3 Organizational crisis communication

Crisis communication is an exception inside organizations. It does not necessarily follow or mirror any kind of already-existing communication model, and there can even be several of them, depending on the field where the organization operates (Coleman 2023). The responsibility of developing these processes belongs not only to the communicative staff, but everyone. Communication staff are ones who facilitate the development processes. Professional communication personnel are usually exceptionally good at scenario thinking and spotting different kinds of potential risks and hazards. There are no simple solutions in crisis communications, and they are always bound to the specificness of the ongoing situation, details and purpose of the organizations providing the response. (Coleman 2023, 218-219, 222.)

Organizational crisis communication is a complex and constantly changing entity that needs to be planned well in advance (Ahlqvist, Nurmeksela & Kvist 2023; Bernardi et al. 2024; Coleman 2023), and is best executed when it is in flexible form. Good preparedness and beforehand made preparations can offer a great return of investment number if crisis occurs and the needed measures and resources were predicted right (Bernardi et al. 2024; Coleman 2023.)

When making a risk analysis, the context of the organization relating to the potential risks should be thought in the forehand. Identifying the potential risks and assessing the likeliness of their occurrence should be listed in a suitable risk matrix. The potential impact of each risk should be evaluated. In addition to the risk matrix, preliminary plans should be designed to mitigate, minimize or prevent the identified risks. When these factors can be found in documented form, for example from the organizations' risk matrix, it supports a systematic approach for response, if the risk turns to incident. Well executed preparations are fundamental, if aimed for high level impact with crisis response measures. (Coleman 2023, 42-46.)

Organizations usually benefit from an individual risk management plan, including the risk assessments gained from creative scenario thinking processes (Coleman 2023). The risks relating to communication can be like many other everyday risks (Stearns & Singh-Knights 2024; Coleman 2023). Crisis communication plans can offer many ready-to-use tools like flexible key words or phrases (Stearns & Singh-Knights 2024; Coleman 2023) and assisting technological solutions (Bernardi et al. 2024). Nowadays technology also includes risks and vulnerabilities to consider, especially if they are implemented poorly (Bernardi et al. 2024). Having an old, simple and non-networked technology at the side of primary technology apparatuses might offer an advance of preparedness for example during cyberattacks (Coleman 2023).

Organizations should think of suitable members and a structure for the consequence management team in forehand. The purpose of the consequence management team is to build organizational resilience, moderate the negative impacts of occurring crises, recognize the groups of populations in most need of support, identify timely communication opportunities, which might otherwise be missed, and control potential protests harming the ongoing responsive actions. Consequence management is implemented by members from all necessary areas of the organization, which can represent the actors from operational response, possible legal services and communication experts. The organization can add or remove these roles from the consequence management team, but the updates must be also made to the crisis communication plan (CCP), and the information and practical rehearsals reach the exact members concerned. When a crisis occurs, the consequence management team should meet as soon as possible and start assessing the possible impacts of the event and start providing prioritized support to those who are somehow involved in the incident. Visualizing events, different possible scenarios, and impact estimations, for example to heat map, which is accessible to all, might enhance the response and minimize negative aftereffects. (Coleman 2023, 149-151.)

Accuracy in crisis communication should be valuated from the very beginning (Ahlqvist, Nurmeksela & Kvist 2023; Liu & Ni 2022; Coleman 2023). During incidents, people usually turn out to be more aware, and for that reason it is crucial that communicative methods are switched to crisis communication mode. Increased accuracy prevents the spread of false narratives. The so-called story of the events and especially the first information given forward, should be as exact as possible, because it tends to stick hard and its' update to every stakeholder can be very challenging. (Stearns & Singh-Knights 2024; Coleman 2023, 3.) Trust within and between organizations is built by sharing information that proves to be valid, in terms of its content (Ahlqvist, Nurmeksela & Kvist 2023; iRo 2023; Coleman 2023; Hammarén & Laajalahti 2019). The source from which people get information related to the crisis also has an impact. If the information reaches the personnel through public channels

before internal communication, it reduces the reliability of the organization. (Ahlqvist, Nurmeksela & Kvist 2023.)

Organizations usually have long term plan — a strategy, where a risk management process should be found. The risk management process includes a crisis plan, which is activated, when necessary, after which the entire organization enters crisis response mode. The role of the communicator depends on the person's knowledge, skills and experience. Job description can include tasks like supporting the organizations' strategy development, creating an early warning system and establishing processes, and lead, co-lead, or coordinating the crisis response. (Coleman 2023, 47-51.)

Successful crisis communicators can always remain calm, while continuously influencing the ones in charge. The person knows how to implement holistic approach to the field of crisis communication activities and engage and value all employees during each phase of ongoing crisis. It is important that the person also knows the differences between the audiences (Ahlqvist, Nurmeksela & Kvist 2023) but can retain the narrative consistent with every stakeholder and negotiate (Coleman 2023, 58, 78, 109-111, 126.) Such a person also knows which communication channel to use with each audience, and that one model does not necessarily fit to all (Bernardi et al. 2024; Coleman 2023).

Communication needs to happen in a place where the stakeholders expect to gain shared information (Coleman 2023). Depending on the situation, the persons responsible must assess whether to use physical contact or a virtual platform as their most effective communication channel (Bernardi et al. 2024; Coleman 2023). This can mean for example that the communication happens live in face-to-face settings on physical or virtual platform briefings in real time, or the message can be found in not-time-bound form from organization's intranet, billboard, email, or other internal or external channel (Stearns & Singh-Knights 2024; Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023). The message can be presented for example in written, photographic, audio recording, or video form (Bernardi et al. 2024; Coleman 2023).

The channels can be compared by the probability they offer to reach the wanted stakeholders. When speaking of organizations' employees, social discussion engagement levels can be kept as high, when manager briefs in team meetings are only moderate, because not all members might be present. Memos, posters, and intranet stories can be ranked offering low engagement level, because it is random, if a person will run into it, and internalize the message properly. Common to all internal messaging is that they should be honest (Stearns & Singh-Knights 2024), transparent and proactive. Stakeholders should always be able to give feedback and participate somehow in the messaging if they will. This can build confidence in the employees and in the leader, that he or she understands the employees correctly. They

should offer information concerning details of the incident, priorities of organizations' responsive actions, what the staff is expected to do at the current time and where they can get support now or later, if needed, and how and when future communication will take place from now on. (Coleman 2023, 96-105.)

Taking resources into account in communication during exceptional circumstances and communicating about it openly can increase trust in supervisors (Bernardi et al. 2024). During crisis times the messages should be kept simple and short – so called easily digestible (Stearns & Singh-Knights 2024; Coleman 2023).

2.2.4 Crisis communication strategy

A crisis communication strategy (CCS) is set by the organization's communication leader, and it differs as a concept from more detail oriented CCP (Coleman 2023), even though for example video and telephone calls, or in-person visits, can be understood as communication strategies (Bernardi et al. 2024). Coleman (2023, 4) describes the different natures between these two, when they are made as documents, by framing the CCS as a document, which "…sets out the high-level approach to be taken when dealing with any issue or incident", and the CCP as "…a tactical document that looks at the specific situation and considers the actions that need to be taken at key points as the crisis emerges, develops and then ends". When CCS is made and kept simple, it promotes the possibility that anyone can understand and implement it during any kind of incidents, crises, and emergencies. Properly made CCS takes stand on and introduces the key sections for the reader. (Coleman 2023, 6.) These are illustrated in Figure 3.

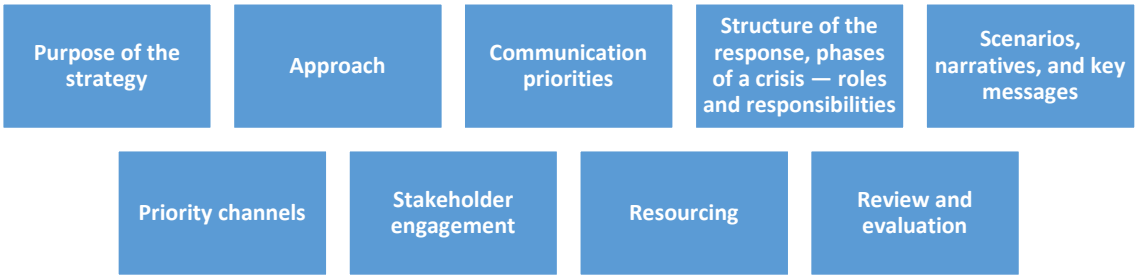

Figure 3: Key sections of a crisis communication strategy
(Coleman 2023, 6.)

Even though the list above seems quite comprehensive, the need for more detailed CCP still exists. CCS should be added to the organization's Emergency Response Manual, if there exists one. The purpose of the CCS is to concentrate on the organizational responsibilities in crisis response. When CCS is made or developed in debriefs, the developers should think about the so-called 5 P's: people, plan, prepare, process, and purpose. Approach of communication is influenced by philosophy guiding the organization towards its' vision and mission. Communication priorities depend on the phase of the incident, and the organizations' role in the event — is the organization leading the crisis response or aiding in cooperation some other leading organization or agency. Even if all these info's are clearly written in the CCS and the CCP documents, it is still not enough, before the organization is sure that the documents reach their audience. The ones responsible in the organization should plan how the strategy and approaches are communicated, distributed, and taught to the personnel. Also, the CCS and the CCP testing and constant development are essential to plan well in advance. (Coleman 2023, 6-11, 213.)

2.2.5 Crisis communication plan

When organizations are making crisis plans, it can be beneficial to categorize potentially needed crisis communication actions. Identification of potential stakeholders and target audiences is the beginning, giving insight into initial actions that must be activated, leading to estimations for needed measures and resources in the middle of the crisis. How to recognize the early signs of pre-recovery and how to deploy harm minimizing recovery communication should finalize the initial process. (Stearns & Singh-Knights 2024; Coleman 2023, 12.) The relationship between crisis plan design and CCP activation is illustrated in Figure 4.

Flexible, but widely different scenarios covering CCP is a must have for every organization (Stearns & Singh-Knights 2024; Coleman 2023). Coleman (2023, 3) states that "communication thrives on creativity" and creativity can be seen as a trait, which should be valued high when choosing the most suitable persons to work as a professional communicator. During crises and other unpredictable incidents, when an organization is taken off from its normal everyday course and extra resources are urged, the CCP should be activated (Stearns & Singh-Knights 2024; Coleman 2023) and the people who are affected by the crisis should always be kept as the top priority (Stearns & Singh-Knights 2024; Coleman 2023). In these situations, there is a need to restrict the personnels creativity among communication, remind and clarify the existence of chain of command, and information share should be done with a systematic approach (Coleman 2023, 70). These scenario specific systematic approaches should be clearly presented in the CCP, with all the necessary personnel, including their clear job descriptions and contact information, should also be listed in the same document. The CCP should be built by using themes and notified risk areas in a way, which results in a time-

saving system. Properly made CCP is kind of a roadmap covering the whole organization (Coleman 2023, 211), where all the phases of different potential crises are covered, and case examples with suitable response measures, fitting to the organizational crisis communication strategies, are presented. The CCP should not be done to be too strict though, but rather work as a navigation tool, providing pre-thought and evaluated measures as examples of accepted activity options. If there is no flexibility in the CCP, the risk is that the communication target is missed, and the crisis response falls short (Stearns & Singh-Knights 2024; Coleman 2023). Coleman (2023) highlights the importance of binding the CCP to the CCS, which enhances the strategic trait of the CCP document. The CCP should be a document considering approach options, providing suitable set of prompts, outlining clear roles and offering response checklists for different scenarios (Coleman 2023, 5-6).

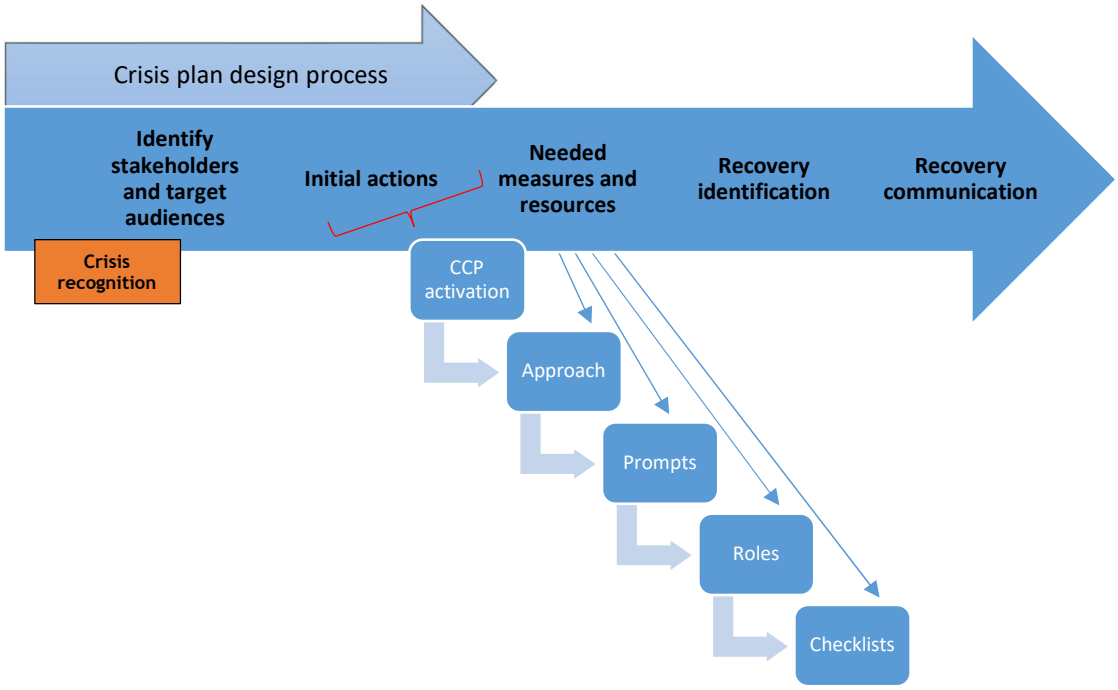

Figure 4: Relationship between crisis plan design and crisis communication plan activation (Stearns & Singh-Knights 2024; Coleman 2023)

Mapping of community and especially key-stakeholder groups that the organization needs to relate to when crisis is faced, can offer insight of the professional roles to consider in advance (Stearns & Singh-Knights 2024; Coleman 2023, 142). Coleman (2023, 14-15) lists example of these kind of job titles in addition to the (Crisis) Communication leader: “internal

communication lead, partnership lead, affected lead, digital communication lead, staff wellbeing lead […], and a media/social media lead". The crisis communication should be considered as a separate entity, going hand in hand with other organizational response activities during each step. A crisis communication leader (CCL) should be among the first ones summoned on site (Coleman 2023), but the crisis communication cannot rely on to only one person in the big picture (Stearns & Singh-Knights 2024; Coleman 2023). CCL will be dealt with further in the chapter 2.2.6.

The recognition of key audience in each event usually happens through individual lived experience, and it can help the choose of proper wordings and communication methods, when the aim of delivering the message is to gain the biggest impact (Coleman 2023). Part of the community and key stakeholders mapping is also the recognition of extra resources (Coleman 2023, 142). Coleman (2023, 17) suggests reaching for sources like named communication staff, and others with comparable skills, knowledge, or experience, or suitable personnel from own and partner organizations or agencies, rental or deputy services, and freelancers or retained external contracted staff. Stearns & Singh-Knights (2024) speaks on behalf of bolstering social capital in advance. The essence of all effective communication methods is relationship development (Stearns & Singh-Knights 2024; Coleman 2023, 91) and well prepared and right way trained people can provide strategic and tactical countermeasures and guidance when a crisis is faced (Coleman 2023, 46). Mutual trust must be present (Hammarén & Laajalahti 2019), because the engagement of experienced employees is the cornerstone of effective companies (Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023, 92).

Relationships between organizations and different authorities must be built well in advance of crises to be as effective as possible in crisis situations. Structure of the response, the leadership responsibilities, and personnel autonomy frames should be presented in the CCP in a systematic, but flexible way. The CCP should be shared with cooperative organizations to maximize its benefits. (Coleman 2023, 11, 19, 220.)

Because a plan is only a theoretical analysis, sharing it can be considered to improve its quality, because the ability of the people potentially implementing it to foresee and the broader understanding of the big picture required in the crisis response will increase. It is important to learn from other people and operators – workshops are proved to be an effective method of sharing knowledge even cross the organizational borders. (Coleman 2023, 216-217, 222.) It is vital that all people inside the organization are familiar with the CCP (Coleman 2023, 19), because then inner and partner stakeholders are sharing mutual understanding about the phase they are in, at the currently ongoing crisis (Coleman 2023, 94). That is why it is important to ensure from time to time that the organizational messaging is understood correctly by any receiver. This enhances situational awareness, can increase collegial trust, clarify the responsibilities and rights, and decrease the stress of the people working with the

crisis. (Coleman 2023, 107, 120.) Active, accurate and fast-paced communication can also help an organization achieve and maintain narrative control (Hammarén & Laajalahti 2019). Prioritizing the communication by recognizing key-channels in the CCP is recommendable (Stearns & Singh-Knights 2024; Coleman 2023, 27). It is not possible to rush the crisis phases, and it is important that the leader communicates this occasionally for the workers who might want to move forward for some reason. Appropriate organizational communication methods might also depart from each other at distinct phases of various crises. (Coleman 2023.)

While making the CCP, it is recommended to improve the resilience of organizations by writing a chapter in the plan that deals with employee wellbeing and is visible to everyone. Emotional awareness and response should be highlighted, especially during the CCP simulation exercises. (Coleman 2023, 172-173.) Matters related to the media must also be discussed with the staff, because then the media will not be able to influence the wellbeing of the people working in response in their own field of work, but on the contrary, the media can be harnessed to help, if necessary, with the help of good relationships (Stearns & Singh-Knights 2024).

The CCP chapter dealing with wellbeing should offer a structured system for debriefs and reviews happening in two separated phases after the crisis – first within a week, and second after suitable time from the first one, depending on the nature and duration of the situation. In the first debrief the purpose is to conclude what worked well, where the areas of improvement are, and collect feedback from the experiences while they still are fresh on people's minds. During the second debrief, the organization's representatives offer thematic data from the incident for the people involved in it. Also, the already done, and future actions for improvement to organizations' actions are presented in prioritized form. Facilitators from outside of the organizations that took part in the crisis response should be brought to lead, or co-lead these debrief events. This person must be someone who has experience from the same kind of or comparable events, with potential to raise similar feelings and emotions through lived experiences. By approaching the recovery phase like this, the organization is also offered a possibility to collect maximum gain from the event data and people's lived experiences. But it is crucial that stepping to the recovery phase is not rushed, because if it is done at the wrong time, it might have negative humane impacts. Having a crisis recovery communication plan as a self-explanatory part of a strategy, with a goal of learning and valuing staff's wellbeing, is a strong sign of healthy organization with bright prospects. When the organization invests to understanding the elements of recovery, its reputation and trust (Hammarén & Laajalahti 2019), and confidence will also be nurtured. (Coleman 2023, 203-208.)

The CCS should identify the review and evaluation methods and standards of communication work, and the whole CCS should be continuously updated and developed, because the

organizations are always under some sort of constant change (Coleman 2023). The CCP as well, should be updated regularly (Stearns & Singh-Knights 2024). There is no one-size-fits-all method for evaluating internal and external communication, but standards must be made in advance, regarding the collection and analysis of data in such a way that this process can support the achievement of the organization's goals and objectives. (Coleman 2023, 24, 106-107, 215.)

SMART tool (Korte, Jokela, Korhonen & Perttunen 2020) can be used to help to identify elements for the objectives to be specific, measurable, achievable, relevant, and time bound. International Association for the Measurement and Evaluation of Communication (AMEC 2024) Integrated Evaluation Framework is an example of a tool that can provide new layers to the planning and evaluation process through 4 O's — outputs, outtakes, outcomes, and organizational impact. Coleman (2023, 107-108) describes that output is the communications shared with staff, and the level of how it reached the intended audience. Outtakes represent the things the staff did as a continuum of the communication and information shared with them. Outcomes are the effects and possible changes on the staff's attitudes or behaviour and reviewed through trust and confidence in the organizations chosen situational methodology. Organizational impact element asses the achievements in organizations' set goals and objectives reached with the communication work. Positive organizational impact is the most important gained benefit from successful communication and is demonstrated as the retaining of staff and material or other concrete achievements of organizational objectives (Coleman 2023, 107-108). In Figure 5 the SMART tool (Korte, Jokela, Korhonen & Perttunen 2020), AMEC Integrated Evaluation Framework (2024) and Coleman's (2023) theoretical framework for evaluation are presented side by side.

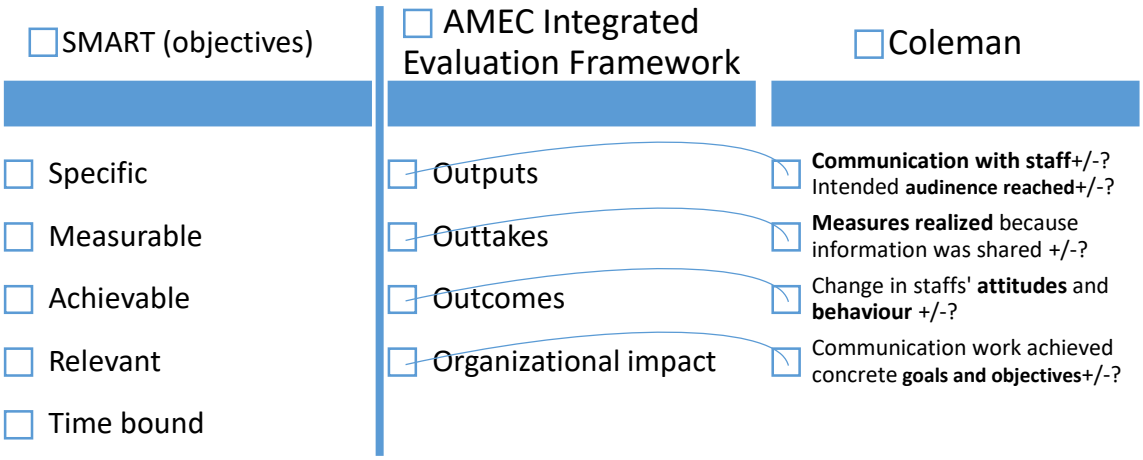

Figure 5: Crisis communication planning and evaluation tools
(Korte, Jokela, Korhonen & Perttunen 2020; AMEC 2024; Coleman 2023)

Traditional evaluation methods might not be suitable or profit crisis communication actions during the response phase but reviewing the impact of actions in some agreed key-trigger points can change the course of ongoing actions, if they are found to be inappropriate or not effective in some ways. Final review, evaluation, is done in the post crisis phase, when the impact assessments of all deployed actions can be used for the process. Finding the gaps in the CCS and CCP and spotting weak or inconsistent chains of recommended actions in the CCP, are the goals of the crisis communication evaluation. (Coleman 2023, 18, 20.)

Coleman (2023, 16) argues that proper communication between organizations builds up on shared trust and confidence. Ahlqvist, Nurmeksela and Kvist (2023) speaks on behalf of trust building too. Different key stakeholder mapping exercises done in cooperation with coworking organizations, that would be included in the response during crises in different scenarios, can aid the process to be more effective. There is not just one right way of performing these scenario tests. The best option is to implement them in simulative live exercise role-play way, but these can turn out to be surprisingly expensive. That is why they are most implemented in military, among law-enforcement agencies, fire- and rescue (emergency) services, and other governmental departments. Depending on the scale of the exercise, it may be recommended to hire one or several actors as target personnel to make it as realistic as possible, plus autonomous/independent evaluator(s) to observe the exercise and give feedback to each organization about their actions from a development perspective. More economical and lighter versions of these simulation exercises are called tabletop- and desktop exercises. They do not need similar prop material or target personnel, because the participants can perform their tasks behind computers. These are usually very suitable for communication-based scenarios, the difficulty level needs to be increased, incidents like cyberattacks or social media-based variable to deal with can be easily added. It is worth sending an invitation to the regulative bodies and agencies who are mentioned in the organization's CCP, because if they manage to participate, it can add an even more realistic feeling and offer wider perspectives for every stakeholder who is taking part in the exercise. Confidentiality and organizational sensitive issues can limit the presence of some national agencies, who work for example with national security issues. This can be important consideration for the organizer, as it can be new information for them about this particular organization and thus even change its share of role in the CCP. (Coleman 2023, 21-24.) When leaders are accepting and especially participating in training, it sends a positive and reinforcing message to the whole organization that preparations for exceptional times should be done (Coleman 2023, 218). There do exist checklists, what to consider when arranging an exercise, and Coleman (2023, 25) offers one as an example:

- ☑ Work with operational colleagues to develop an exercise if possible.
- ☑ Focus the exercise on the key areas of risk or approaches that feel weak.
- ☑ Consider bringing in an agency or third party to run the exercise.
- ☑ Decide whether you will do a full role-play exercise or a desk-based review.
- ☑ Involve key people from inside the organization to take part in, or run, the test.
- ☑ Discuss involvement in the exercise with communicators from key stakeholder organizations.
- ☑ Run focus group with members of the public to test their response to the plan and any prepared messaging.
- ☑ Keep the plan under continual review, taking into account feedback from testing and changes in the organization and its operating environment.

The CCP should be updated at least once a year (Coleman 2023, 224) and after every activation event (Stearns & Singh-Knights 2024). Visual materials and symbolic boosting methods can add value to any kind of communication (Ravazzani & Maier 2022) and for that reason, it could be vice, if considered to update each time the CCP is getting attention, but also in the initial crisis communication plan creation phase too. Under stress and hurry the selection of decisions, that a responsible leader should be endlessly weighing to minimize the harm and maximize the organizational return of investments can be narrower, if compared to the peaceful times. The CCP should be tested during non-crisis periods at regular intervals to ensure that it is still suitable and matches the nowadays fast developing and technologically leaping scenario realities. (Coleman 2023.) Test objectives should be set to identify strategic gaps and time-consuming bottlenecks between own and stakeholder organizations (Coleman 2023, 18, 20). Approach for the tests of both documents, CCS and CCP, should be that something in them is outdated or wrong, and that they need at least minor adjustments, if not major changes. (Coleman 2023.) Most important thing is to plan things ahead and then implement the steps in the CCP piece by piece (Stearns & Singh-Knights 2024; Coleman 2023, 211).

The physical presence of the person performing the communication should increase when the topic being communicated is complex, difficult or unpleasant for the recipient. A creative and open mind, combined with a quick ability to analyze data and realistic situational analysis skills, are qualities that support a person's ability as a crisis communicator. The confidence to stand behind one's own assessments and the innovativeness to ask the right questions at the right time should guide the person carrying out the task. Following a well-planned and regularly tested CCP should lead to successful communication during crises. (Coleman 2023.)

2.2.6 Crisis communication leader

During crises, communication equals leadership, and crisis communication likewise understanding the crisis (Reynolds & Seeger 2005). Crisis communication is information flood management, where the practitioner needs to find out what is true and what is not (Heath & O'Hair 2008). Eaddy, Gower and Reber (2022, 79) refers to a wide survey made by PwC and its' interpretation in the source "DeNicola, 2021, para. 2", which claims that 57% of corporate executives believes that the organizations' board members understand the company's crisis plan well, and 37% believes that the level of crisis management skills of the board of directors' is good or excellent. It can be concluded from this, that it might be beneficial to generally make crisis management and crisis communication more mainstream everyday subjects, and allocate time to gain and uphold these skills, at least in private sector. Coleman (2023, 122) argues that effective crisis management is based on effective teamwork, but responsibility always lies with the leader.

CCL is not just a spokesman, but an experienced person who usually sees wide scales and is able to draw conclusions from different scenarios in abnormal situations (Heath & O'Hair 2008; Coleman 2023). During crises, this person should be present in the same space with the highest responsible leaders and commandeering managers and have access to the same information. CCL should be consulted before any decisions, especially if they lead to concrete actions. Trust and culture of mutual understanding between the highest organizational members and the CCL are built during peaceful times, when CCL must work as an interaction tool between stakeholders and communicate at all levels and sectors not just in the organization, but whole society. Crisis communicators generally, but especially the CCL's, must understand the ongoing incident and the methods of organizational response in such a situation. It means that the people responsible for any part of crisis communication must be able to rehearse the needed actions in variety of scenarios in forehand. Rehearsals and testing of CCP should be written in the job descriptions for the people participating in the responses, because it is possible that in some organizations where training for the crises is not part of an established operating model, using time for such activities can be seen as a waste of resources. (Coleman 2023, 48-50, 81, 123.)

Pandemics and other health-related crises cause fear and uncertainty among people globally. Managing these emotions, a crisis communicator must be an expert to promote cognitive, affective, and behavioral learning, and work as teachers of emotional education. (Soares et al. 2022.) CCL is a person who actively builds the organization's resilience in cooperation with colleagues inside the own organization, but also together with the representers of crisis time cooperative organizations (Heath & O'Hair 2008). One of the CCL's main goals is first to develop, and then maintain a working culture, which supports a resilient organizational atmosphere. (Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023.) It is almost inevitable that

mistakes happen over time, and in an organization that actively wants to build its resilience, failures are seen as an important part of the process — as opportunities to gain knowledge over experience (Coleman 2023, 20, 26). Only if trust between people in command and tactical level operators is built over time and stands on solid base, both management and leadership are possible during crises, but if trust is lacking, management turns out to be almost impossible (Coleman 2023, 116).

Crisis leaders must primarily rely on facts, but they must not forget the emotional factors either, especially while communicating in exceptional situations. Qualities and traits that are required from crisis leaders are: motivating skills, consistency, determination, compassion, visibility, ethicality, resiliency, responsibleness, and effectiveness at communication. The person must be competent at managing expectations while being empathic and humane. (Coleman 2023, 117, 119.) The term competence is usually understood in a way where a person holds the right kind of abilities, meaning knowledge, skills and attitude (Verduyn 2023; Huang et al. 2021; Echtelt 2020).

Being humane means also that the CCL must observe oneself and understand that everyone has limits, and that they can run out of energy, especially if the crisis gets prolonged (Coleman 2023, 128). People's resilience to crises may be increased with the openness of communication (Hammarén & Laajalahti 2019). The overall effectiveness of time management is crucial, and it can often be justified to design a personal assistant for CCL as an additional resource within organizations for such situations, which will also ensure keeping the prioritization of crisis communication up to date (Coleman 2023, 123).

Constant evaluation of measures taken into action in response to an incident must be done while the crisis is still going on. Analytical observe of one’s own, organizational, and inter-organizational elements of response can offer both acute and long-lasting vital information. Success in communication and operational response are the most important areas to pay attention to while reviewing the situation. (Coleman 2023.) Crisis communication leader could be referred to as a person with so-called all-seeing eyes. A person, who has the best possibility of predicting the future, and who can interpretate well non-clearly existing information gathered from surrounding sources, like fellow humans, individual environmental or sociological events, social atmosphere, megatrends, and meta-level meanings of messages hidden between written lines.

2.2.7 Study on professional communicators conducted in Finland 2023

Recent research conducted by “iRo Research and consulting” (iRo) in Finland during the year 2023, shows that from the total respondents of 966 professional communicators, from which 942 were still working (iRo 2023, 3), only 15% worked for the government, which was 2% less than in the 2021 (iRo 2023, 22). Of this population, 94% had at least a bachelor's degree that

included at least some studies in communication (iRo 2023, 31). In one section (iRo 2023, 36), the respondents had to choose a maximum of 5 areas out of 27, where they wanted to improve. Of this population, 35% announced that as a priority of improvement (1st out of 27) they wanted more skills and knowledge in category strategy work and overall management. The second highest (2nd out of 27) category was "Artificial Intelligent" with 34%. Emergency and crisis communication was in 15th place out of 27 with a remarkable low score of 14%. This means, that the majority – total of 86% out of the Finnish communication professional is having an experience, that they would not have any difficulties in emergency and crisis communication situations, or that the probability of personally facing such events, is considered insignificant. There is a bit of a conflict between the answers, because during the next two years, most important issues for communication management were recognized to be similar themes, that crisis communication considers (iRo 2023, 41). These are presented in Figure 6.

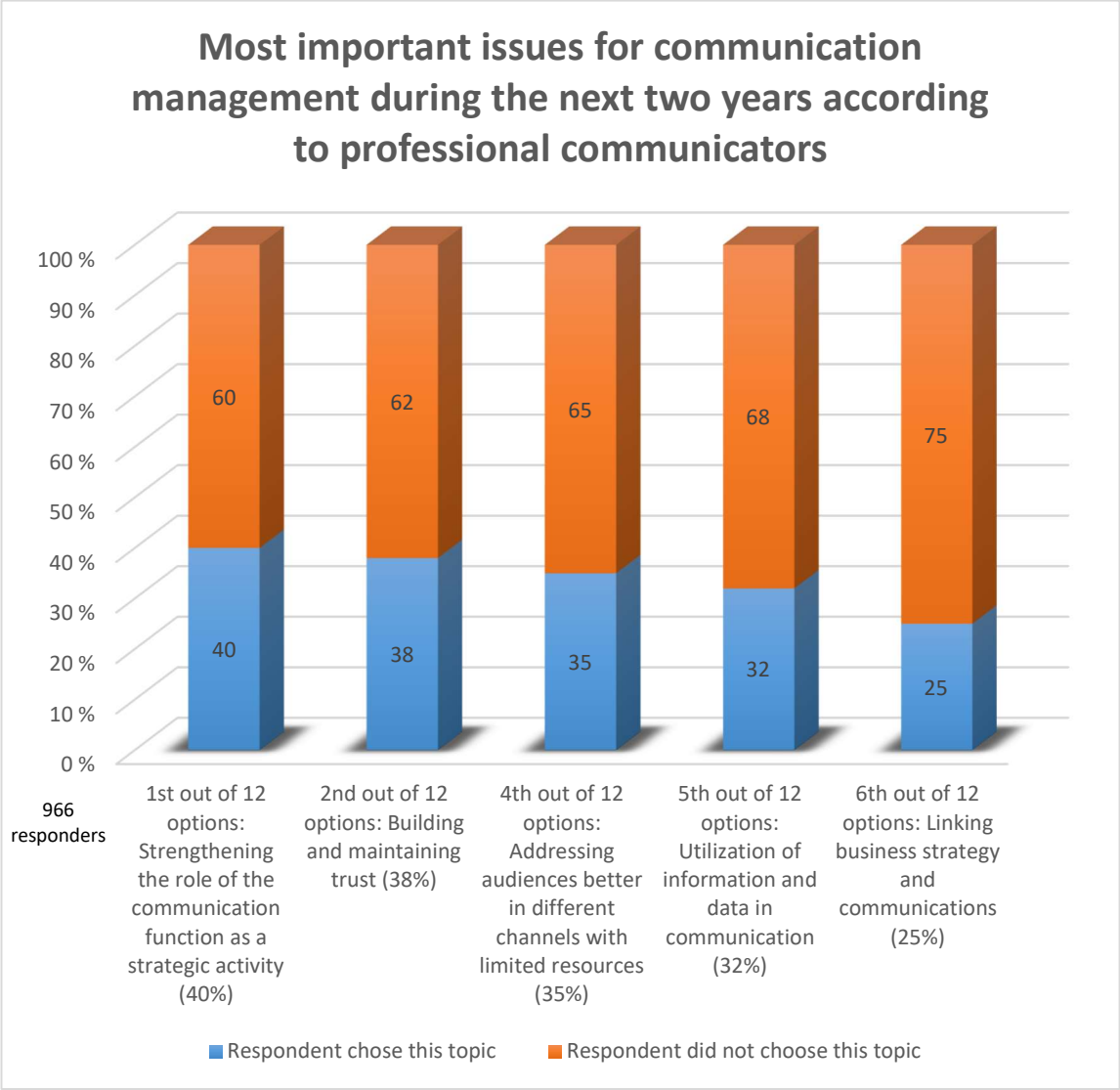

Figure 6: Most important issues for communication management during the next two years according to professional communicators

(iRo 2023, 41)

The most stressful part of communication work was found to be connected to high workload and poor management (iRo 2023, 71). These are presented in Figure 7.

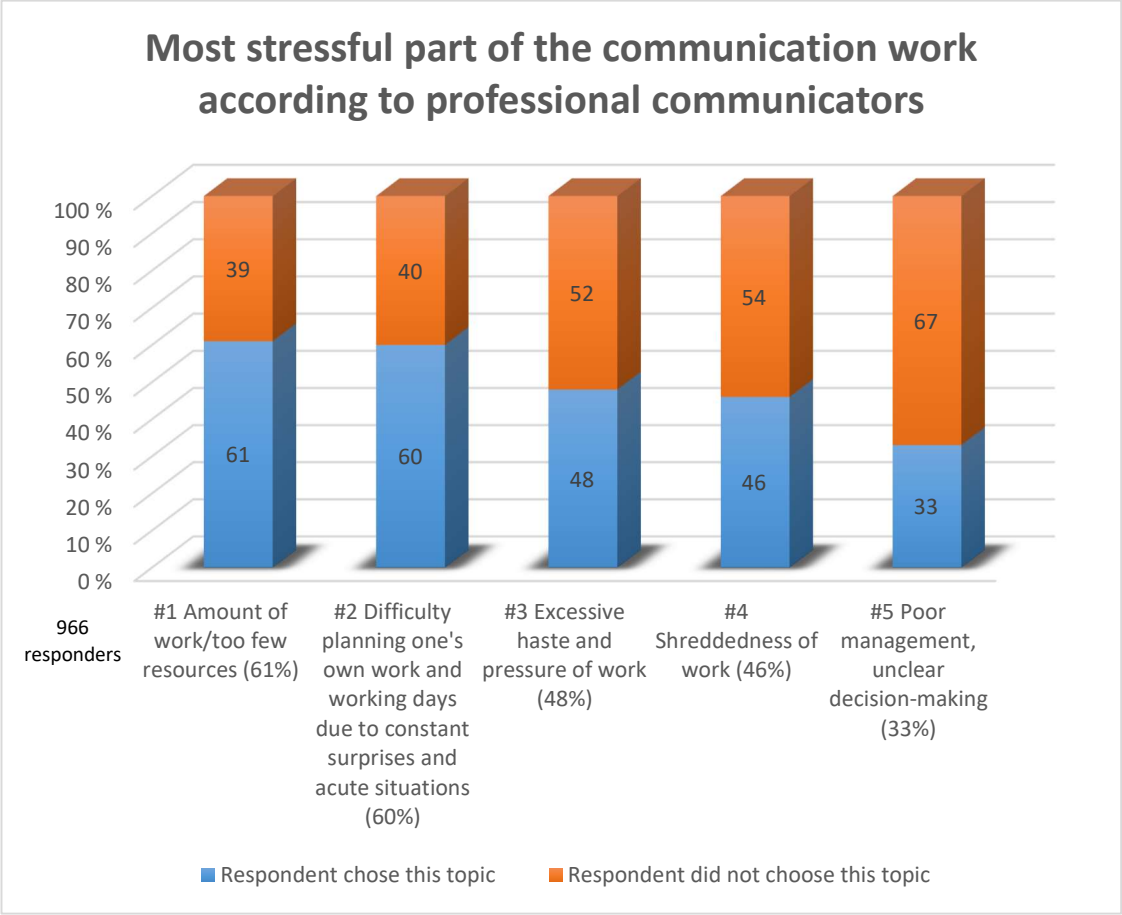

Figure 7: Most stressful part of the communication work according to professional communicators

(iRo 2023, 71)

These answers speak on behalf of the aspect, that there is not one clear description of emergency and crisis communication, and/or the concept is perceived as trivial and such as that anybody could manage it, communication professionals lacking understanding of the concept of crisis communication, or at least problems of recognizing the elements included in the field of emergency and crisis communication.

When Valuing communication in your organization is compared between 2021 and 2023, it can be seen that in the respondent's organizations, the general valuation of communication work has dropped in almost half, 62% (2021) versus 34% (2023). At the same time people does not assume as much as before, that anyone can perform it successfully, as seen in the decreasing numbers from 47% (2021) to 12% (2023) (iRo 2023, 47.) 96% of the communication professionals agreed the ideas, that the communication should be seen as essential part of organizations strategy, and play a key-role when organizational changes are planned (iRo

2023, 48). Only 30% out of the organizations represented by respondents, had an arrangement for crisis situations, which is also 5% less than in 2021 (iRo 2023, 63), and 59% experienced their job highly (46%) or quite (13%) stressful (iRo 2023, 70).

2.3 CBRN

Definition of chemical, biological, radiological or nuclear (CBRN) threats can be presented as:

> "Intentional or accidental release of biological, chemical, nuclear or radiological hazards, resulting in loss of life, destruction and/or international crises. Includes accidents at or sabotage of biolaboratories, chemical plants and nuclear power plants, as well as the intentional or accidental release of biological, chemical and nuclear weapons" (World Economic Forum 2024, 96),
>
> Or
>
> "CBRN incidents include the detonation of CBRN weapons and the accidental or deliberate release of chemical and biological agents, toxic industrial chemicals (TICs) and toxic industrial materials (TIMs), biological pathogens and toxins, and radioactive material" (NATO 2018, 1-1).

The use of weapons of mass destruction (WOMD) as:

> "Deployment of biological, chemical, cyber, nuclear, radiological or autonomous AI weapons, resulting in loss of life, destruction and/or international crises" (World Economic Forum 2023, 75),

and terrorist attacks as:

> "Large-scale or persistent small-scale terrorist attacks carried out by non-state actors with ideological, political or religious goals, resulting in loss of life, severe injury or material damage caused by biological, chemical, nuclear or radiological weapons or other means" (World Economic Forum 2023, 75).

Common to all CBRN substances or agents categorized as WOMD, is that they are potential of causing catastrophic scale harm (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; World Economic Forum 2023, 77; European Union 2022; University of Maryland 2022; Tin et al. 2021; Maavoimien Esikunta 2014; Baka et al. 2008). Non-state actors dealing with WOMD's are rare, but this is something worth to pay more attention in the future. High knowledge barrier has limited the attempted misuses, but because of rapidly developing technological sector, especially artificial intelligence (AI), machine learning (ML) algorithms, and for example biological design tools, the non-technological actors are increasing their

potential as a threat. (World Economic Forum 2024, 55.) Most dangerous scenarios concern the cases of connecting weapons of mass destruction, especially nuclear (N) weapons, to AI systems (World Economic Forum 2024, 55, 91). Tackling the CBRN threats requires wide-ranging cooperation between actors from different social and international sectors (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). Personal protective gears are the very basic measures to activate in CBRN situations. There are different types of systems and frameworks for that. (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; NATO 2018) One is the five-step (0-4) Mission Oriented Protective Posture (MOPP) system, used by NATO (2018).

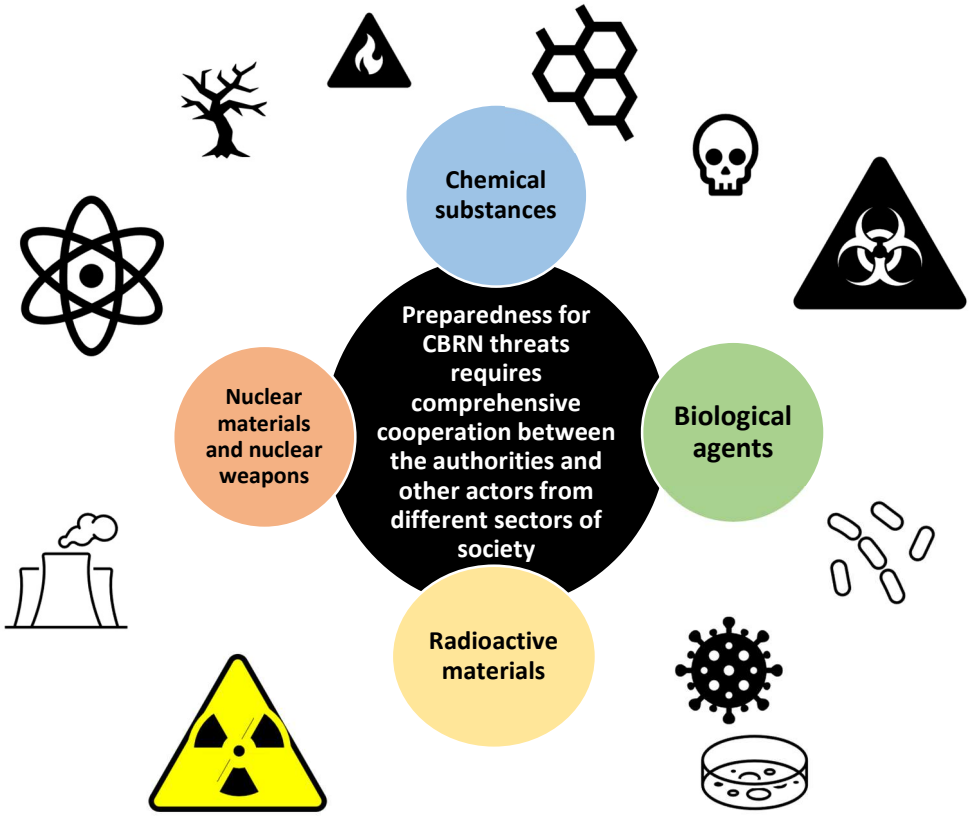

Figure 8: Diverse CBRN threats call for broad-based preparedness
Modified from: Ministry of Defence Finland (2024b, 10)

2.3.1 Chemical threats

In the field of CBRN, chemical threats are the most often faced cases among authorities (University of Maryland 2022; Tin et al. 2021; Maavoimien Esikunta 2014). Materials are categorized to be ‘hazardous’, if they present increased risks to people who are exposed to

them (Hart 2021). These materials can be found in different composition or physical states, and they can be identified as

> "…chemicals or substances that are classified as a physical hazard or a health hazard. Physical hazard materials are those classified as an explosive, flammable cryogen, flammable gas, flammable solid, ignitable liquid, organic peroxide, oxidizer, oxidizing cryogen, pyrophoric, unstable (reactive), or water-reactive material. Health hazard materials are those classified as a toxic, highly toxic, or corrosive material". (Hart 2021.)

Modern way of thinking chemical related threats, should also cover the subject of drugs misuse. For example, fentanyl is a high-potent synthetic opioid drug and causing the worsening of global opioid crisis and around 110,000 deaths only in the United States in 2022. The fentanyl epidemic is assumed to spread rapidly and early signs of increasing number of illegal laboratories are already found. (World Economic Forum 2024, 73.)

Organization for the Prohibition of Chemical Weapons (OPCW) (2025a) was established in 1997 and now, in 2025, 193 countries have signed the Convention which aims to eradicate all chemical weapons in the world. Chemical Weapons are often referred shortly as "CWs" and the chemical in them as "Chemical Agents". Types of Chemical Agents are categorized as: choking agents, blister agents, blood agents, nerve agents, and riot control agents. Toxins are toxic chemicals and if misused, they can be considered not only as CWs, but also as biological weapons, because they are produced by living organisms. (OPCW 2025b.)

2.3.2 Biological threats

After chemical threats, biological attacks are the second most common (University of Maryland 2022; Tin et al. 2021). Biological incidents include the presence of biological pathogen like bacteria, viruses, fungus, parasite, prion, bioweapons, or toxins - in other words, a biological agent, or a B-agent. (NATO 2018, 1-1; Maavoimien Esikunta 2014, 12-54; Baka et al. 2008.) B-agents pose a health risk to the person who comes into contact them, and if the B-agent is disease-inducing microorganism, an infectious disease may result. Usually, the exposure happens by inhaling biological aerosol, ingesting contaminated goods, like water or food, being in skin or mucosa contact with contaminated substance, getting bites or stings spontaneously or when a person systematically handles animals, or by insect vector. The delay from contact till the occurrence of illness varies from hours to weeks. If the carrier has exposure to an infectious B-agent, the person can become contagious and spread the colonizing B-agent in a way that other living beings are potentially exposure to health danger. Some B-agents may remain contagious and infectious even after the host organism has died. (NATO 2018, 1-3 — 1-4; Baka et al. 2008; Maavoimien Esikunta 2014, 12-54.) B-agents, and the disease caused by them, which can naturally transmit in both ways between

humans and animals, are called zoonosis, or zoonotic diseases. B-agents can be categorized according to the needed safety equipment's to biosafety levels (BSL) I, II, III, and IV, where the IV causes most severe symptoms and difficult to response health-threat. (World Health Organization 2020.)

2.3.3 Radiological and Nuclear threats

Radiological threats are the third most common and nuclear threats most rarely form of CBRN attacks (University of Maryland 2022; Tin et al. 2021). European Union CBRNe Glossary (2022, 82) defines radiation as

> "a form of energy emitted during radioactive decay. There are two basic types of radiation: ionising and non-ionising, depending on their energy. Ionising radiation IR, with energy above 5 eV (electron volt), such as alpha particles and X-rays can ionise atoms, which means it can remove electrons from atomic shells. Non-ionising radiation NIR, with energy below 3 eV, like, for example, ultraviolet (UV) light and visible light cannot ionise atoms."

Radiation dose is expressed in Sv, which stands for sievert, and means equivalent dose, where 1 Sv = 1 Gy of gamma-radiation. Radiation level, or dose rate, is measured and expressed in mSv/h, which means millisievert per hour. The factors determining the radiation dose that a person absorbs depend on the exposure time, distance to the radiative source, protective gears and radiation blocking material between the person and the radiative source, and the way that person has exposure – is the contaminated material effecting outside or inside the body. 5 mSv dose causes no symptoms, 100 mSv is minimum that can be seen effecting chromosomes, 1,0 Sv causes repeating nausea and vomiting for 15% of the exposures after 48h, after 4,0 Sv 100% gets symptoms in few hours which 50% dies without medical attention after, and with a dose of 7,0 Sv 100% dies in 2-3 weeks. If the dose is over 20,0 Sv the symptoms occur immediately, and the person will die in 24-72h. (Maavoimien Esikunta 2014, 76-77.)

Radioactive sources and materials are in common use in industrial and medical purposes. In industrial fields they are used for producing energy in nuclear power plants with uranium (European Union 2022, 109) and for example caesium-137 (137Cs) or cobalt-60 (60Co) are used to check hidden flaws in materials by radiographing them. Iodine-131 (131I) is used for thyroid cancer radiotherapy. (European Union 2022, 83.)

Nuclear threats refer to the use of nuclear weapons or improvised nuclear weapons, both of which can produce a nuclear explosion (European Union 2022, 54) while spreading radiation material such as the chemical elements of uranium (U) (European Union 2022, 69) or plutonium (Pu), which is the most optimal isotope for nuclear weapons (European Union 2022,

69, 77). Uranium as a fuel for nuclear reactors, is enriched from its natural occurrence 0,72% to 3-5% concentration, but when it is used as a nuclear weapon, the percentage is at least 90%. Nuclear material, like uranium, can be toxic in both chemical and radiological ways. (European Union 2022, 109.) International Atomic Energy Agency (IAEA) (2024) is the world's top organization that "seeks to promote the safe, secure and peaceful use of nuclear technologies" in the global nuclear scene.

2.4 CBRN crisis communication

Researcher found zero publications concerning the Finnish inter-authority CBRN communication. There was also a lack of any kind of recent academic literature concerning inter-authority CBRN communication, or other literature comparable to it. Ready existing inter-authority CBRN communication models were not found during this research.

Coleman (2023) have made "A strong framework" for organizations from different military, and civil emergency services' crisis management approaches. It presents seven aspects to consider:

1) Ensure that the organization has appointed leaders
2) Gather everyone in one room, either in-person or for virtual platform
3) Keep up the state of readiness by performing planning and testing events
4) Ensure that the right individuals are in the right role
5) For consequence management, you need to understand the measures taken into action and the affected groups
6) Keep communication integrated
7) Minimizing human suffering is always the top priority which is nurtured by doing what is right, even it would harm the reputation of the organization. (Coleman 2023, 78-80.)

Figure 9 presents an example version of a crisis communication response structure, aimed at the personnel deploying the pre-thought communication plan approach in crisis situations. The structure is divided into five sections, or phases, according to generic timeline without connecting it to any specific crisis. (Coleman 2023, 8-11, 198-199.)

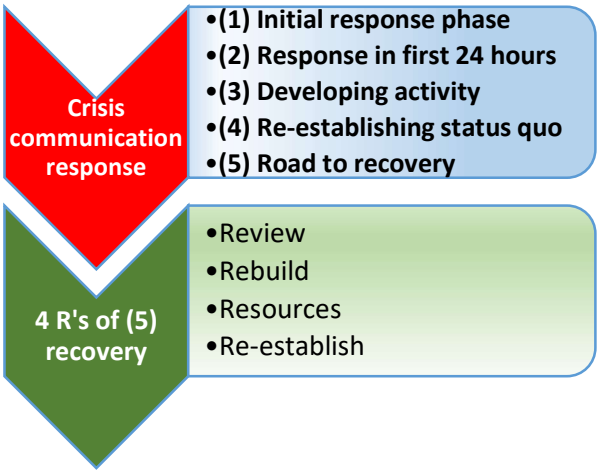

Figure 9: From crisis communication response to recovery
(Coleman 2023, 8-11, 198-199.)

The operational response should be as fast as possible, because the initial actions can reflect positively to work that needs to be done, or negatively by increasing the rush and pressure in the future (Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023). Concept of golden hour is more commonly used in the private sector — it means that the first message to the staff and to the public should be sent during the first hour of the incident, in which case the organization is to be able to control the situational communication entity. Technology offers splendid support to achieve this goal, but only if the preliminary work in the peaceful times is done properly. It is important that the validity of the information, spread through priority community channels in the early operational response phases' rush, is confirmed and misinformation avoided. (Coleman 2023, 57-61.) Crises can also broaden views on the more diverse use of technology (Ahlqvist, Nurmeksela & Kvist 2023).

Assumptions and not-specific information can lead to troubles (Ahlqvist, Nurmeksela & Kvist 2023; Liu & Ni 2022; Coleman 2023, 63). Readymade structural message templates with properly chosen, risk minimizing terminology and wordings, shortens the delay in communication (Coleman 2023, 81). They can increase the communicators' goal of trust building (Hammarén & Laajalahti 2019) potential between all crisis communicators and the ones in charge inside the organization. Also, if it is possible that the same people are communicating during the whole scenario, it is preferable to do so aiming to minimize the misunderstandings in the narrative (Coleman 2023, 65). Special attention is to be paid for the terminology: all members and active stakeholders should use the same terminology and similar names of certain things, to avoid misunderstandings among people (De Rycker & Mohd

Don 2013). If an error is made, it should be top priority to correct it (Coleman 2023, 66). Negative communication, including all terminology that harms the intra- or interorganizational morale and the efficiency of work brought by people, must be banned (Coleman 2023, 130).

Organizational crisis communication can be described as its own language, because of the individual traits of the setting and existing plans (Coleman 2023, 93). Hammarén and Laajalahti (2019) found that structures and rules are useful during abnormal times. Crises are commonly known platforms for creating various versions of existing languages and terminologies. If several organizations want to communicate appropriately when crisis occurs, the common language between them must be agreed and rehearsed in advance (De Rycker & Mohd Don 2013.) Employee engagement is a key to successful crisis communication both in and between organizations. When employees are engaged to the organization, four elements should be in place: structure, leadership, channels, and messages. Active listening is a skill that leaders and communicators should practice constantly. (Coleman 2023, 92, 96-97, 109.)

Coleman (2023, 8-9) suggests that organizations should gather a one-size-fits-all physical or virtual grab bag, which holds in essential material aiming to provide the best and fastest possible initial response for the potential crises, recognized in the organization's CCP. The bag could contain, for example, an external memory drive with the CCP, and structures of the very first intra- and inter-organizational messages to be used. Detailed contact information of additional resources and necessary technological apparatuses could also be added to the bag. (Coleman 2023, 63.) During the initial phase, the operational lead should also be contacted in early stage. Depending on the situation, the cooperative organizations should also be contacted (Coleman 2023, 63; De Rycker & Mohd Don 2013). Fast and accurate information sharing in the beginning is vital because it gives a sort of a push notification aiming to activate all stakeholders to more alert mode, where they are potentially faster contacted and operationally useful, if needed (Coleman 2023, 63; Ahlqvist, Nurmeksela & Kvist 2023; Hammarén & Laajalahti 2019). For the sake of clarity and seamless information stream with minimum errors, it is recommended to keep a rolling log providing data like gained and provided information, and persons who are authorizing each message and communicational decisions (Coleman 2023, 63).

During the (2) response phase, especially in the first 24 hours, CCP is to be followed, and more detailed information of the incident gathered (Coleman 2023). The second (2) phase time-window should be adjusted to suit better to the ongoing CBRN incident — for example complex global B-cases, or better known as pandemics, might go on for a very long time, urging the presence of several organizations and extra consults (Coleman 2023, 13), when a simple R-case, where the object of interest is a single source radioactive radiator, can potentially need only a fraction of both, time and human resources (European Union 2022).

Leader's checklist for first hours, provided by Coleman (2023, 132-133), offers a structured approach for concrete actions during first moments after the crisis has occurred and the leaders in charge are summoned on site:

- □ Ensure you understand what you are dealing with and how the situation may develop
- □ Go physically to the room or place where the event is being managed
- □ Contact key stakeholders, necessary cooperative organizations, and launch an early alert regarding the crisis or incident
- □ When all tactical advisers are present on scene, gather them in the same place
- □ Name a coordinator monitoring the actions of response, and make sure that the person knows what to report and to whom
- □ Identify the scale of the incident, and all affected
- □ Keep briefing with the person that is going to oversee communications, and agree the methodological approach that is going to be used
- □ Be visible in operational areas and if possible, meet and support with your presence the staff members dealing the incident in frontline – if physical presence is not possible, arrange at least online briefing
- □ Generate structures and timetables for meetings and leaders' regular info sessions to come.

The use of advanced technology in crisis communication now and in the future is evident and crucial (Guthrie & Rich 2022; De Rycker & Mohd Don 2013). What greater the amount of information is coming at once; the bigger role advanced technological solutions get (Guthrie & Rich 2022). Artificial intelligence (AI), meaning: (1) Artificial Narrow Intelligence (ANI), (2) Artificial General Intelligence (AGI), and (3) Artificial Superintelligence (ASI) (Guthrie & Rich 2022, 185), and machine learning algorithms, extended reality (XR), augmented reality (AR), mixed reality (MR), virtual reality (VR), virtual beings and multiple selves ("Agents"), internet of things (IoT), and avatars are examples of todays' tools, that are probably here to stay and renew many standards. Many of these work by automation make it possible to release workforce for something else. (Guthrie & Rich 2022.) CBRN situations can be difficult and wide – the amount of information coming same time from different sources can be suffocating, and that is why the technology cannot be forgotten when speaking of any kind of crisis management having the CBRN element in it (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; World Economic Forum 2023, 77; European Union 2022; University of Maryland 2022; Tin et al. 2021; Maavoimien Esikunta 2014; Baka et al. 2008).

If not already in the (1) initial phase, at least when moving to (3) developing activity phase, the relevant stakeholders and cooperative organizations should be contacted and engaged into action. In the (3) developing activity phase, the operational staff continue to figure out the scale of the incident and gather more specific information about the related issues. The

organization should have enough human resources for continuous 24/7 work, for the next 1-4 weeks. (Coleman 2023, 10.) Of course, during CBRN incidents these numbers could be different, but it would be smart to think about the limits for organizational action in forehand, that if the situations prolong, there would be some initial backup plans.

It is important to keep up the reputation and stakeholders' confidence towards the organization, and if the stakeholders know that there will be contacts or information updates periodically, it can ease their stress and enhance productivity. Before (4) re-establishing status quo, the supervisors should begin to assess how far in the future the defuse of the situation is, and when it is possible to start to scale back resources. Cooperation and information sharing between the organizations are especially important in this phase, when the aim is to avoid any extra damage. Reviewing the communication should be done all along, but when the situation is turning to its' dawn, the evaluation of the whole communication process can offer fresh data and solid information to support further development. From the crisis communication perspective, the decision when to move to the (5) road to recovery phase, is difficult and the right timing of it, vital. (Coleman 2023.)

If the case seems to turn into a long-term crisis, the CCS should be evaluated and developed on the run, because it most likely needs to be changed somehow (Coleman 2023). Communication measures should be evaluated after any major incidents, and make sure that the approach used at the time is still most effective. The vital part of crisis communication is listening. When a crisis communicator truly hears and understands the meaning of the direct and indirect messages received, the person can make best possible decisions. (Stearns & Singh-Knights 2024; De Rycker & Mohd Don 2013.) This may require active consulting towards every key stakeholder at regular intervals. By doing this, the crisis communicator can also better keep up the focus on right priorities and situational awareness. When crisis communicator takes the initiative and opens communication channels that build internal trust, indirect information about the personnels' moods and working ethics is heard, and the personnel's creativity is nourished. (Coleman 2023, 190-191.)

Especially after protracted crises, it is necessary to harness the so-called four Rs for the recovery phase. These actions should focus enhancing reputation, trust (Hammarén & Laajalahti 2019) and confidence, which are needed recovery elements. Reviewing the data of insights and monitoring gives understanding of what has happened. Rebuilding the plan with review data gives a solid base for further actions. Resources checking and applying extras, if necessary, nurtures the wellbeing of existing personnel and builds buffer of human resources. Re-establishing of operational capacity, which includes recovery communication, merging the entire previous chain of events into the organization, which should be stronger after the event than before it. (Coleman 2023, 198-199.)

Recovery communication observes lessons to learn from past events aiming to update the CCS, and this should be done in cooperation with organizations which participated in the response, or other relevant key stakeholders involved. (Coleman 2023, 201-203, 208.) Systematically executed reviews and evaluations done after a recovery phase of every remarkable maneuver or act during an event like crisis, which discusses about things in response that worked well and things that need to improve, are called debriefs (Coleman 2023, 71, 76). Hot debriefs are made instantly after the main incident — it is more common that several agencies take part to them after incidents where the emergency services have been engaged with, because they are usually the ones who give statements to affected people (Coleman 2023, 76). Debriefs summarize information from different sources, provide answers to potential questions from the ones affected, and offer a wide scale platform for future development (Coleman 2023).

Especially in the military environment, each individual member of the team is valued and seen as an essential part of the entity and for that reason worth being assessed and guided not just separately, but more importantly as a member of the persons functional team (Coleman 2023, 71). Communication approach and assessment of the success in crisis communication should be discussed both, intra- and inter-organizationally — Coleman (2023, 76) describes that people should be supported to be comfort of discussing critically and share experiences openly, and that “debriefs are not about apportioning blame but should be about improving the response, identifying urgent actions and building for a stronger recovery”. Modern organizations and agencies learn from each other and actively share knowledge, because they understand that when the others benefit from the already-gained wisdom, the sharer gets stronger allies (Coleman 2023, 86).

The suitability of technological solutions should also be assessed after each crisis (Guthrie & Rich 2022; De Rycker & Mohd Don 2013). Kegyes, Süle & Abonyi (2024) highlighted the role of machine learning in future prospects also in the field of CBRN related communication. The authors present the OODA-loop approach, which comes from the words observe, orient, decide, and act. The OODA-loop is designed to help the decision-making process and is expected to be especially suitable for military environments, and it could be suitable for machine learning (ML) tasks. The authors present the phrases as:

1) Observe: Gather information directly or indirectly; collect internal and/or external data.
2) Orient: Data fusion from heterogeneous sources; data cleaning and consistency checks; taking advances from data processes.
3) Decide: Identify the options; evaluate them by focusing on the objectives.
4) Act: Implement decisions. (Kegyes, Süle & Abonyi 2024.)

They present their idea as, when CBRN detection happens, the ML task of source data generation happens through observation. After the connection between source data and certain CBRN detection exists, the machine using that data can start making detections. Before it can act or do anything concrete about it, it must be able not just to manage the information and orient to data preparation, but also combining the data, in other words, making data fusion and building a model for decision making. When the decision is ripe, the machine can make an act, for example concerning physical CBRN protection, hazard management, and/or medical assistance. At the same time, it shares the gained new information with the database and teaches plus learn from the event. (Kegyes, Süle & Abonyi 2024.) This process is illustrated in Figure 10.

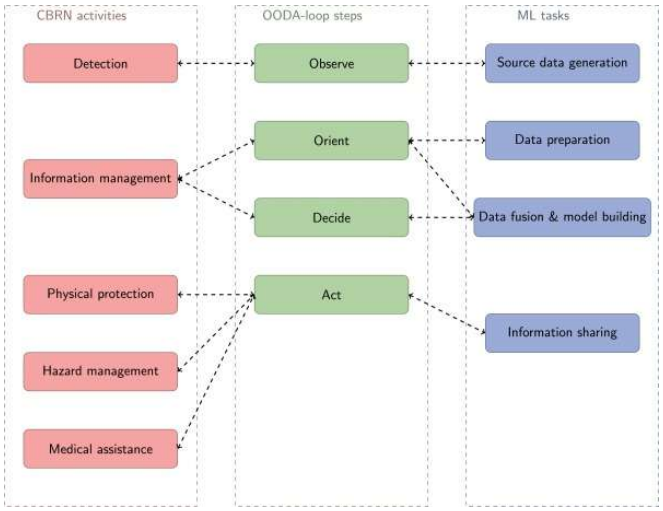

Figure 10: Relationships of CBRN activities, OODA-loop steps, and ML tasks (Kegyes, Süle & Abonyi 2024) — Use under the terms of Creative Commons CC-BY license

2.5 Introduction to the organizations

2.5.1 The Finnish Defence Forces and CBRN

The Finnish Defence Forces (2025a) introduces themselves in their official webpage as an 12 000 employee's strong organization, that

> "…secures Finland's territorial integrity, the livelihood and basic rights of its population and the freedom of action of the government, as well as defends the rule of law with military force if an armed attack or a corresponding external threat is directed at Finland."

They declare that their tasks are: “1. the military defence of Finland”, “2. supporting other authorities”, “3. taking part in regional surveillance cooperation or otherwise providing international assistance and participating in international activities”, and “4. taking part in international military crisis management and military tasks in other international crisis management” (The Finnish Defence Forces 2025a). The Defence Forces' top CBRN expertise is concentrated in the Suojelun osaamiskeskus, also called shortly as SOK. Free translation could be presented as CBRN Centre of Excellence. This is located in the Pori Brigade, and it maintains national CBRN readiness, training coordination and development work, research activities, and international CBRN cooperation as part of NORDEFCO (Nordic Defence Cooperation). In addition, SOK maintains the Suojelun erikoisosasto, also called shortly as SEO, which is largely made up of people in reserve. (The Finnish Defence Forces 2025b.)

CBRNE-strategy 2024 (Ministry of Defence Finland 2024b, 45) states that:

> “The Finnish Defence Forces maintain preparedness for CBRNE incidents in all security situations. The Defence Forces have personnel, equipment and troops suitable for CBRNE reconnaissance, sampling and analysis, decontamination of persons and materials, and explosive ordnance disposal. The Defence Forces also have special expertise related to CBRN laboratory analytics, CBRN protection and explosives.”

2.5.2 Police of Finland and CBRN

The Police of Finland (2025a) introduce themselves in their official webpage as an organization that

> “…are responsible for ensuring public order and safety. The police prevent and investigate crime. The ultimate goal of the police is to keep everyone safe.
>
> Values are something that we consider important, that guide the choices we make in everyday work. The police are true to their values: fair, courageous and always reliable.
>
> The police are part of society and evolves with society.”

They declare that their tasks are: 1. “ensure the safety of people and the environment in all situations and at all times”, and 2. “prevent crime and investigate offences and brings them to the consideration of charges”. There are 11 local police departments and two national units: the National Bureau of Investigation and the Police University College. (Police of Finland 2025b.)

CBRNE-strategy 2024 (Ministry of Defence Finland 2024b, 44) states that:

> “The police are responsible for preparedness for criminal CBRNE threats and the investigation of the realised incidents, as well as for leading cooperation between the authorities in their sector. These tasks include intelligence and the prevention of threats, incident identification and management measures, technical and tactical incident investigation, including forensic laboratory examinations, and the provision of information about incidents. The police operate as part of the national representation in EU programmes and committees that aim to prevent threats related to CBRNE substances. The development of CBRNE threats and CBRNE situational awareness are monitored through connections with INTERPOL and Europol and their databases. The police monitor situational awareness within their mandate 24/7 based on information collected by the police command centres and the Police, Customs and Border Guard (PCB) Criminal Intelligence Centre of the National Bureau of Investigation. Following a criminal CBRNE threat, the primary responsibility for the situation is transferred to the police once any emergency rescue operations have been completed. As appropriate for the situation at hand, the police are assisted by the other authorities of the CBRNE cooperation network in incident identification and management measures.”

2.5.3 Finnish Rescue services and CBRN

The Finnish Rescue services (2025) introduce themselves and their tasks in their official webpage as follows:

> “Accident prevention, rescue operations, preparedness and civil defence form a coherent system in Finland that covers all types of incidents from daily accidents to major disasters. The Ministry of the Interior guides and directs emergency response centre operations, and prepares related legislation. The aim is to build a safe and crisis-resilient Finland. There are 21 rescue departments in Finland, which carry out rescue service duties in their regions.”

CBRNE-strategy 2024 (Ministry of Defence Finland 2024b, 44) states that:

> “The rescue services are tasked with preventing accidents and taking care of urgent rescue operations tasks in all security and safety situations. The purpose of the operations is to save and protect people, property and the environment when accidents are imminent or occur, limit the damage caused by accidents and mitigate its consequences. For their part, the rescue services prepare for CBRNE threats by reserving required equipment, training personnel and

ensuring oversight. CBRNE risks have been taken into consideration in the planning of the rescue services' operations. The rescue authorities maintain situational awareness to prepare for rescue operations, adapt the readiness of the rescue services and secure the provision of the services. In a CBRNE incident, the rescue authorities lead and implement the rescue operations. In such cases, emergency operations may include hazardous substance intelligence and identification, leak elimination or substance collection, as well as the decontamination and evacuation of injured and exposed persons. In addition, the rescue authorities issue orders concerning evacuation, protective evacuation and sheltering in place."

2.6 Gaps in existing literature

Soares et al. (2022, 282) found that "instructional risk and crisis communication research has focused primarily on providing warning messages […] and instructions for minimizing the potential harm of crisis". Like mentioned in the previous chapter, publications concerning the Finnish inter-authority CBRN communication was not discovered. Academic literature concerning inter-authority CBRN communication, and existing inter-authority CBRN communication models were also not found during this research. Kegyes, Süle and Abonyi (2024, Figure 3) analyzed the presence of CBRN keywords in publications and found that communication was not adequately addressed, as its absence can be observed in Figure 11.

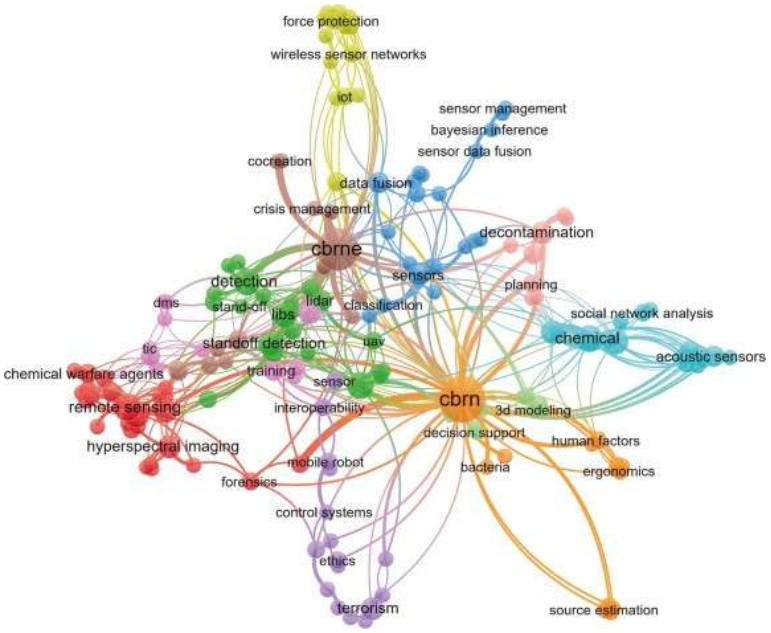

Figure 11: CBRN keyword co-occurrence analysis

(Kegyes, Süle & Abonyi 2024) — Use under the terms of Creative Commons CC-BY license

Using visuals and symbols can be beneficial when adding them as a part of crisis communication. The qualitative research in this field is still scarce, but the whole concept of enhancing any kind of communication with visuals should be studied further. Visual materials are easily more global than spoken language, which is a constantly evolving end product of social processes. Especially chains of information and information clusters benefit drastically from the use of visuals. (Ravazzani & Maier 2022.)

3 Aim and objective

The aim of this study is to increase Finland's general safety by improving the quality of the Finnish CBRN related culture and communication between the Finnish Defence Forces, the Police of Finland, and the Finnish Rescue services. This will be done by updating their cooperating methods, and by providing practical solutions through better and more appropriate overall understanding of the scene.

The objectives of this study are to understand what it takes to become a CBRN expert in these organizations, as well as to understand the national CBRN communication culture prevailing in the Finnish Defence Forces, the Police of Finland and the Finnish Rescue services, and its effects on reality.

This study answers three research questions:

1. How to succeed in the Finnish CBRN culture as an authority?

2. How does CBRN compare as an area of expertise in relation to the wider field of authorities?

3. How Finland's national CBRN culture could be updated?

4 Research methodology

Manias-Muñoz and Reber (2022) suggest that there should be done more qualitative research in the field of crisis communication and that the research in this field should be moving from case-studies more towards generalizations. At the same time, the challenges of quantitative approaches, especially concerning the collection of reliable data and accurate information, are recognized to be very difficult. Swiftly developing cultures, the international diversity of

populations, and variety of crisis response methods justify and reason for the use of case- and qualitative study methods. (Manias-Muñoz & Reber 2022.) In the future, it might be beneficial to start using a more mixed-method study approach, but it usually requires a lot of resources (Cheng, Spruill & Dalton 2022).

4.1 Study design

This study was designed by following the COREQ -checklists provided by Tong, Sainsbury and Craig (2007, 352) and is categorized as phenomenological study. It was carried out using a qualitative research method, since no previous academic research has been conducted on this population in this setting for this reason.

According to Knapp and Daly (2017), when choosing to use a qualitative research approach, the researcher wants to understand the experiences of selected individuals or participants in a particular setting and the significance of the topic for this population. The desired data can be said to occur naturally. Researchers usually build inductive statements and less often work with deductive tests. Quantitative research works with numbers, but qualitative concentrates on analyzing, for example words or visual images. The most common qualitative data-gathering practices are “participating in a social scene and taking notes”, “interviewing individuals or groups”, “collecting tapes and analyzing talk”, and “collecting and analyzing written, visual, or multimedia texts”. (Knapp & Daly 2017, 64.) In their research, Cheng, Spruill and Dalton (2022, 11) studied 135 articles from 15 journals, concerning crisis communication. The included papers were published between the years of 2016 and 2020. The authors found that the most used research activity was content analysis, which was used for analysis process in 40 cases, meaning 36,7% overall, and that using interview as data gather method, was the fourth most commonly used research activity. Interview measures were used in 10 cases, covering a total of 9% of the articles. A total of nine methods were listed. This reflects the intent of the author of this thesis, that collecting data by interviewing key-informants and analyzing the recorded interview data by using the method of content analysis, can be seen as a suitable research design in the field of crisis communication.

4.2 Information acquisition: PICO model, and PCC model for criteria

The Rector’s Conference of Finnish Universities of Applied Sciences Arene (2023) guides were used during the data handling process. Theoretical background building process was started by using the PICO model tool to recognize the key concepts. In the PICO model, the letter P stands for population, I for intervention, C for comparison, and O for outcome. (Jensen 2023). Furthermore, University of South Australia (2024) presents a PCC framework, which is a tool helping a researcher to observe the inclusion and exclusion criteria with more depth, when planning and performing background information search.

The PICO model is a protocol tool that can be used in the research planning process, to guide it to be more evidence based (Jensen 2023). It was used at the design stage of this study, divided to 1. Initial shorter PICO model, and 2. Wider PICO model holding in keywords, search terms, and search strategies.

In this study, the initial PICO model shows that the population was chosen to be people who work with the CBRN related issues in the Finnish Defence Forces (Army), the Police, and the Fire and Rescue services. Intervention concerned CBRN communication cultures in the chosen Finnish authority organizations. Comparison formed to be the comparison of the CBRN communication cultures internally and between the Defence Forces, the Police, and the Fire and Rescue services. Outcome was supposed to be to: gain understanding of the similarities and differences in the cultures of CBRN communication in the chosen Finnish authority target organizations and to enhance the internal and interagency CBRN communication in and between these organizations.

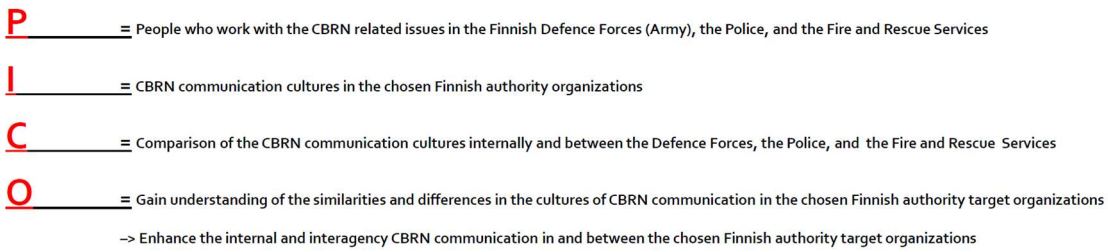

Figure 12: Initial PICO model used in this study's planning phase

The initial PICO model, presented in Figure 12, was introduced as a part of the researchers' thesis topic analysis and thesis plan seminar PowerPoint presentations, which were held in the Laurea University of Applied Sciences led Microsoft Teams (Microsoft 2024) online seminars during the autumn 2024. The Wider PICO model shown in Table 1 was used for background building.

Table 1: PICO model used for background building in this study's planning phase, including keywords, search terms and search strategies

PICO Elements	Keywords	Search Terms	Search Strategies
P (Population)	People who work with the CBRN communication related issues in the **1. Finnish Defence Forces** (Army), the **2. Police**, and the **3. Fire and Rescue Services**	Defence Forces & Police & Fire and Rescue Services	Defence Forces ***OR*** Army ***OR*** Special Forces ***OR*** Police ***OR*** Fire and Rescue Services ***OR*** Firefighters ***OR*** Paramedics ***OR*** Rescue Services
I (Intervention)	**CBRN communication** (culture)	CBRN Communication & CBRN Communication Culture	Interpersonal Communication ***OR*** Inter-personal Communication ***OR*** CBRN Communication ***OR*** CBRN ***OR*** Communication Culture ***OR*** CBRN Communication Strategy ***OR*** Crisis Communication ***OR*** WOMD Communication
C (Comparison)	CBRN communication (cultures) **1. internally** and **2. between** the organizations	Organizational CBRN Communication (Culture) & Interagency CBRN Communication (Culture)	Organization Communication ***OR*** Organizational Communication ***OR*** Interagency Communication ***OR*** Organization Communication Strategy
O (Outcome)	Enhancement of the **1. internal** and **2. interagency** **CBRN communication**	(CBRN) Communication Enhancement	Communication Enhancement ***OR*** Communication Improvement ***OR*** Better Communication ***OR*** Improve Communication ***OR*** Enhancement of Communication

Second PICO model, presented in Figure 13, is an updated version from the initial one, made during and after the analysis phase. It was updated because of the data, to better fit to the

frames of the chosen research method and to serve the purpose of the study. In this final version, the population is people who work with the CBRN related issues in the Finnish Defence Forces, the Police of Finland, and the Finnish Rescue Services. Intervention concerns CBRN topic in the Finnish Defence Forces, the Police of Finland, and the Finnish Rescue service. Comparison was set to be as: comparison between organizations of the Finnish Defence Forces, the Police of Finland, and the Finnish Rescue service. Outcome turn out to be to gain understanding of the similarities and differences in the CBRN cultures in the chosen Finnish authority organizations and enhance the CBRN culture in and between the chosen Finnish authority organizations.

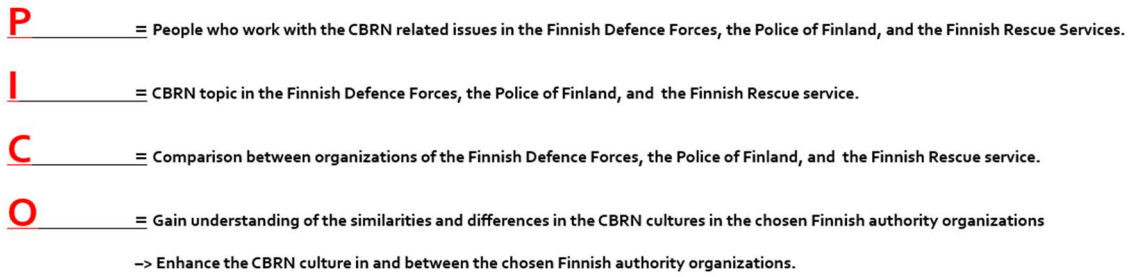

Figure 13: Updated PICO model after the analysis phase

PCC model (University of South Australia 2024) was used for to article-based information acquisition about the thesis plan. The PCC model was chosen because it helps to structurally determine the inclusion and exclusion criteria for background literacy search. According to the University of South Australia (2024), in the PCC model, P stands for population, first letter C for concept and the second C for context.

The PCC model used for building theoretical background for this study was created on blank file with the Microsoft Excel software and is presented in table form in Table 2.

Table 2: PCC model in table-form

PCC element	Chosen criteria
Population	Geographical = High educational level among the majority of population = 1. Scandinavia, 2. Europe, 3. USA & Australia
	People who work with the CBRN related issues in the Finnish Defence Forces, the Police, or the Fire and Rescue Services
	People who work with the CBRN-related issues in the Defence Forces, the Police, or the Fire and Rescue Services
Concept	Interpersonal Communication, general theories
	Inter-authority Communication
	Communication inside and between the target population or suitable similar populations
	Communication methods, -standard operating procedures, -styles, -channels, -common practices, -challenges, -experiences, -expectations
	Concept = CBRN Communication (for example communication methods, standard operating procedures, -styles, -channels, -common practices, -challenges, etc.)
	Communication inside and between authority organizations (best if related to CBRN)
Context	Communication inside and between the target organizations
	Communication inside and between the target organizations relating to CBRN
	Communication inside and between the target population, relating crisis situations, common training, common projects, and/or cooperative situations
	Communication culture inside and between the target population, relating to CBRN operative messaging, -crisis situations, -training, -common projects, etc.

Inclusion criteria for the theoretical background material are age under five years old, except the ones related to the CBRN; full text available; peer reviewed; the language is either

Finnish and/or English. Exclusion criteria are age over five years old, except the ones related to the CBRN; duplicates; the language is not Finnish and/or English.

All findings that fit the criteria frames were reviewed and listed in a separate Research table, made by the researcher, and saved in the Zotero software, created by Corporation for Digital Scholarship (2025). The sources from the Research table are listed at the end of this document, in the References section. A screenshot example of the Research table is presented in Figure 14.

Thesis Research Table / Esa IHALAINEN 2024

N:o of the source and its' type	Name of the publication	Source	Purpose	Method(s)	Findings	Theoretical and conceptual framework	Key terms concerning CBRN and/or communication	What it has to offer concerning the topic
		Accessed 12 September 2024. https://doi.org/10.1017/S1049023X21000790			such as regional differences, unclear definitions, and the need for ongoing training and integration into daily practices.	standard operational procedures.	Mass Casualty and Disaster Management Coordination of Emergency Services Two-tiered Triage System Emergency Preparedness Medical Rescue Coordinator Awareness Inter-reginal Collaboration	
HOX 7 Academic article	Social Media and Crisis Communication (SMCC) Research in A Global Context: An Updated Review and Critique	Cheng, Y., Spruill, T. & Dalton, C. 2022. Social Media and Crisis Communication (SMCC) Research in A Global Context: An Updated Review and Critique. In: Jin, Y. & Austin, L. (ed.) Social Media and Crisis Communication . 2nd edition. New York: Routledge, 7-19.	Review the topical literature.	Quantitative content analysis.	More than half articles out of 157 applied theoretical frameworks and models. Situational Crisis Communication Theory (SCCT) were used more than others. Other important theoretical framework: Crisis and Emergency Risk	SMCC search: Social Media and Crisis Communication. SCCT: evidence-based framework that helps to understand best ways to understand the methods of reputational protection during post-crisis communication situations. Notifies also the ways how organizations	SCCT CERC SMCC Communication Tool Contextual Factors Theoretical Framework	Useful Theoretical Frameworks.

Figure 14: Example of the Research table

All sources for the theoretical background building process were either open access material or reached with Laurea UAS student-accessible licenses. The quality of the data is ensured by assessing their academic elements and structures, such as whether the source has been peer-reviewed and/or whether the publisher's own ethics assessment has been carried out with quality and presented as part of the publication. With regard to textbooks, those that the lecturers at Laurea University of Applied Sciences have distributed in their courses as learning materials or recommended sources, were selected. Thus, these were considered to have acceptable substantive validity also from the point of view of the thesis process. The most significant single source, if one wanted to be elevated above the others, turned out to be Amanda Coleman's publication Crisis Communication Strategies: Prepare, Respond and

Recover Effectively in Unpredictable and Urgent Situations, which was published in 2023. The textbook in question was built from a large number of high-quality sources and it offered a lot of information in terms of content that could be applied to this need. The publisher had also dealt with the topic of crisis communication in her previous works, so she could be considered to have experience with the topic for a longer period of time. At any point, the information provided by original sources was not intentionally distorted or deliberately extracted from the subject matter. To avoid inadvertently changing the data content, Zotero software was used to save a copy from each original source used in process, so that they can be rather easily tracked if necessary.

No directly applicable sources were found, and the researcher had to build a circular theoretical network around the topic of research, from topics that were somehow intertwined with it, and in this way try to cover as many aspects as possible.

4.3 Data collection

This study used the method of individual key-interviews, which were audio recorded. Knapp and Daly (2017, 65) describe interviewing to be an action of “next to participant observation”, which as a method is the most closely related to an everyday talk, where people are asked about the social world around them. In this study, the interviews were structured with similar-to-all question protocol, like suggested by Knapp and Daly (2017, 66), because of the way the gained data can be more comparable to each other and data-collection phase be more rigorous. Similar structure can offer depth in better understanding the target population while gaining more insight about the focus groups members, and interpersonal cultures they are representing inside their own, and between the other participating organizations. (Knapp & Daly 2017, 65-66.) The questions were formed in an open-ended way, meaning that the participant cannot answer only “yes” or “no”, but instead, they must use their own descriptive words and phrases in their answers.

Since the data was collected through individual interviews, an interview framework was created (Roberts 2020). In addition to the previously mentioned Research table, the researcher collected possible suitable interview questions separated by color codes on sticky notes in addition to background studies. Questions were listed as soon as the researcher came up with them while going through the literature. After this, the questions were first categorized into six priority/hit categories, then the three highest categories were reviewed again, of which the remaining one category, i.e. the highest remaining after two rounds of filtering, was the one from which the interview framework was built. Originally, there were more than a hundred questions, but in the end, only a fraction of the original ones remained in use, which can be seen in the question frame found in the appendices of this study (Appendix 4). In terms of the available resources, it was not realistic to try to take every

perspective of every question that came to mind into account in a study of this scale. On the other hand, this large-handed selection also meant that the researcher went through the topics very extensively, before making the final decision regarding the final form of the individual interview framework.

Participating people were chosen with purposeful sampling on behalf of their solid working life background, which deals with issues related to national security somehow with a relatively strong focus on CBRN issues (Palinkas et al. 2024). Suitable people were mapped by phone and email during the spring and summer of 2024, as well as through snowball sampling. This step was carried out at an early stage, because it was necessary to be sure that the study could even theoretically be carried out, because the researcher knew from his own experience that the target group suitable for the sample would be very few in any case. Six people gave their preliminary consent to participate either through personal contact with the researcher, or through snowball sampling. In the end, however, only five people were able to participate — two people from two organizations and one person from one organization. Due to these reasons adjustments in the study structure and objectives were made to ensure anonymity of all informants.

The data collecting method was face-to-face pilot-tested before the actual interviews with a person who had working life CBRN experience but was not available to key-informant interviews due to other reasons. The structure and questions of the interview query changed as a result of the observations made during and after the pilot test, to better serve the aim objectives of this study. The researchers' own experience is that the pilot-testing was vital for this kind of research.

The interviewees are people with suitable information power. The term refers to a situation in qualitative research where the sample size, in other words, the number of participants, is relatively small for some reason, but nevertheless considered sufficient, because the relevance and information content of the data can be considered relatively high in terms of the objective and purpose of the research. (Malterud, Dirk Siersma & Guassora 2015.) In this study, it was originally expected to have a low number of total participants, because of the specificity of CBRN work field and low number of existing suitable candidates. The so-called saturation point is usually not met in these settings, but in this study, it was still achieved on behalf of the wanted data. With information power, the data obtained must be considered highly informative, since the inclusion criteria dictate that the participant must have extensive experience in the subject, preferably at least five years and/or status of being in a position in the national work field, where his/her knowledge and experience of CBRN is considered relevant in his/her own organization, as well as in national inter-authority setting in field of CBRN. Other inclusion criteria: consent to a face-to-face or remote setting

interview, lasting approximately one hour, and the opportunity to participate in this study between November 2024 to February 2025.

Sampling, meaning the individual interviews, were offered to be made on face-to-face sessions in place chosen by the informant, but the participants were also offered an opportunity to be interviewed over the internet in suitable secure discussion enabling software, like the Microsoft Teams (Microsoft 2024). Remote meetings were offered an option if geographical or locational issues could not be resolved with reasonable effort and cost. The presence of people other than the informant and the researcher was excluded to ensure that the framework was optimal for a reliable interview. In the end, all interviews were implemented as a remote meeting by using the Microsoft Teams (Microsoft 2024), at the time when the key-informant wanted to. They were offered the opportunity to conduct the interview in English and a completely flexible interview time that the key informant could choose. In the end, all interviews and data collection were conducted in Finnish, because it was the mother tongue of both each participant and the researcher.

The time reserved for each interview was not intentionally limited, but the informants were given an estimation of one hour in the scouting phase. All informants were instructed to reserve at least two hours so that they would not censor themselves or limit the amount of information they provided in the interview due to their haste, giving the participant more room for maneuver and time to reflect, which was considered to strengthen their information power. Participants were allowed to refuse to answer questions and interrupt the interview at any time if they felt like it. Not a single interview was interrupted.

Demographic data was not collected to ensure the anonymity of the participants. All participants got the research information letter/research bulletin, consent form, and the interview query/structure with supportive questions. These were sent well in advance as one individual email, sent separately to all participants. Initial research bulletin was also sent to the organizational contact persons after the topic analysis and plan for the research was approved, to ensure the highest possible quality of data gained during the interviews. The consent form document was undersigned by the researcher and the participants did not have to send it back with their signature, because verbal consent was collected and audio recorded. All but one (key-informant #4) had read the materials before the interview, but this person still had read everything else except the consent form, which he was given time to familiarize himself with, before the interview started. The recordings were stored behind several passwords on the researcher's own computer, accessible to one person only, for six months from the end of the research and/or until the end of the academic appeal period, but no longer.

All interviews were recorded in separate voice recordings apparatus, Sony dictaphone model “IC recorder ICD-PX470” (Sony Europe B.V. 2024). The recorder was presented to the participants via webcam before starting the recording. The lengths of the interview recordings are: #1. 1h 19min 59s, #2. 1h 53min 17s, #3. 1h 25min 41s, #4. 1h 02min 53s, #5. 1h 51min 29s, and the total length of all interview-data is *7h 33min 19s*.

4.4 Data analysis

Collecting data by interviewing key-informants and analyzing the interview material with content analysis method can be seen as suitable research design in the field of crisis communication. Interpretivist approach with inductive data analysis are suitable methods to choose when the topic is not studied much or at all before (Knapp & Daly 2017, chap. 3). Content analysis was used with inductive approach, where the data tells and orders where the researcher will concentrate to (Knapp & Daly 2017).

The researcher listened to the interview recordings repeatedly over and over again, rewinding them to ensure that all the content of the recording was obtained into a Microsoft Word text file, where he typed them out manually as actively open coding. For example, if a person clearly laughed or laughed when saying something lightly with humor, the researcher wrote this in the text by marking the passage by writing it inside the stars (e.g. *laughter*) so that the weight of the thing would not be distorted when interpreting it from the text alone.

The word counts of the transcribed texts were: #1. 7084; #2. 12,547; #3. 9385; #4. 7316; #5. 11,804 and the total of 48,136 words of all transcribed secondary data combined. The transcribed open-text versions of the interview recordings were always sent to the interviewee in question for review and comments.

Creation of codes was done with Atlas.ti (ATLAS.ti Scientific Software Development GmbH 2024) research tool, where the open texts were added. The creation of codes included making notes and highlighting words and sentences from the texts and combining them under the appropriate preliminary categories. A total of 154 different codes of the preliminary category were accumulated under four groups, which were "Other observations", "RQ1 : Organizational CBRN communication culture", "RQ2 : Inter-authority CBRN communication culture", and "RQ3 : Enhancement suggestions". RQ refers here to the term research question. These 154 preliminary codes appeared in 680 different places a total of 2716 times. Figure 15 shows an example of the Atlas.ti program.

Figure 15: An edited screenshot example of the Atlas.ti program

The Atlas.ti program offered the possibility to get the annotations in Microsoft Excel file format with a clearly tabulated separation, where the different codes, their frequency and linking to one or more of the five open-text interview documents were clearly visible. This was exploited by transferring the table in question to the Microsoft OneNote program, where the researcher's touchscreen computer could easily be used to make highlighting markings. The topics that were highlighted were such that they appeared in all or almost all of the interviews, or their occurrence was exceptionally significant in terms of quantity. These two perspectives were emphasized differently so as not to confuse each other. From these highlighted topics, it was possible to compare whether they also supported the researcher's own analysis, but these numerical values were not directly utilized because they did not fit the chosen and used research method as such.

The original research questions, which were found to be too narrowly defined, significantly complicated the analysis of this study. As the analysis went forward, the initial research questions were modified to support the inductive approach of the study. This decision was made because adhering strictly to the initial research questions would have resulted in the omission of some key findings and thereby limited the scope of the analysis. In this study, they were left aside in the analysis phase, because it was found that when the analysis phase sought to get answers to the research questions, it meant that some of the key findings would have remained outside the framework set by them and thus censored them.

When codes on the same topic were bundled into groups and examined without the aforementioned frameworks, it was possible to better see the data as it actually was, and to find clear subcategories in the codes, and always five main categories (Elo & Kyngäs 2008). In

this phase of the analysis, a tabular analysis tool was used, with example sentences with direct quotations at the bottom, which are related to the example codes of individual words above them, as well as the subcategories derived from them. At the top is the higher-level main category of the findings, derived from the subcategories. These tabular tools are represented in the chapter 5, where each main category is drawn from subcategories.

4.5 Timetable

This study took place between spring 2024 — spring 2025. Spring and part of the summer of 2024 were used for initial planning. Part of the summer and autumn 2024 were used for studying theoretical background and to write the study plan, which was approved by Laurea UAS in November 2024. Organizations research permits, in total of four of them – two for the same organizations' two different units, were applied between the November 2024 and January 2025. Target organizations' research permit processes took from three weeks up to seven weeks. Individual interviews started in December 2024 and last one was carried out in February 2025. The analysis of the data took a total of five weeks and was completed at the end of February 2025. Finalizing the report was done during the end of February and two first trimesters of March 2025.

5 Results

Five main categories were identified as key findings in this study. As the aim of this study is to increase Finland's general safety, three of the five main categories have been censored due to the sensitivity of their contents.

All the citations are direct translations from Finnish to English made by the author. The quotations were translated as closely as possible to the original text on a word-for-word basis. However, for certain geographical slang or dialect words, the author selected the English equivalent that most closely matches the intended meaning, ensuring that the content remains unchanged. In the beginning of each sub-chapter in the results, a summary table of the main category, sub-categories, codes and example interview quotes are presented to provide a comprehensive and visual presentation of the results.

5.1 Success in CBRN

The first main category from the interviews was the CBRN specialists' view of *what is needed to succeed in the CBRN topic*. The main category was summarized from five subcategories presented in Table 3.

Table 3: Analysis with tabular tool – 1. main category: Success in CBRN

Main category	1. Success in CBRN				
Subcategory	1.1 Competence and experience are mandatory for CBRN professionals	1.2 Skills are acquired in real life collaborative situations	1.3 Dedication to the topic of CBRN	1.4 Continuous development	1.5 Networking and trust building skills
Coding	Specialists, professionals, extensive skills, complex, knowledge, skills, expertise, equipment, infrastructure, dedication, development, personal traits, enthusiasm, high quality, cooperation, networking				

1.1 There are a shocking number of things here that you need to know and learn all the time. (Ind. Interview 4)

1.1 It requires anyway... Anyway, such a place so... A lot of experience and, and education. And when you combine that with such a special industry, you see... I would say that it is not possible to get there straight from school. (Ind. Interview 3)

1.2 In other words, you have to have practical experience to get that person there, as it were, on an operational level before, before you can move up the hierarchy to become a CBRN expert. (Ind. Interview 5)

1.3 This is quite an interesting topic for those who are dedicated to this. […] as if with my heart involved in this activity. (Ind. Interview 4)

1.4 And as if we were working with these other internal security actors under the same roof, we would be able to develop the best and most effective, as it were, common guidelines, when we do this work together. (Ind. Interview 2)

1.5 CBRN key people know each other and have worked together for a long time and they do a lot... A lot of cooperation. That's how it is... It kind of works best of all at the moment. (Ind. Interview 1)

Competence and experience of the CBRN professionals were described as complex and required various skills acquired over experience in real life collaborative situations after basic vocational educational degree and training. Because CBRN is a wide topic, the interviewees see that a person who wants to succeed among the topic must be highly dedicated to it and continuously develop oneself. The topic of CBRN is considered so broad that it is thought that it is almost impossible for one person to fully control every aspect of it, and for that reason networking and trust building skills are valued high. There are several CBRN professionals, i.e. people who, due to their degree and/or professional title, react to CBRN events in each of the organizations that participated in this study, but the number of CBRN specialists/experts who have acquired more in-depth knowledge of the topic was said to be very limited on a national scale.

> There are a shocking amount of things here that you need to know and learn all the time, you learn more all the time. (Ind. Interview 4)

> It requires a lot of experience in the field. That, you understand what you're talking about, because CBRN is kind of a pretty broad concept. (Ind. Interview 1)

Depending on their organization, professionals are received a different amount of basic CBRN training – for some, this was practically non-existent at the time of graduation and for others, the basics may be under control at a level that enables them to participate in the basic CBRN field activities. CBRN professionals can be assigned to carry out practical tasks under precise management, but all interviewees share the insight that the responsibility for managing these situations should always lie with a CBRN specialist who has a solid empirical background in fieldwork on the topic of CBRN. Participants think that fieldwork in this case, can mean either real CBRN situations or practical exercises simulating CBRN situations.

> It requires anyway... Anyway, such a place so... A lot of experience and, and education. And when you combine that with such a special industry, you see... I would say that it is not possible to get there straight from school. (Ind. Interview 3)

The difference in the competence of CBRN professionals and specialists in the field was described as significant. The high level of know-how of CBRN specialists was mainly built after both vocational education and basic CBRN training. The high competence was obtained through continuous professional development through years of practical experience, while practicing and maintaining existing basic skills. The interviewees see that an extensive network with different actors directly and indirectly related to the CBRN area of responsibility had to be consciously built as part of the personal toolbox. In the discussions, it emerged that the elements of the partners and stakeholders related to this specific cooperation field of different sectors of society had to be learned and it could not be ignored.

The ability to coordinate different elements of different stakeholders in potentially rapidly changing situations had not been achieved by any informant in a short period of time.

> In other words, you have to have practical experience to get that person there, as it were, on an operational level before, before you can move up the hierarchy to become a CBRN expert. (Ind. Interview 5)

The participants also highlighted a person's personality traits and natural interests as an affective factor in whether they are suitable for a CBRN specialist. The interviewees felt that the person had to have at least some degree of innate interest in both natural sciences and, for example, psychology, as well as the will and ability to learn more about topics that were foreign to them.

> This is quite an interesting topic for those who are dedicated to this. […] as if with your heart involved in this activity. (Ind. Interview 4)

According to the informants, reliability, openness, willingness to cooperate, friendliness, collegiality, accuracy and the ability to respect others were considered positive in predicting success in working on the CBRN topic.

> Yeah it is so that to enter this world, it has to... It has to begin from the very person itself. (Ind. Interview 5)

During the interviews, the researcher was told that CBRN professionals could be trained/produced to some extent quickly with the current systems if desired, but it took longer to increase the number of CBRN specialists, especially since not all were suitable for the task in question, even if they would receive all necessary training. The selection of the wrong person and the potentially difficult induction process to the organization's CBRN area of responsibility were seen as a possible factor in weakening the CBRN expert's own commitment to their organization, but it was also seen as having a potential negative impact on the national CBRN authority network and eventually even on the cooperation of the entire field.

> If the person is just told to do the job and has no interest in, the end result would not be good. […] CBRN key people know each other and have worked together for a long time and they do a lot... A lot of cooperation. That's how it is... It kind of works best of all at the moment. (Ind. Interview 1)

5.2 Non-traditional interaction culture

The second main category is *the non-traditional culture of interaction* in the field of CBRN. This main category was drawn from four subcategories, which are presented in Table 4.

Table 4: Analysis with tabular tool – 2. main category: Non-traditional interaction culture

Main category	2. Non-traditional interaction culture			
Subcategory	2.1 CBRN has its own language with special terminology and vocabulary	2.2 Strong contact networks across organizational boundaries	2.3 Different approach depending on the organization	2.4 Attracts and engages a wide range of sectors of society
Coding	Communication, messaging, own terminology, speaking CBRN, risk of misinformation, leadership communication, management communication, announcements, debriefing, sharing information and experiences			

2.1 Often when we talk about what we need to be able to do, one thing is to translate the CBRN language into Finnish. (Ind. Interview 1)

2.1 That you kind of talk Ceberne and assume that others understand too, but they don't understand if they haven't been trained for it or have no experience of it. (Ind. Interview 3)

2.2 The expert level knows each other and we speak the same language and we meet often and we know each other as we know. It works well. We can call each other, we can be in touch at any time and ask if there is something to ask, and tell if there is something to tell. (Ind. Interview 2)

2.3 It may still be the case with dangerous goods accidents, but they are mainly related to... For example, transport accidents. […] The police [...] always have the primary responsibility according to their area of responsibility, such as... Criminal activity in some way. […] The Defence Forces [...] may have criminal activity, terrorist activity, or it may be something... Like the use of war... Made by another state. (Ind. Interview 5)

2.4 When we talk about comprehensive security, comprehensive security is not only about first response actors in peacetime and then again during war, like the Defence Forces, but the comprehensive security is built on all actors, and the more communication we have between different actors, how we prepare, in other words, when, we share information that is central to operations, And what affects it, as it were, overall preparedness, there is... That kind of thing is nothing but beneficial, because then, in principle, our entire society is more prepared. (Ind. Interview 5)

The informants have noticed that when they have communicated about their field of expertise, they speak with words, terminology and vocabulary, that are unfamiliar to most people. In the interviews, the participants often brought up the concept that there are strongly connected CBRN people around different sectors of society, even though these different stakeholders would approach the topic only from their own perspectives, that differ from those of other organizations. The participants repeatedly mentioned that what fundamentally differentiates CBRN specialists from their colleagues is the use of a language of their own, which was unintentionally formed around the topic of CBRN, that the participants called with a name Ceberne.

> Often when we talk about what we need to be able to do, one thing is to translate the CBRN language into Finnish. (Ind. Interview 1)

Key informants understood people who did not know the language because, as with any foreign language, it was practically impossible for a person who did not master it and did not know it to be able to communicate using it on a related topic. The participants considered the spread of misinformation to be an obvious risk if Ceberne was applied by an incompetent person. In connection with the interviews, the participants reflected on the fact that the information-oriented nature of the CBRN topic required a lot of theoretical scientific knowledge, which on the other hand provided a basis for the Ceberne language. Ceberne was said to have his own specific terminology and vocabulary that a person had to master in order to speak and understand it.

> Then again, when we talk Ceberne, not necessarily everyone has any kind of vision and knowledge of their own, in which case the conversation is more one-way. (Ind. Interview 1)

> The challenging factor is that if a person thinks they know about CBRN, and it talks. And it is taken as the full truth. Then we may suddenly drift to the point where it has been communicated incorrectly. (Ind. Interview 5)

> We may talk like nonsense. So you think you understand about radiation, for example, but you have misunderstood it. That is a very big inconvenience, it may cause if the recipient takes it as the truth. (Ind. Interview 2)

> If you're not deep into this topic, it's a pretty superficial discussion and probably quite uncertain, because as I said, this is pretty specific anyway. (Ind. Interview 4)

> That you kind of talk Ceberne and assume that others understand too, but they don't understand if they haven't been trained for it or have no experience of it. (Ind. Interview 3)

In the interviews, the participants said that over the years, the Finnish authorities have built a comprehensive and close CBRN cooperation network based on experience and mutual trust, in which this language is common among CBRN experts.

> The expert level knows each other and we speak the same language and we meet often and we know each other as we know. It works well. We can call each other, we can be in touch at any time and ask if there is something to ask, and tell if there is something to tell. (Ind. Interview 2)

According to the interviewees, different authority organizations approach CBRN situations from slightly different perspectives, which are mainly related to their areas of responsibility assigned by society: for the Rescue services, it is primarily an accident, for the police, a man-made crime, and for the Defence Forces, either a threat to Finland by another state, terrorist activity or other criminal activity. The difference between the police and the Defence Forces in terms of criminal activity was that in peacetime, the police lead the situations in question, and in times of crisis, the Defence Forces.

> It may still be the case with dangerous goods accidents, but they are mainly related to... For example, transport accidents. […] The police [...] always have the primary responsibility according to their area of responsibility, such as... Criminal activity in some way. […] The Defence Forces [...] may have criminal activity, terrorist activity, or it may be something... Like the use of war... Made by another state. (Ind. Interview 5)

According to the interviewees, CBRN events have often been situations that have required multi-authority cooperation. Usually, one organization has been hierarchically higher than the other organizations, that provide assistance to the stakeholder leading the operation. Management relationships may also have changed in the middle of operations as new information has become available, and the situational picture has been better understood as the operations have progressed. A risk that may have increased the confusion of operations may have been that different terminology has been used and is still used for the same issues between different authorities and even within Ceberne's language. Different Ceberne languages have also been spoken in different situations, depending on what kind of audience has been present in the situation and, in particular, what the CBRN level of these different actors has been.

> Above all, being able to talk about the matter in a way that everyone who is not so familiar with the subject understands, i.e. translating professional terms into something easy to understand. It's really important when communicating. (Ind. Interview 1)

> This kind of communication between specially trained people works well, who speaks Ceberne, speaks the same language - certainly works well. It works well, so does the communication of the people who speak Ceberne with other authorities. (Ind. Interview 3)

> We may still use some terms in a slightly different way, but at the moment, I would dare to say that the actors in the field always know what we are talking about. (Ind. Interview 5)

CBRN specialists understood the reasons behind this arrangement, and they felt that the differences in organizational approaches were a positive thing. These differences provided an integrated opportunity to structurally examine the multidimensional CBRN field from different perspectives. On the other hand, the lack of a common structured communication culture and a collective broad understanding was perceived as a threat, as these could lead to situations where, in a potentially rapidly changing CBRN event, both leadership relationships and responsibilities between the organizations responding to the situation may have been unclear.

> The benefits come from the differences that are sorted out by the fact that everyone may have a slightly different approach, which means that it takes into account as much as possible and on a large scale. And harm can then appear, perhaps for the same reason, if the goals are different. (Ind. Interview 1)

According to the information received from the interviewees, due to the differences in the organizational structures, it was possible that different actors had unequal people in management and decision-making positions right at the scene. In this case, the chain of commands of one organization could grow long, while another organization operating in the same situation probably had people who had decision-making power over the situation that was present.

> There is not going to be the last people on the front line who make the big decisions, but they're somewhere in the command center. (Ind. Interview 2)

CBRN specialists consider that the operations of another organization or its quality may have suffered if the overall situation progressed and the situational awareness of one actor involved in the response, developed faster than another organization simultaneously performing its own basic task in the same incident scenario. Delays caused by ambiguities have sometimes increased the threat to the environment and in these cases, severity has been depending on the variables affecting the situation and the characteristics of the substance causing the threat.

> [NAME OF ORGANIZATION] can't make difficult decisions alone in the field, and that becomes the challenge that we're in the wrong place, the leaders of different authorities, we're not even there on the command rock. (Ind. Interview 2)

According to the respondents, the CBRN topic had been perceived as so broad that it had been seen as a necessity to activate different sectors of society and actors in different sectors to cooperate in advance to support the authorities participating in CBRN operations. According to the interviewees, scenario thinking had made it possible to broaden the examination and identify useful cooperation opportunities that were not only implemented by the authorities.

> So when we talk about comprehensive security, comprehensive security is not only first response actors in peacetime and then again in wartime, like the Defence Forces, but the comprehensive security is built on all actors, and the more communication we have between different actors, how we prepare, in other words, when, we share information that is central to operations, And what affects it, as it were, overall preparedness, there is... That kind of thing is nothing but beneficial, because then, in principle, our entire society is more prepared. (Ind. Interview 5)

According to the officials who participated in the interviews, CBRN cooperation was the most coherent between the Defence Forces and the police. These organizations were able to mix with their staff working on CBRN and still work together in the same team. From the perspective of managing the overall situation, the rescue services and the police felt that they worked best together, because they cooperated a lot with each other even in normal everyday life. The police and the Defence Forces spoke to Ceberne, who were closest to each other. Both of these organizations generally used language closer to international NATO terminology than the Finnish rescue services.

According to the answers received in the interviews, there have been differences in the terminologies used by the organizations. In particular, vocabulary related to the level of protection came up in the interviewees' stories. According to the interviewees, the Rescue services and the police used terminology that is closer to each other in this specific context. Based on the responses received from representatives of various organizations, the Defence Forces' CBRN experts were aware of this terminological contradiction, and the Defence Forces had familiarized themselves with the so-called ABCD system separately and adapted their own operations if necessary. Based on the responses, the Defence Forces were able to react and correctly comply with the level of protection determined by the police, for example, in their cooperation situations, even though the Defence Forces did not officially comply with the system in question.

5.3 The third main category

The content is censored due to its sensitivity.

Table 5: Analysis with tabular tool – 3. main category:

Main category	3.		
Subcategory	3.1	3.2	3.3
Coding			

5.4 The fourth main category

The content is censored due to its sensitivity.

Table 6: Analysis with tabular tool – 4. main category:

Main category	4.			
Subcategory	4.1	4.2	4.3	4.4
Coding				

5.5 Updating the CBRN communication culture

The fifth main category deals with *how the CBRN communication culture can be updated.* Five developmental subcategories emerged in the analysis, leading to the main category mentioned. The content is censored due to its sensitivity.

Table 7: Analysis with tabular tool – 5. main category: Updating the CBRN communication culture

Main category	5. Updating the CBRN communication culture				
Subcategory	5.1	5.2	5.3	5.4	5.5
Coding					

6 Discussion

Some contents in this chapter are censored due to their sensitivity.

CBRN situations were experienced as complex and emphasizing the role of leadership. These traits go together with the traits of crisis communication (Ahlqvist, Nurmeksela & Kvist 2023; Bernardi et al. 2024; Coleman 2023). The results pointed out that during CBRN incidents, the amount of information is potentially vast. During such events, the meaning of leadership is emphasized (Reynolds & Seeger 2005). There are several operators in the same place at the same time in their own professional field. CBRN incidents can be called to be as crises, because like the definitions were presented in the chapter 2.1, they can be "a low-probability, high-consequence event that develops very rapidly and involves ambiguous situations with unknown causes and effects" (Pearson, Roux-Dufort & Clair 2007, 109). The crisis definition offered by Tubb (2020), where crisis is named to be a serious threat to the basic structures, values and norms of a system, where the nature of the event is highly

uncertain and decisions are done under time pressure and contain uncertainty can also be seen suitable. The elements mentioned by Pedak (2018), the negative impact, uncertainty and obscurity, are usually present in the CBRN situations. Colemans' (2023, 34-35) five elemental definition suits to CBRN events too. The researcher believes that it is appropriate to talk about crisis management when the topic involves CBRN.

Success in CBRN requires competence, in other words: knowledge, skills and attitude (Verduyn 2023; Huang et al. 2021; Echtelt 2020). Theoretical knowledge supports this view for every specialist, regardless of their specialty (Coleman 2023, 72-76). Knowledge gained from experience, especially from live situations, is an absolute prerequisite. Coleman (2023, 16) recognizes that experience is also essential among those implementing successful crisis communication. Šemrl et al. (2024a; 2024b) states that people using dialogue in their interactions needs experiences to share, if they wish to perform dialogue at all. This means that when a new person enters the business, the topic of CBRN can only be studied up to a certain point, after which the person must be able to enter field conditions to complete the accumulation of his or her skills. The CBRNE Strategy 2024 made for Finland, emphasizes the meaning of planned training as a part of national CBRN crisis readiness (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). An individual who is not an experienced CBRN professional in practice, should not be called a CBRN specialist under any circumstances, and should not be placed in such a position within his or her own organization. Naming the right person for the right position is also seen as wisdom in the theoretical framework of this study (Coleman 2023). It could be seen as a vice way of using the existing resources too (Bernardi et al. 2024), because the general number of CBRN specialists is few.

Although the CBRN field is strongly based on natural sciences (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; World Economic Forum 2023, 77; European Union 2022; University of Maryland 2022; Tin et al. 2021; Maavoimien Esikunta 2014; Baka et al. 2008), those applying for the field should be mentally mature. It should be possible to expand scenario thinking to cover one's own ego even critically. Of course, this requires courage, but it could be considered to be a trait of mental maturity. The psychological effects associated with CBRN should also be understood and included in the response (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b), so the researcher sees that it is justified that the humane sciences are also related to CBRN competence.

The findings of this study suggest that success in CBRN has a lot to do with individuals' leadership and management skills. Several sources find similar traits connecting to crisis situations, where communication can be seen equal to leadership, and crisis communication understanding the ongoing event (Reynolds & Seeger 2005; Coleman 2023). The people who coordinate these potentially very dangerous and generally unclear situations between organizations play big roles in the scene of national safety especially during CBRN-related

crises (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b), and that is why it is justified to argue that they should be leading the communication activities then. Soares et al. (2022) also see people skilled in crisis communication as teachers of emotional education and upbringing, which as an idea fits together when building wide-ranging, cross-organizational cooperation and mutual trust. Trust between people plays a big role in resolving multi-organizational crises (Ahlqvist, Nurmeksela & Kvist 2023; iRo 2023; Coleman 2023; Hammarén & Laajalahti 2019) and the same concerns CBRN topic, because the topic itself is characterized by creating distrust even in the professional self-esteem of the authorities.

Both the interviewees and theoretical understanding (Ahlqvist, Nurmeksela & Kvist 2023; Coleman 2023) state that it is important to understand one's own organization with its representatives, operating methods and needs, as well as the corresponding elements in the case of their partner organizations. CBRNE-strategy 2024 (Ministry of Defence Finland 2024a; 2024b) also supports this insight.

In order for the above to succeed, a CBRN specialist must have extensive communication and networking skills, because networking in itself does not necessarily build trust. Coleman (2023) argues that trust building in and between organizations happens through information sharing. Other sources support this (Ahlqvist, Nurmeksela & Kvist 2023; iRo 2023; Hammarén & Laajalahti 2019). In the CBRN world, this can become a problem because sometimes it is necessary to limit the sharing of information both within and between organizations. One needs to be genuinely strong both professionally and psychologically, as well as an experienced CBRN specialist, to be able to lead other people in ongoing CBRN situations, because the CBRN crises can be very destructive (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b; World Economic Forum 2023, 77; European Union 2022; University of Maryland 2022; Tin et al. 2021; NATO 2018; Maavoimien Esikunta 2014; Baka et al. 2008).

There is a non-traditional interaction culture between the Finnish Defence Forces, the Police of Finland and the Finnish Rescue services, all of which are significant parts of Finland's stakeholders responding to CBRN situations. It is common, that the CBRN events requires more than one actor to response (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b), and when speaking of authority organizations, it seems rather natural, that the operating cultures responsible for the different areas of responsibility of society will have to make adjustments. Contingency Theory of Strategic Conflict Management (Manias-Muñoz & Reber 2022) speaks on behalf of flexibility in crisis communication, but as a character, it should be adopted while making plans ahead, to all crisis phases (Coleman 2023) in CBRN related processes.

The basis for high-quality cooperation between these stakeholders, besides shared trust, is the so-called CBRN language, which could be called Ceberne as the specialists do. It has evolved over the years to its latest form so it's not just something that's just been intentionally invented. The theoretical field of crisis communication recognizes the concept of so-called organizational crisis language and if that if this language covers representatives from several organizations, it should be practiced beforehand (Coleman 2023; De Rycker & Mohd Don 2013). In practice, Ceberne is only spoken by CBRN specialists from different authorities who are strongly networked and have strong mutual trust.

Ceberne can probably be considered exceptional in the sense that it has gradually taken shape over a long period of time through the empirical activities of the people who primarily need it to perform their task, unlike crisis communication languages in theories, where they are deliberately created in a certain way (Coleman 2023; De Rycker & Mohd Don 2013). Ceberne has been shaped into an organizational boundary crossing micro-reality, to respond to the needs of professionals, who otherwise operate in different worlds but feel an innate attraction to the same topic. Shared interests are known to accelerate stakeholder cooperations (Coleman 2023), and Ceberne makes it possible for the CBRN specialist to share their experiences with their peers, who are not in their own organization. On the other hand, it has been shaped to maximize individuals' experience-based knowledge, but also to enhance manual skills which can potentially be gained from that knowledge. At its highest, this quietly maturing information sharing culture has been created metaphorically with reference to physics, a harmony of wave movements, where people can effortlessly blend in with another organization that shares their aspirations toward a common goal. This can be expected to contribute to the existence of reserve staff as well as from the point of view of operational efficiency (Coleman 2023).

According to the information reached by the researcher, this language is mentioned for the first time in this study and is thus significant in both an academic and a practical sense. This finding can be expected to shape the CBRN topic in a direction that takes more account of national education, unless the change in question has been spontaneously implemented into the non-public national strategy at the same time as this study was written, which is considered unlikely. In the context of work life induction, learning a new language, which can be taught more deeply through real or simulated operational activities alone, should extend the current induction period if this factor has not already been considered in the induction plan for the position of CBRN specialist in the organization. Job requirements written out in employment contracts and job descriptions create transparency and predictability (Coleman 2023) which can also be considered ethical virtues from the perspective of communication (Voges & Peters 2022).

These specialists often have to act as interpreters when, for example, different authorities and non-authorities talk about CBRN issues differently from each other in different situations, and with different terminology, inter alia. To avoid misunderstandings, the terminology should be similar to all (Coleman 2023, 66; De Rycker & Mohd Don 2013). Since they also act as interpreters in their own organizations, the researcher thinks they can be called necessities because they enable the realization of very basic organizational CBRN tasks.

One might ask why this kind of language is necessary and whether it should just be consciously abandoned, but research findings suggest that without such language, the risk of misinformation related to CBRN data increases significantly. This should be avoided, especially when the misinformation risk is noticed as a potential risk (Meer & Jin 2022) and identified as highest short-term risk globally (World Economic Forum 2024, 8, 11). Ceberne also operates on a certain level in international cooperation, which brings Finland's official activities closer to its partner countries. In international situations, the importance of communication increases significantly compared to interactions between populations speaking the same language. An example of this could be the field of medicine, where Greek and Latin terms are widely used around the world, which allows for compatible cooperation between professionals and specialists, who are lacking common general language. In other words, CBRN experts should also be able to think about broad scenarios and empathetically understand the needs of others, because the fragmentation of the CBRN field of responsibility can be considered intentional, even if it is not a coherent and stable entity in the classical sense.

One problem in approaching CBRN situations from different organizational perspectives may be, that if the scenario is identified as a CBRN event, and the response starts with the initial assumption that it is an accident (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b), even if the situation was actually intentionally caused, the situation is led by Fire and Rescue Services, in which case their actions may destroy forensic evidence, that may be important to other organizations. For this reason, it would be important for the Fire and Rescue Services to rule out human causes whenever a situation arises before starting operations. This may not always be possible, because the primary task is to save lives and minimize material harm (The Finnish Rescue services 2025) — however, in the case of a deliberate CBRN attack, timely police work carried out with sufficient resources could save lives and decrease material harm many times over. In the case of intentional attacks, it is always good to keep in mind that there may be several attacks, in which case rapid police work could prevent possible further attacks before they are conducted (Ministry of Defence Finland 2024a; Ministry of Defence Finland 2024b). High-quality and sufficient documentation should take place in every situation on behalf of different actors, in addition to their activities. One option is to set a collective timeline to the joint command post (Coleman

2023). These, in turn, would be made possible by making versatile use of modern technological solutions.

6.1 Recommendations

The content in this chapter is censored due to its sensitivity.

6.2 New terminology proposal

While working on the theoretical framework of the research plan, the researcher realized that the terms "CBRN Communication" and "CBRN Messaging" had not been defined in the current literature found. With the warm-up questions at the beginning of the interviews, the interviewees were asked to define the terms "communication" and "messaging" on a general level, and a few inductive questions later, the terms "CBRN communication" and "CBRN messaging". "CBRN communication" and "CBRN messaging" were similar in the responses to the versions without the CBRN prefix. The clearest difference, and the concretization of one of the most common features related to the topic of CBRN, was shown by the fact that the narrator had a clear responsibility to weigh his audience deeper than the surface and to be able to assess the general level of knowledge of the listeners or the recipient populations related to chemistry, biology, nuclear and particle physics. This is also related to government organizations in such a way, that even if there are people who have previously been involved in the topic, the information distributor must be able to deduce exceptionally not the average listener, but the level of the recipient with the weakest level of knowledge, and adapt their communication so that the information to be shared also reaches this person.

OpenAI's generative AI model ChatGPT/GPT-4o was searched for each term using the following search prompt/query, where the XYZ enclosed in quotation marks was replaced with the terms listed below. Each application was made separately, in the same discussion thread, on Monday 24.2.2025, at approximately 00:20 Finnish time.

> ”Onko termiä "XYZ" määritelty minkään virallisen tahon puolesta viralliseksi termiksi? Virallisella tarkoittaen esimerkiksi tasoa, että kyseistä termiä voitaisiin käyttää vaikka kansainvälisessä oikeudenkäynnissä tai laeissa?”
>
> And same translated from word to word into English:

> “Has the term "XYZ" been defined as an official term by any official entity? Official, for example, meaning the level at which the term in question could be used, for example, in international court proceedings or laws?”

Based on the interview findings of this study, the researcher suggests that this document defines the following terms:

- CBRN Messaging (for ChatGPT: “CBRN viestintä” (FIN))
- CBRN Communication (for ChatGPT: “CBRN kommunikaatio” (FIN))
- CBRN Management Communication (for ChatGPT: as in identical form)

The ChatGPT test strengthened the researcher's negative findings in connection with the construction of the theoretical framework — the terms in question had not been defined before. The first two were asked directly as their own questions from the CBRN specialists who participated in the study, so the same observation could be documented in connection with the research interviews — none of the interviewees had intentionally used or even heard these two terms used as predefined concepts, although a strong consensus, could even talk about saturation, was achieved in the answers. The concept of CBRN Management Communication was constructed by the researcher in connection with the analysis of the research interviews, based on the research findings.

- “CBRN Messaging”: A form of risk-communication. One-way transmission of information related to the topic of CBRN (Chemical, Biological, Radiological, Nuclear) by a faceless umbrella-like organization, which is not intended for targeted individuals, but for a larger, usually unspecified group of recipients. The recipients do not need to understand the CBRN topic, or the language or terminology related to it, but the messaging must be done in a language that also reaches those people who do not already understand anything about the topic in question.

- “CBRN Communication”: Interaction between two or more people on the topic of CBRN (Chemical, Biological, Radiological, Nuclear), which is carried out in a more casual, every-day, free, and not official way to people who are already familiar to the speaker, either inside or outside the organization, and who understand at least the basics of CBRN. During a non-active operational worktime it is implemented in a non-structured way, for example in the form of exchange of ideas related to the CBRN, in a situation that happens more in connection with other social interactions. In active operational situations within the organization, it usually means a more structured, mainly verbal, but also written interaction, which should be recorded in suitable, and when implemented in a high-quality way the movement of the data can be examined

afterwards unmistakably. In multi-authority situations, the importance of structure in communication is emphasized.

- “CBRN Management Communication”: In their decision-making, people acting as senior management officers in active working life positions at the organizational strategic level, systematically consult the mid-level managers of their organization, who have the most up-to-date information, and the best level of know-how in CBRN matters at the time of the communication event. In other words, managers take the initiative and actively consult their subordinates with CBRN expertise in decision-making processes that affect the entire organization, well in advance of internal and/or external communication at the strategic level within the organization. The purpose of this communication method is to ensure the inclusion of CBRN specialists in a marginal but broad field within a large organization, in decision-making processes and thus also to increase predictability and transparency and understanding related to the review of operations. The aim is to maximize the practical benefits and strengthen the professional identity of CBRN experts as information transmitters in their respective fields of expertise, while respecting the organizational hierarchy.

6.3 Strengths and limitations

The strengths of the research are related to the treatment of a new topic in academically accepted structured ways, the researcher's own knowledge about the topic, and existing networks in the Finnish CBRN field, which mainly enabled the implementation of this type of study at all. Strength was also the economical perspective — this study did not require a vast amount of money or human resources to conduct.

The limitations of this study can be found in the theoretical background, as there was no existing peer reviewed research or other literature directly related to the topic, which made it impossible to build a precise and spot-on solid background. For some background information, only a few or a generally small number of sources were found, probably due to the sensitivity of the CBRN topic. In terms of crisis communication, the search for information could have continued indefinitely. When working on the section in question, the researcher noticed that without a specific topic, the collection of information easily started to sprawl, which is why it was also not meaningful to start looking for a strong synthesis for many topics due to the available resources. In other words, the theoretical framework in this type of research starting situation provides at best only experimental examples of topics that the researcher assumed would arise or that could have been relevant to the topic if they had appeared in interviews, which was the expected value.

The study is geographically limited to the Finland and only to Finnish speaking natives. Other cultural contexts may face restrictions in applicability.

The current world situation and CBRN itself also potentially cause such a limitation that it is not easy, if even impossible to carry out even close to identical study by someone else, at least at the moment. A small sample would be reality in any circumstances. In this study, it caused the original planned structure to change in a more limited direction, which meant that the results of the study fell short of the best possible situation. For this reason, it is probably also justified to consider the perspective that war and poor international relations also slow down the development of the academic world and thus a deeper understanding of the real world.

The second phase of this study was supposed to be implemented as a onetime held, freewheeling discussion enabling, focus group online workshop. It was going to be held in the Microsoft Teams (Microsoft 2024) e-meeting platform, facilitated by the researcher. This never materialized, and organizing a similar event in the future, either as a separate event or as part of this type of research, could bring a lot of added value to the later achievement of the goals of this study and to increasing national, general safety.

In the best scenario, all participants from the first phase would have participated. All participants were informed of the possibility that they could have been recognized by their voice by other participants. The workshop structure was going to be built and the topics chosen from the knowledge gained from the first parts' interviews, after participants commented and/or corrected the transcripts, and the current knowledge gained from the data analysis. Because the participants fit the chosen inclusion and exclusion criteria, they were also automatically kept suitable as representative members for their organizations and spoke on behalf of it in the second parts' focus group workshop. Knapp and Daly (2017, 66) suggest, that suitable size for focus groups would be something between 3 to over 30 people, the situation should be led by someone, and relatively free speech should be allowed. In this study, the minimum number of participants recruited from each organization was originally two, meaning that the workshop would have had the same number of participants as the interviews conducted, in this case at least six, if at least six interviews had been conducted.

Because the population limiting special trait of CBRN is included in this study, it would have been very difficult to get these people at the same time to the same space, or even online meeting on remote software platform, like Microsoft Teams (Microsoft 2024). The reality is that there is a limited number of suitable participants overall, and their attention through their professional role is most likely wanted constantly by different authority stakeholders. This originally put a challenge in the intended second part of this study. The researcher considered that already in the initial planning and scouting phase by asking suitable

participating people, if they would have agreed that this kind of study could be useful, and if they would be ready to participate as a key-informant in both phases.

Since only one participant from one organization was admitted to the interview phase, the workshop could not be organized, because then all the other people participating in the workshop, of which there should have been a minimum of two per organization, could have unambiguously identify the source of information about one organization and connect it to this single person in question. At the same time, it would have been possible to misuse his or her identifiable characteristic, i.e. his or her original voice, because the researcher would also have had no way of ensuring that none of the remote participants would record the workshop. If the original plan had been implemented, this would not have been a problem, as the participants were informed of this in the study consent form and in the e-mail cover letter sent to them by the researcher, in which case they could have refused to participate in the entire study if they wished. From an academic perspective, a situation in which there would be only one participant from one organization was unbearable.

6.4 Trustworthiness

Nowell, Norris, White and Moules (2017) discuss in their relatively recent publication about Lincoln and Guba's trustworthiness criteria. In the following sections, the researcher examines the trustworthiness of this study through similar perspectives: credibility, transferability, dependability, and confirmability.

6.4.1 Credibility

The topic has not been studied before, so opening up this topic scene can be considered to create credibility at least for further research, and thus also for itself. In the research plan phase, the recognized risks were: organizations withdraw and cancel or deny their participating, schedules don't match between the stakeholders, topic sensitiveness related self-censorship concerning the cooperation between authorities or too strict behaviour concerning the topic of CBRN generally, informants lack of trust towards the interviewer, recordings get somehow destroyed/unusable, linguistic and terminology differences, informants' emotional distress at the time of the interview, informants low level of knowledge concerning the subject despite the methods used in recruitment, informants lack of professional experience concerning this specific topic, and so-called X factors of life. Thus, after the completion of the study, it can be stated that the only risk that materialized was that the sample fell one person short of the original goal.

The researcher has almost two decades of knowledge of the subject based on his own experience, and the researcher has also done paid work on the topic, which has provided him with a basic understanding of it at the national level. This provided a basis for the fact that

already in the planning phase of the study, it was possible to be confident that preliminary contacts were made with the relevant people, based on which it was ensured that the topic of the study was necessary in terms of time, and that the entire study should be carried out, because it would by default have to offer some information that would be suitable for the concrete world.

Some of the research subjects were already familiar with the researcher to varying degrees, while others did not know at all. Trust in the research subjects was built by utilizing their social contacts related to the topic in recruitment. In addition, snowball sampling was used, in which case a common, trustworthy person may have increased the trust of the people who eventually ended up being interviewed in the researcher. The researcher introduced himself and his research in advance by e-mail to the press officers, and at the beginning of the interviews, he kept his webcam on, showing the interviewees himself and his current workspace. The researcher sought to build and maintain mutual trust through constant communication via email and by conveying situational information about the different stages of the process throughout the study. After a person had indicated their willingness to participate in the study, communications were switched from general intelligence communications to personal, individually sent emails in order to avoid inadvertently sending messages intended for individuals with any wider distribution. Generic messages were sent in the same style as well, just in case.

In the research plan phase, the researcher drew up criteria for the implementation of the study, which were followed in the implementation of the study. Research permits were applied for by each organization in accordance with their instructions and by following the academic guidelines of Laurea University of Applied Sciences. When applying for research permits, communication with the parties granting the permits was active due to the additional clarification needs and more detailed questions they asked.

At least one specific person with information power was appointed as a key informant from each of the planned organizations. Although they were representatives of different organizations, they were united by a common cross-organizational theme that was also the subject of the study, i.e. CBRN. The information obtained from the interviews is relevant, abundant and descriptive. The interview framework ensured that the same topics were discussed from slightly different angles at different stages, which ensured that the findings related to the topic were true and not spontaneously told on a whim if they came up again and again at different stages of the interview.

The only criterion set for interviews that was not met in the planning phase was the number of research subjects. The researcher was unable to reach another suitable interviewee from one organization to another, despite several companies, the methods used, and the

communication channels used, even though the contact information of the person and their secondary contact person was known. The pursuit of the last person and recruitment were abandoned only when the very last time limit dictated by practice, i.e. the researcher's livelihood, was reached, so no shortcuts were taken at this stage either, but the researcher believes that the situation was handled as well as possible in this case and with the available resources.

What was also not succeeded was the third original goal set at the planning stage — to examine the organizations as separate entities. This was due to the absence of this one interviewee, because naturally it was not possible to start looking at the organization in question without the information about it coming from only one source.

The study was also supposed to include a CBRN communication workshop between government organizations, but this had to be cancelled because there would have been only one participant from one organization who could have been identified in connection with the workshop based on his or her identifiable voice. The probability of other spokespersons identifying this individual should be considered high, because CBRN is a marginal topic in the field of public authorities, and the representatives of various authority organizations working with it are strongly networked on a national scale. The researcher considers it likely that if the CBRN communication workshop of phase two had not been cancelled, it would have made it possible for other participants to personalize the responses given by this individual directly to him.

The selection of the communicators selected for the study was successful, and the criteria set for the research subjects in the research plan phase were met for each research subject. The participation criteria were deliberately strict, because the researcher wanted to ensure that information power would be realized. In addition, a strict set of criteria was used to ensure that people who could potentially benefit from the study would be selected for interviews once it had been completed. With this, the researcher wanted to contribute to the motivation of each of the few research subjects to provide as truthful information as possible. The researcher believes that loosening the participant criteria could have lowered the credibility of the data and diluted its value, even though it might have made it possible to include a larger sample population at the same time. Each interviewee was given the opportunity to talk about the topic as much as they wanted – this is also shown by the duration of the interviews, which ranged from 1h 02min 53s to 1h 53min 17s, and the word count range from 7084 to 12,547. Only one participant was obtained from one organization, which removes the possibility to assess the CBRN communication culture of their organization, because in this respect the information would be identifiable and based on the views and experiences of only one person.

The researcher and the research subjects had a common language, even though the interviewees used so-called professional vocabulary on a few occasions during the interviews. During the interviews, the investigator ensured by asking clarifying questions that he had understood what the subject had just said in a way similar to what the spokesperson in question had intended in the situation. The researcher wanted to ensure that his or her interpretations and perceptions corresponded to those of the interviewees.

During the analysis phase, the researcher ascertained from the interviewee, if necessary, what the interviewee had meant by something he had said, if it was not unambiguously clear to the researcher from the material available. The findings made after the analysis were also communicated to each interviewee and they were given the opportunity to comment on them. The results also showed saturation, although it was not directly sought. The stories of each interviewee were mainly in line with the inter-agency and development sections, and it can thus be said that the study is successful and reliable when examined posthumously.

The researcher's supervisor recommended changing the research questions after the analysis. This made it possible to increase the credibility of the research, because the data processed according to the research method determined what should be obtained from it as a research result, and not by trying to force the data into the mold of predetermined research questions.

Holistic bias, i.e. giving more weight to individual events or descriptions in the study and generalizing them to describe the entire material, was minimized by using the Atlas.ti analysis program. Atlas.ti was able to highlight topics that appeared in all or at least one more interview.

The elitist bias, i.e. that informants who are verbally expressive, would be elevated to the sole source of information while ignoring others, would cause the researcher not to consider his or her entire data was also deliberately minimized by the researcher's choices. The interviews were recorded, transcribed into open text and analyzed using the Atlas.ti program, so that the different documents remained in their own compartments. The subject matter was coded, and the same code set was applied to the entire data. Thus, the factual content could be separated from each other and at the same time stapled together from the entire data, without it being possible to trace their source ties retrospectively. At the preliminary stage, 154 different codes were identified from all five interview documents that were written open. These appeared total of 2716 times in 680 different quotes.

6.4.2 Transferability

With regard to transferability to research, it should be mentioned that the issues presented in connection with the theoretical framework were also present in the research findings. The topic of CBRN is considered to be extensive and complex in literature as well, but the first

research finding brought a dimension to it in such a way that it can now be said that there is also evidence of the characteristics of the people working with the topic in question and especially their competence requirements. Crisis communication theories also speak for continuous development, networking, and active trust building. Placing the right person in the right position was also strongly highlighted in both the theoretical knowledge and the research results.

The concept of crisis communication is leadership emerges both in the theories of crisis communication and in the interviews of this study. The interviews show that some CBRN specialists would find it useful to have CBRN professionals at strategic levels as well. However, even those who do not feel that this necessarily agree with the idea that CBRN specialists should be able to influence strategic-level operations and decision-making processes. Theories of crisis communication (Coleman 2023) mention that a person with the title of crisis communication manager should carry out their work as an equal to the organization's top management and be placed in the same space as them. As one of the development options, the researcher suggests that in the future, organizations should consider appointing an experienced CBRN specialist and placing them in a supervisory position at the strategic management level responsible for crisis communication. However, this person should be allowed to maintain contact with operational activities to keep up to date with the ever-changing CBRN field.

The advance planning of activities and active planning work carried out with different actors are also in line with crisis communication theories. Planning the number of additional resources and their availability is a significant part of creating a crisis matrix. Debriefing, i.e. defusing and debriefing activities, is still carried out to some extent today, but assimilating it as a natural part of every organization's structured operation could even change attitudes related to development work to be more effective and, at best, documented, provide data measurable at the strategic level of organizations, for example, to support decision-making on financial matters. Taking even further, similar documented issues could even influence the political field affecting the topic of CBRN.

In the Research methodology section, the researcher has described his activities in such detail that anyone with a similar and equally comprehensive background in the subject, the ability to speak Ceberne, existing similar networks, and the operational experience base shared with these people and thus the existing level of trust, can repeat this study and get comparable results that are meaningful to examine in relation to this study.

6.4.3 Dependability

The results of the study can be expected to be permanent and consistent, as they come from people working with the CBRN topic, who have practically created the current culture around

the topic in question. In other words, this study reaches even decades deep for one marginal phenomenon, so it is not easy to expect that this foundation built over a long period of time would change very quickly in any radical way.

The research interview framework was built in such a way that at the beginning there were a few general warm-up questions related to organizational communication to relieve the possible tension of the communications officer and give an idea of the nature of the interview before moving on to the interview sections that serve the research questions more precisely. From the point of view of interaction, the interview situations went well without exception, and they were always the most rewarding the better the interviewee had familiarized themselves with the material sent to them in advance, i.e. the information leaflet, the consent form, and the interview frame. All material and interviews were conducted in the research subjects' and the researcher's native language, Finnish.

The research interviews were carried out by the same interviewer for each interview using a remote connection using the Microsoft Teams program, although the researcher was also offered the option of the researcher coming to the interviewee on site. On the other hand, this ensured that the interview situations themselves were as similar as possible and that the research subjects were given the freedom to choose the most favorable space for themselves for the interview event. The researcher considers this to be important from study's reliability perspective, because this way the research participants were allowed to use their self-determination to optimize the environmental influencers in the interview situation. The researcher wanted to give participants experience of situational control, because it could be seen from the material sent to them in advance that the topics to be discussed could be sensitive, without going into confidential matters, or, for example, embarrassing from the perspective of the work atmosphere, if the organization's culture happened to be unsupportive towards research activities.

The benefit of the remote connection was also that the interviewees' colleagues would avoid seeing a researcher in a marginal CBRN field physically with a specialist in the same field, i.e. with a potential interviewee. In this case, after the publication of the study, one of these colleagues of the interviewee might be able to connect the situation in question to the findings or quotes presented in the study, which could risk the anonymity of the information provided by the interviewee.

The study has been documented and reported in such detail that it should be possible to understand and, if necessary, repeat it if all elements and criteria are met on behalf of the party conducting the research. Whether the other person will be able to reach exactly the same conclusions as the person conducting this study is complete speculation because no one else has and will not have access to the same data. For this reason, peer review cannot be

carried out either. For this reason, it makes no sense to judge whether anyone would be able to reach completely identical conclusions.

6.4.4 Confirmability

Although the researcher had a long background in CBRN, the research results are based solely on an objective and structured examination of the research data. Confirmability has been strengthened by providing direct citations from several sources, both in connection with the results, and in the structural tabular analysis tool - in other words, triangulation has been used.

Considering all the variables, the researcher did his best to conduct this study in a way that meets the criteria of credibility, transferability, consequentiality and verifiability while striving to achieve the set aim and objective.

6.5 Ethical considerations

The Rector's Conference of Finnish Universities of Applied Sciences Arene (2019; 2023) gives ethical recommendations for thesis processes, and they were recognized and followed. Ethical boards' review was not needed for this study, because the participants direct or indirect personal, or other sensitive information (racial, ethnic, politician opinion, religious belief, philosophical belief, genetic or biometric data that can be used for participants' recognition, health status, sexual behaviour orientation, criminal convictions and offences) was not collected for publication. Research permits were applied for and granted from the participating organizations before their representatives were interviewed.

All Finnish laws and regulations complied with any data, that is restricted, holds status of limited access, are not meant to be distributed openly, or holds a risk towards any persons', organizations or national safety or security, was not published. Participants were reminded about this before and during the interviews, and they were advised to refrain from sharing such information with the researcher. Any case, if the researcher faced such of information, he was obliged to destroy all related documents, no matter what form they are, and to refrain from distributing such information in any ways.

Knapp and Daly (2017, 66) point out that interviews conducted in social sciences can be easily biased, and that the researcher will be balancing between postpositivist and interpretivist realities, where one must try to keep objectivity by avoiding intervening in the subject, but at the same time trying to build connection with them for more trustworthy and informative gain. By acknowledging the existence of these poles that act as extremes of each other and using the inevitable overlapping and connecting similarities between them as a framework of understanding interpersonal rapport, the researcher makes the best possible alternative to a

qualitative interview data collection process for his or her process (Knapp & Daly 2017, 66). Undersigned contacted the participating organizations' CBRN specialists during the end-spring and summer of 2024 to inquire about the need for such a study. Undersigned sent short PowerPoint presentation as prior notice of this study and its initial implementation plan to the organizational contact persons after the topic analysis was approved by the academic host organization of Laurea University of Applied Sciences.

Researcher retained self-critical attitude during the whole process. Research journal was kept throughout the study to support the recognition and decreasing the biases, and to bring more self-critical rigorousness to the report writing phase. Because only one person was going through the data, the integrity and trustworthiness of data analysis is enhanced using Atlas.ti research tool for the open-texts transcriptions. This made it ethically possible to have a broader perspective on data analysis without compromising participants' personal data.

No external funding was sought or needed. The expenses were covered by the researcher, and they are formed from the Sony IC recorder ICD-PX470, local public transportation travel costs, office supplies like papers and pens, electricity consumed by the devices and the wear and tear due to natural use of existing equipment.

Throughout the study, the researcher followed the ethical operating models presented at the planning stage. The data was collected, stored, processed and used in accordance with the data management plan, and it or the data based on the individuality of the research subjects was not compromised at any stage. Although this study had a quite small sample size, it was quite representative considering the entire potential sample population, because it is a very marginal group of people at the national level. Considering the sensitivity of the topic, the researcher does not report how many people the sample could have included in the theoretical maximum if suitable potential personnel from the whole country had participated. The aim of the study was to increase national security, and the public reporting of this quantitative information would be against this.

7 Conclusion

Some content in this chapter is censored due to its sensitivity.

CBRN situations are complex, especially when they are realized, and the related solution and management methods require a lot of resources from the responsible organizations, and as a necessity, an experienced specialist working with the topic in question. The right kind of proactive measures, especially with regard to personnel, but also with regard to material, play a significant role in paving the way for the success of operators in CBRN response. In academia, a person can learn chemistry, biology and physics all the way to a doctorate, but

he or she would still not be a qualified CBRN specialist if he or she lacked practical experience — let alone the personality traits required for the subject. As a rule, not everyone is suitable to be a CBRN expert, because the task in question also requires suitable personal qualities from individuals. People who have a very pessimistic attitude will probably not be suitable to work as a CBRN specialist.

CBRN situations can only rarely be solved by a single organization, and they require close and synchronized cooperation, primarily between authority organizations, but also from different sectors of society outside the field of authority. Large-scale CBRN events are fortunately rare, but on the other hand, the actors who primarily respond to them are not easily able to develop mutual cooperative routines for this same reason, which is why the situations are considered particularly difficult. At present, there is a strong network of CBRN specialists in various fields, but generally the level of basic knowledge of the authorities on the subject should be higher than what it is now.

In the authority organizations, CBRN experts can be said to be abundant, but CBRN specialists are very scarce. Success in CBRN requires high competence, in other words: knowledge, skills, and attitude. Competence is gained especially with empirical experience from live situations. In principle, not just anyone can become a CBRN specialist, because it also requires suitable personal traits from individuals, such as good knowledge of people, understanding of psychology, networking skills, technological know-how and the will to continuously develop oneself.

On a practical level, the path to becoming a CBRN specialist could be presented in a way where first a suitable person is chosen from the applicants. This person should have a personality suitable for the CBRN field and have a sufficiently comprehensive basic education or otherwise acquire an understanding of e.g. natural sciences. Then the person completes all the relevant basic studies of one's own organization and acquires sufficient practical experience within one's own organization as a performing member of the substantive crew. Next step is to complete the basics of official activities course, or equivalent generic similar-to-all course, in order to gain an up-to-date understanding of the national and/or even international responsibilities, operating instructions, resources, capabilities, cooperation methods and the distribution of management responsibilities in different scenarios. Phase that cannot be skipped or rushed is to gain work experience in field conditions as a member of the substance crew performing CBRN tasks for a sufficiently comprehensive period – meaning several active years. During this process, the person should be able to establish and maintain relationships with CBRN specialists from one's own and other cooperative organizations, meaning not only government organizations. If the initial selection has succeeded, the person actively participates in development and information sharing work

across the whole CBRN field. The process is practically never ending, and the last phase covers actively maintaining and updating one's skills through whole career.

There is a non-traditional culture of interaction between the CBRN authority organizations that participated in this study, i.e. the Finnish Defence Forces, the Police of Finland and the Finnish Rescue services. The basis for high-quality cooperation between these actors is trust and the so-called CBRN language, which is called Ceberne. This language is only spoken by CBRN specialists who are strongly networked over organizational boundaries. They must act as interpreters when, for example, different authorities and non-authorities talk about CBRN issues because they might use different terminology. Unlike usual crisis communication languages, Ceberne is not something that is intentionally created, but formed passively over decades in its recent form.

CBRN experts from different authority organizations consider experts working on CBRN topics in their own and other authority organizations to be highly valued and valuable resources also from the perspective of the success of their own operations. CBRN specialists from different organizations may experience a strong collegiality towards the CBRN collaboration personnel of the neighboring organization. At the moment, this collegiality is even described as a friendly relationship, the original factor of which is an interest in the topic of CBRN, as well as compatible social traits and a set of values that promote general well-being.

CBRN is not just a subject — it is a skill acquired through work, determination, and experience, which must also be maintained indefinitely. CBRN is even a social concept that draws people with the same interests together across society, but especially in government organizations, this phenomenon can be observed strongly.

More funding and time for existing experts might be needed to improve the quality of cooperation and communication by national CBRN authorities.

It is not necessarily always perceived when discussing the topic of CBRN that the acronym in question covers everything in the world of natural sciences in terms of physics, chemistry and biology. All investments in the CBRN field and the decisions, actions, support and solutions that drive it forward are at the same time investments in our existence and understanding of reality. By increasing the understanding of the topic of CBRN, the same doctrines can be widely applied to other things, such as solving negative global problems. The fight against climate change also needs strong experts in natural sciences. It is always worth trying to understand reality better through learning, because then you can make long-term investments in the future by influencing the present. Thus, even at the individual level, efforts can be made more effectively to make our global living environment even safer, more sustainable, and more pleasant for both current and future generations.

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Figures

Tables

Appendices

Appendix 1: Data management plan (ARENE)

DATA MANAGEMENT PLAN

Planner(s): Esa Ihalainen

Thesis title: Qualitative study of CBRN communication between authorities

Thesis commissioner: -

Plan preparation date: 7.11.2024

1. General description of the data

1.1. Description of the data: Data and materials to be collected or that already exist and their properties

During individual interview AND joint workshop, audio recordings are recorded in .mp3 format, with a quality where 1h creates a file that's size is approximately 100Mt.

- 6 x 1h individual interviews = ~600Mt
- 1 x 1-2 joint workshop = 100Mt to 200Mt
- Total memory/space needed = <1Gt

Audio recordings are collected with Sony dictaphone model "IC recorder ICD-PX470".

- Individual files as text transcriptions from the recordings in .docx format with a file size which is comparatively negligible.
- Transcripts made manually
- Atlas.ti AI tool used for qualitative analysis

1.2. Ensuring the quality of the data

Contents of the original data, the recordings, will remain unchanged during the whole process.

Each audio file is saved as individual file in separated organizational folders. Original data and the transcriptions are kept in separate folders. The files are pseudonymised by naming them as "(AUDIO or TEXT)#participant number + dd.mm.yyyy". Audio files are destroyed from the dictaphone after the researcher has ensured, that they are transferred to computer and work as they should.

2. Ethical principles, legislation and the processing of personal data

2.1. Personal data and data protection considerations

Does your data contain direct or indirect personal data: yes

Does your data contain sensitive personal data: no

Data Protection Impact Assessment (DPIA) is not needed, because the personal data is indirect, meaning the voice of a participant, but the content will not hold information, where the person could be recognized, and the recordings are stored in a way that no one else can access them.

2.2. Main responsibility for the processing of personal data, i.e. controllership

Only one real person, me, have access to any data material.

2.3. Privacy policies and statements

All participants will get the research information letter, or research bulletin, and privacy statement either as a hand-out or through email, no later than before the interview.

No individual consent forms or document are made, and signatures are not collected to maximize the protection of participants' personal data. Verbal consent is requested before each interview and recordings are stored behind several passwords on the researcher's own computer accessible to one person, for six months from the end of the research and/or until the end of the academic appeal period, but no longer.

2.4. Research designs in theses requiring ethical review

Is an ethical review needed? No.

Ethical boards' review is not needed for this study, because the participants direct or indirect personal, or other sensitive information (racial, ethnic, politician opinion, religious belief, philosophical belief, genetic or biometric data that can be used for participants' recognition, health status, sexual behaviour or orientation, criminal convictions and offences) is not collected for publication.

2.5. How will you manage the rights to the data and materials you use, produce and share?

There will not be any kind of ownership or parallel rights of use transfers of any research data or material. This study can be published on Theseus database without any original data or any material, where a participant could be recognized. Anything related to the participants, their personal data or information, data connecting to the participants' host organizations, are not

stored for further use and will be destroyed, and for that reason they cannot be used later. If an inter-authority CBRN communication (theoretical) model or framework is created during this study, it will be initially handed to open use carrying undersigned name as a creator. Undersigned will probably continue to work with the subject after this study and use the becoming open-source data for further academic purposes.

3. Data documentation

3.1. Data documentation

A research journal is kept throughout the data collection and processing.

3.2. Data order and integrity

Each audio file is saved as individual file in separated organizational folders. Original data and the transcriptions are kept in separate folders. The files are pseudonymised by naming them as "(AUDIO or TEXT)#participant number + dd.mm.yyyy".

Audio files are destroyed from the dictaphone after the researcher has ensured, that they are transferred to computer and work as they should.

4. Recording and information security during the thesis process

Sony dictaphone model "IC recorder ICD-PX470" was chosen because of its high audio recording quality, as well as the wireless connectivity device capabilities it lacks. The device does not contain, for example, a transmitters or receivers related to Bluetooth or Wi-Fi connections, making wireless hacking of content impossible.

All paper materials, like transcriptions of the interviews and workshop, and the computer used for this process, are kept behind four locked doors from outside world.

5. After the completion of your thesis: destroying, preserving, or finding further use for and opening data

Audio files are destroyed from the dictaphone after the researcher has ensured, that they are transferred to computer and work as they should. All data is stored until six months from the end of the research and/or until the end of the academic appeal period, but no longer. All files are destroyed and overwritten then. All paper materials, like transcriptions of the interviews and workshop, and the computer used for this process, are kept behind four locked doors from outside world. All possible paper material containing any kind of data are to be burnt at the end of the research process same time when the electronical files are destroyed and overwritten. There will not be any further use, or possibility to it, to use any data from this research, when

the academic appealing period has ended. Nothing will be shared or opened to any public data archives at any point.

6. Duties and responsibilities

Only one person, me, can access to the data and for that reason, I am the only one in charge and responsible for the data during its lifecycle. Human resources needed for the data handling at any stage are planned and taken count while making the study plan – the amount has been found to be realistic. No more than 1 GB of disk space is required, and this will not cause problems or additional actions, even if the need multiplies significantly.

Appendix 2: Information sheet/research bulletin

CBRN-kommunikaatio Suomen viranomaiskentällä -tutkimus

Tutkimukseen osallistuville henkilöille tiedoksi

Tutkimuksen **tarkoituksena on lisätä yleistä kansallista turvallisuutta** tekemällä Puolustusvoimille (Maavoimat), Poliisille sekä Palo- ja pelastustoimelle parannusehdotuksia niiden sisäiseen sekä viranomaisten väliseen CBRN-kommunikaatioon.

Tavoitteena on ymmärtää nykyistä CBRN-kommunikaatio- ja viestintäkulttuuria edellä mainituissa organisaatioissa ja niiden välillä, sekä **parantaa suomalaisen CBRN-kommunikaation laatua**.

Lisäksi **tavoitteena on luoda näyttöön perustuva teoreettinen CBRN-kommunikaatiomalli/-viitekehys**, jota voitaisiin hyödyntää samankaltaisissa kansallisissa ja/tai kansainvälisissä organisaatioissa, jotka toimivat samoilla ammattialoilla kuin osallistujaorganisaatiot.

Tutkimus on yksilötoteutettu lopputyö Esa IHALAISEN Laurea ammattikorkeakoulun YAMK / Master of Healthcare (Global Health & Crisis Management) -opintoihin. Tutkimus toteutetaan tekemällä yksittäisten henkilöiden haastatteluja (kesto ~1h) ja näille henkilöille myöhemmin tarkoitetun erillisen kertaluontoisen organisaatioiden välisen CBRN-kommunikaation työpajan (@Teams) menetelmin. Yksilöhaastattelujen rakenne pidetään yhdenmukaisena avoimen kyselylomakkeen kanssa, joka on rakennettu olemassa olevan kriisiviestinnän teoreettisen viitekehyksen pohjalta. CBRN-kommunikaatio työpajan rakenne tehdään yksittäishaastatteluista saadun tiedon pohjalta sen jälkeen, kun tutkija on analysoinut näistä saadun datan.

Yksilöhaastattelut sekä työpajan keskustelu ääni-nauhoitetaan, jotta pisaraakaan arvokasta tietoa ei pääse valumaan hukkaan. Teidän tietonne on työllä sekä vaivalla kokemuksen kautta hankittua ja tarkoituksena on saada käytettyä sitä monipuolisesti rakennuspalikoina viranomaisten toteuttamaa CBRN-kommunikaation kehityksessä. **Minkäänlaista kuvamateriaalia ei tallenneta** - pelkästään ääntä. Tutkimuksen toteuttaja tulee olemaan ainut, joka pääsee nauhoitteisiin käsiksi ja kaikkea materiaalia käsitellään jokaisessa vaiheessa siten, että **yksittäistä osallistujaa tai juuri hänen antamiaan vastauksia ei voida tunnistaa** niistä. Kaikki materiaali tullaan myös lopulta tuhoamaan, jotta niiden väärinkäytön riskit saadaan minimoitua.

Älä kerro tietosuojan alaista tietoa missään vaiheessa tutkimusta! Jos jotain tämmöistä kuitenkin vahingossa lipsahtaa haastattelun yhteydessä tai tajuat myöhemmin, että jotain ei olisikaan pitänyt sanoa/kertoa → anna tämä allekirjoittaneelle tiedoksi missä vaiheessa tahansa niin tämä tieto tullaan tuhoamaan eikä sitä käytetä osana tutkimusta. Yksilöhaastattelut puretaan tekstiksi ja saat lukea omasi sanasta sanaan vielä ennen sille tehtävää sisällön analyysiä - tässä vaiheessa voidaan tehdä vielä korjauksia tai poistoja. Tutkimuksen toteuttaja sitoutuu toimimaan eettisesti sekä kunnioittamaan ja noudattamaan tietosuojaan liittyviä asioita.

Lyhyesti

1. Osallistuessasi tulen yksilöhaastattelemaan sinua valitsemaasi paikkaan valitsemaasi aikaan. Vaihtoehtoisesti voidaan tavata etänä esim. Teams:in välityksellä. Keskustelut ääni-nauhoitetaan analyysiä varten, jotta kaikki tieto saadaan mahdollisimman hyvin valjastettua käyttöön.
2. Kaikkien eri organisaatioiden yksilöhaastattelujen ja niiden sisältöjen analyysien jälkeen järjestetään etänä kertaluontoinen työpaja, jossa käydään tulokset läpi ja tutkija pyrkii esittelemään laatimansa CBRN kommunikaatiotyökalun, jos sellaista on lopulta käytettävissä olevan datan perusteella mahdollista tehdä. Työpajassa käyty keskustelu nauhoitetaan ja analysoidaan.

Tähän tutkimukseen liittyen EI OLE OLEMASSA OIKEITA TAI VÄÄRIÄ VASTAUKSIA. Tarkoitus on kerätä CBRN ammattilaisten kokemuksia ja näkemyksiä CBRN-kommunikaation tämän hetken tilanteesta ja kuinka sitä voitaisiin tehostaa kansallisesti palvelemaan paremmin osallistujaorganisaatioita.

Tutkijan esittely | **Taustaa**

Edited/deleted for privacy reasons for final report

Tutkijan esittely | **Nykyisin**

Edited/deleted for privacy reasons for final report

Esa IHALAINEN	**Lopputyötutkija / Laurea ammattikorkeakoulu**
Sairaanhoitaja AMK **Obduktiopreparaattori** **Master of Healthcare -opiskelija**	Nykyinen työpaikka Edited/deleted for privacy reasons for final report
Puhelinnumero Sähköposti	Edited/deleted for privacy reasons for final report

Appendix 3: Consent form

AMMATTIKORKEAKOULU
University of Applied Sciences

Tutkimukseen osallistuvan suostumuslomake

Qualitative study of CBRN communications in the Finnish authorities

CBRN-kommunikaatio Suomen viranomaiskentällä -tutkimus

Päätutkija:
Esa Ihalainen
Sairaanhoitaja AMK
Obduktiopreparaattori

Sairaanhoitaja YAMK opiskelija
Master's degree student in Global Health and Crisis Management
Email edited/deleted for privacy reasons for final report

Lopputyön valvoja:
Elsi Haverinen-Mottaghi
Lehtori
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Laurea ammattikorkeakoulu

- Allekirjoituksellani varmistan, että olen vastaanottanut yllä mainitulta tutkijalta tutkimustiedotteen ("Tutkimukseen osallistuville henkilöille tiedoksi"), lukenut ja ymmärtänyt sen sisällön sekä saanut mahdollisuuden nostaa esiin tutkimukseen liittyviä kysymyksiä. Ymmärrän, että tutkija tulee pyytämään minulta tätä dokumenttia vastaavan verbaalisen suostumuksen tutkimukseen osallistumisestani ja tallentaa sen ääninauhoitteelle.
- Ymmärrän, että osallistumiseni on vapaaehtoista ja saan vetäytyä tutkittavan roolista sekä pyytää minua koskevan tiedon sekä aineiston poistamista milloin tahansa ilman jatkoseuraamuksia.
- Ymmärrän, että tutkija kerää, varastoi, analysoi ja muuten käsittelee tutkimuksen yhteydessä syntynyttä materiaalia, kuten informaatiota ja dataa, luottamuksellisesti tietosuoja-asetuksia noudattaen.
- Ymmärrän, että tutkimus toteutetaan siten, että minulla säilyy anonymiteetti sen kaikissa vaiheissa, vaikka suoria lainauksia haastattelustani olisikin kirjoitettu auki tutkimuksen loppuraporttiin.
- Ymmärrän, että osallistuessani tutkimukseen, tutkija haastattelee minua sekä äänittää tämän haastattelun. Annan tutkijalle luvan käyttää ääntäni tutkimuksen yhteydessä siten, että hän purkaa haastattelun tekstiksi sen jatkoanalyysiä varten. Tutkija säilyttää haastattelun äänitettä sekä sen purettua tekstiversiota tutkimuksen toteutuksen sekä akateemisen valitus-/kiistämisajan suojatusti joko digitaalisessa tai fyysisessä muodossa.
- Ymmärrän, että osallistuessani tutkimukseen, tutkija tulee kutsumaan minut haastattelun jälkeen CBRN kommunikaatiotyöpajaan, joka järjestetään sähköisesti etäyhteydellä käyttäen Microsoft Teams -keskusteluohjelmaa tai vastaavaa sopivaa ohjelmaa. Ymmärrän, että tutkija tulee äänittämään tämän työpajan ja käyttämään siitä saatua dataa vastaavalla tavalla kuin yksilöhaastattelujen yhteydessä kerättyä dataa.
- Ymmärrän, että edellä mainittuun työpajaan osallistuu myös reaaliajassa muita henkilöitä. Ymmärrän, että työpajan yhteydessä muilla siihen osallistujilla, jotka ovat joko omastani tai muista tutkimukseen osallistuvista organisaatioista, on mahdollista tunnistaa henkilöllisyyteni äänestäni. Ymmärrän, että tutkija ei voi myöskään varmistaa, etteikö joku muu työpajaan osallistuva henkilö itse tai välillisesti edesauttaen jotain toista henkilöä voisi nauhoittaa tai muuten tallentaa työpajan keskustelua sen aikana.
- Ymmärrän, että minkäänlaista visuaalista materiaalia, kuten valokuvia tai videota ei minusta tulla tallentamaan tämän tutkimuksen aikana tutkijan toimesta.
- Ymmärrän, että en saa tutkijalta tai hänen organisaatioltaan mitään erillistä korvausta tutkimukseen osallistumisestani.
- Ymmärrän, että minun ei tule kertoa tai muuten luovuttaa mitään henkilötietojani, arkaluontoisia- tai salassa pidettäviä tietoja tämän tutkimuksen aikana. En myöskään luovuta vastaavia tietoja muista tutkimukseen osallistuvista, jos esimerkiksi tunnistan heidät heidän äänestään tutkimuksen yhteydessä järjestettävän työpajan yhteydessä.
- Hyväksyn yllä olevat kohdat asiasisältöineen, suostun tutkimuksen ehtoihin ja vakuutan tutustuneeni niihin tarpeeksi hyvin, että ymmärrän oman osuuteni, oikeuteni sekä roolini tutkimuksen toteutukseen liittyen.

Tutkimuksen osapuolien allekirjoitukset

_____ _____
Tutkimukseen osallistuvan allekirjoitus Aika

_____ _____
Tutkijan allekirjoitus Aika

Tätä dokumenttia on tehty yksi kappale, joka jää tutkittavalle itselleen. Tutkijalle jää ainoastaan tätä dokumenttia vastaava suostumus ääninauhoitteelle, jota säilytetään ennalta määrätyn ajan (esitetty dokumentissa "Data Management Plan")

Appendix 4: Interview questionnaire structure

CBRN-kommunikaatio Suomen viranomaiskentällä -tutkimus

(Qualitative study of CBRN communications in the Finnish authorities)

Haastattelurunko ja tukikysymykset

Huom. kysymysten numerointi liittyy tutkimuskysymyksiin ja ovat tässä vain tukena tutkijalle myöhemmin tehtävää data-analyysia varten.

- Miten ymmärrät termit ”organisaation kommunikaatiokulttuuri” ja ”organisaation viestintäkulttuuri” ja mitä nämä tarkoittavat sekä merkitsevät sinulle?
- Mistä eri elementeistä oman organisaatiosi kommunikaatio- ja viestintäkulttuuri rakentuu tällä hetkellä?
- Miten kuvailisit oman organisaatiosi kommunikaatiota ja viestintää yleisellä tasolla?
- Miten määrittelisit termit ”CBRN-kommunikaatio” ja ”CBRN-viestintä”?

1. Kertoisitko *omista kokemuksistasi ja näkemyksistäsi* liittyen oman organisaatiosi CBRN-kommunikaatio- ja viestintäkulttuuriin

- Minkälainen on mielestäsi ihmisten yleinen suhtautuminen CBRN-kommunikaatioon ja -viestintään?
- Mikä on ihmisten taitotaso tällä hetkellä liittyen CBRN-kommunikaatioon ja -viestintään?
- Mitä valmiuksia/tietopohjaa/taitoja/kokemusta/tai muuta vastaavaa ihmisellä pitäisi olla, jotta häntä voitaisiin pitää pätevänä ja hyvänä kommunikoimaan sekä viestimään aiheesta CBRN?
- Mitä yhtäläisyyksiä JA eroja olet havainnut eri ihmisten viestintämenetelmissä/-tyyleissä/-tavoissa/-termistössä/jne. kommunikoitaessa CBRN-aiheeseen liittyen? Mitä hyötyä tai haittaa näistä yhtäläisyyksistä/eroavaisuuksista voi olla?
    - Esimerkki avaamaan mitä viimeisimmällä kohdalla haetaan takaa: Henkilö X kommunikoi kollegalleen henkilö A:lle jotain liittyen aiheeseen CBRN. Henkilö Y kommunikoi samalle henkilö A:lle samasta asiasta omalla tyylillään -> ymmärtääkö henkilö A molemmissa tapauksissa asiasisällön/tilanteen/kuulemansa tai lukemansa viestin painoarvon/jne. identtisesti samalla tavalla molemmissa tapauksissa? -> jos ei, niin mistä tämä johtuu?

1. Kuvailisitko *omia kokemuksiasi sekä näkemyksiäsi* oman organisaatiosi kommunikaatiosta ja -viestinnästä, kun verrataan CBRN-aihetta muihin vastaaviin aihekokonaisuuksiin

- Mitä yhteneväisyyksiä JA eroavaisuuksia olet havainnut eri ihmisten viestintämenetelmissä/-tyyleissä/-tavoissa/-termistössä/jne. heidän kommunikoidessaan yleisistä aiheista kollegoilleen? Mitä hyötyä tai haittaa näistä yhtäläisyyksistä/eroista voi olla kommunikaatiokulttuurin näkökulmasta?
- Miten ihmisten viestintä eroaa kommunikoitaessa eri aihekokonaisuuksista verrattuna CBRN:ään?
- Mitkä näkisit tärkeimmiksi syiksi mahdollisiin eri aiheiden välillä vallitseviin kommunikaatiotapojen ja viestinnän yhteneväisyyksiin JA eroavaisuuksiin?

- Mistä elementeistä ja/tai asioista rakentuu sinun mielestäsi hyvä ja laadukas organisaatiosi sisäinen kommunikaatio- ja viestintäkulttuuri? Mitkä taas voisivat olla uhka sille? Miksi valitsit nämä asiat?

3. Miten *mielestäsi* CBRN-kommunikaatiota ja -viestintää voitaisiin parantaa tai tehostaa omassa organisaatiossasi

- Mikä toimii tällä hetkellä hyvin ja miksi?

- Mikä toimii tällä hetkellä hyväksyttävällä tasolla, mutta jota voitaisiin parantaa? Miksi ja miten?
- Mikä ei toimi tällä hetkellä ollenkaan? Mistä tämä johtuu ja mitä tälle asialle voitaisiin tehdä?
- Mikä tai mitä on jätetty täysin huomiotta, vaikka mielestäsi kyseinen aihe olisi pitänyt ottaa huomioon?
- Miten olemassa olevia teknologisia ratkaisuja ja keksintöjä tulisi mielestäsi hyödyntää nykyistä monipuolisemmin organisaatiotasoisessa CBRN-kommunikaatiossa? HUOMIOI TIETOSUOJA!

2. Mikä on *kokemuksesi ja näkemyksesi* oman organisaatiosi ja kahden muun tähän tutkimukseen osallistuvan organisaation välisistä CBRN-kommunikaatio ja -viestintäkulttuurista

- Minkälaista on mielestäsi ihmisten yleinen suhtautuminen eri viranomaisten väliseen CBRN-kommunikaatioon ja -viestintään?
- Mikä on ihmisten taitotaso tällä hetkellä eri viranomaisten välisessä CBRN-kommunikaatiossa ja -viestinnässä?
- Mitä valmiuksia/tietopohjaa/taitoja/kokemusta/tai muuta vastaavaa ihmisellä pitäisi olla, jotta häntä voitaisiin pitää pätevänä ja hyvänä kommunikoimaan sekä viestimään aiheesta CBRN eri viranomaisorganisaatioiden välillä?
- Mitä yhtäläisyyksiä JA eroja olet havainnut tähän tutkimukseen osallistuvien viranomaisorganisaatioiden välillä niitä edustavien ihmisten viestintämenetelmissä/-tyyleissä/-tavoissa/-termistössä/jne. kommunikoitaessa CBRN-aiheeseen liittyen? Mitä hyötyä tai haittaa näistä yhtäläisyyksistä/eroavaisuuksista voi olla?

2. Mikä on *kokemuksesi ja näkemyksesi* oman organisaatiosi ja kahden muun tähän tutkimukseen osallistuvan organisaation välisistä yhteneväisyyksistä ja eroavaisuuksista kommunikoitaessa CBRN-aiheesta verrattuna muihin vastaaviin aihekokonaisuuksiin

- Mitä yhteneväisyyksiä JA eroavaisuuksia olet havainnut eri organisaatioiden viranomaisten viestintämenetelmissä/-tyyleissä/-tavoissa/-termistössä/jne. heidän kommunikoidessaan ns. yleisistä aiheista eri viranomaisille? Mitä hyötyä tai haittaa näistä yhtäläisyyksistä/eroista voi olla kommunikaatiokulttuurin näkökulmasta?
- Miten eri organisaatioiden edustajien viestintä eroaa kommunikoitaessa eri aihekokonaisuuksista verrattuna CBRN:ään?
- Mitkä näkisit tärkeimmiksi syiksi eri organisaatioiden välillä eri aiheisiin kytkeytyviin kommunikaatio- ja viestintätapoihin liittyviin yhteneväisyyksiin JA eroavaisuuksiin?

❖ Mistä elementeistä ja/tai asioista rakentuu sinun mielestäsi hyvä ja laadukas viranomaisorganisaatioiden välinen kommunikaatio- ja viestintäkulttuuri? Mitkä taas voisivat olla uhka sille? Miksi valitsit nämä asiat?

3. Miten *mielestäsi* CBRN-kommunikaatiota ja -viestintää voitaisiin parantaa tai tehostaa tähän tutkimukseen osallistuvien viranomaisorganisaatioiden välillä?

- Mikä toimii tällä hetkellä hyvin ja miksi?
- Mikä toimii tällä hetkellä hyväksyttävällä tasolla, mutta jota voitaisiin parantaa? Miksi ja miten?
- Mikä ei toimi tällä hetkellä ollenkaan? Mistä tämä johtuu ja mitä tälle asialle voitaisiin tehdä?
- Mikä tai mitä on jätetty täysin huomiotta, vaikka mielestäsi kyseinen aihe olisi pitänyt ottaa huomioon?
- Miten olemassa olevia teknologisia ratkaisuja ja keksintöjä tulisi mielestäsi hyödyntää nykyistä monipuolisemmin organisaatiotasoisessa CBRN-kommunikaatiossa? HUOMIOI TIETOSUOJA!

Appendix 5: Tabular tool used for data analysis

The content in this chapter is censored due to its sensitivity.