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324

Aino Ruggiero

Crisis communication and terrorism

Mapping challenges and co-creating solutions

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UNIVERSITY OF JYVÄSKYLÄ

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ABSTRACT

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Terrorism is a globally connected, uncontrollable, transboundary risk that continually evolves and changes forms, resulting in multiple complexities that affect the lives of both citizens and organisations across the globe. These risks involve a high level of complexity when they materialise as crises, and the use of CBRN (chemical biological, radiological or nuclear) materials presents the possibility of a worst-case scenario. Crisis communication in such cases would not only be essential but also a matter of life and death.

Hence, the purpose of this research was to better understand and describe the challenges of communication in CBRN terrorism crises as well as how these challenges can be addressed by the communication supporting crisis management of public authorities. Empirical research was conducted for this thesis, and this thesis shell provides a synthesis of the empirical findings and the theoretical insights obtained from the crisis communication literature.

This thesis is comprised of five sub-studies reported in five original articles. The research is based on a qualitative research approach grounded in a social constructionist ontology and an interpretive epistemology. The data of this research were generated through literature reviews, a qualitative online questionnaire and a table top discussion, and it was mostly thematically analysed. The central findings of this research, combined with theoretical insights obtained from the literature, were synthesised and illustrated in a model, which depicts complexities and ways to cope with them using an integrated approach to crisis communication for CBRN terrorism.

From a practice perspective, the findings of this thesis can promote professional resilience in the field by introducing approaches and methods communication professionals can use to cope with the most complex types of crises. From a theoretical perspective, by reviewing and synthesising insights from the scientific literature on the topic of crisis communication when CBRN terrorism is involved, this thesis provides a broad understanding of the dimensions and boundaries of this multi-disciplinary area of research and clarifies the specific aspects, elements and insights involved.

Keywords: crisis communication, terrorism, CBRN, process approach, social media monitoring, communication strategy making, sensemaking

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PREFACE

Following the public debate surrounding the arrival of terrorism in Finland after the Finnish Security Intelligence Service raising of the level of the terrorist threat assessment in June 2017 from low to elevated and what was possibly the first jihadist terrorist attack performed on Finnish soil in Turku in the following August, the growing importance of crisis communication in the case of terrorism as a research topic is clear. The way in which I ended up doing PhD studies in the field of crisis communication, designed to help people in situations of crisis and thus make the world a safer place to live, emerged as an interplay of several events, but it coincided with my inbuilt desire since an early age to contribute to societal problem solving. Conducting these PhD studies has also been a journey of co-creation that I could not have made alone, a journey of sharing with many people to whom I am immensely grateful.

First and foremost, I want to thank my supervisor, Professor Marita Vos, who made the beginning of my PhD studies possible by offering me the possibility to work as a project researcher in an EU-funded research project CATO (CBRN Crisis Management: Architecture, Technologies and Operational Procedures) during 2012–14[1]. Her dedicated guidance and support, combined with a spirit of dedication for and enjoyment of research and a belief in me, enabled the journey in many ways and essentially made it an inspiring process of co-creation. A warmest thank-you goes to my esteemed reviewers, Professor Jesper Falkheimer from Lund University, Sweden, and Professor Matthew Seeger, from Wayne State University, Detroit, USA, whose valuable comments made the finalising of the thesis an inspiring and insightful process. I would also like to thank Professor Vilma Luoma-aho, my second supervisor, with whom I started my research initiatives as a bachelor student; her determination and vision was always a source of inspiration and example for me.

I would like to thank my funders, the European Community's Seventh Framework Programme (FP7/2007–2013), Pertti Hurme, as the head of the Department of Communication, and after him Professor Epp Lauk, who hired me as a doctoral student and a project researcher. I would also like to thank the current head of the Department of Language and Communication Studies, Anne Pitkänen-Huhta, for funding the language check of my thesis, and Jyväskylä University School of Business and Economics, led by Professor Hanna-Leena Pesonen, which became my workplace during the finalising stage of my PhD studies.

In the course of my PhD research, I have been surrounded by many wonderful colleagues whose direct and indirect help, support and insights have been invaluable. I would like to thank all the colleagues at the CATO project, particularly Anne-Marie van het Erve, Frank Verger and Dieter Rhode, who were important partners in the co-creation of research and many fun times. A big thank-you goes to the members of our crisis communication research team, Jenni Hyvärinen, with whom I also shared a room and many significant moments in the early stage of my PhD studies, and Anne Laajalahti, who has

served as an example of a senior researcher with her deep insights. I would also like to thank Laura Asunta, my neighbour roommate in the finalising stage of my thesis, whose soulful research has been a source of inspiration. A heartfelt appreciation goes to all the PhD students at the Department of Communication whom I came to know in the course of my research: you have been a source of companionship on the path of doctoral studies.

In the sphere of co-creation of life beyond but not separated from the research, I would like to thank my parents, Heljä and Seppo Haverinen, for giving me all the necessary ingredients in the journey of life. I would like to thank my sister, Eeva Rohas, and brother, Joonas Haverinen, for the lifelong moments spent together, and Eeva, not only for sharing the entire period of life during my studies in Jyväskylä through many defining moments and various turns but also for being a source of inspiration and support in the path of PhD studies. A special thank-you goes to my family in Italy, especially my mother-in-law Anna Sorrentino, for offering a home for recreation and relaxation during the many holidays spent there. I also want to thank all my friends; without you, life would not be life. An eternal thank-you goes to the entire family of Sahaja Yogis around the world, including in Jyväskylä, for the timeless moments of silence and peace spent together enabling recreation and restoration in a holistic way. Above all, I would like to thank Shri Mataji Nirmala Devi for my self-realisation; without the practice of meditation and yoga taught by her I would not be here.

Finally, I want to thank my closest companion, co-creator and co-traveller since I started my MA studies at the University of Jyväskylä in 2007, my husband, friend and colleague, Salvatore Ruggiero, for being the binding unit between all the spheres of my life, making it into a meaningful whole. Last but not least, I want to thank our daughter, Vimala Ruggiero, for being the nucleus of that whole, a source of continuous joy and exploration in everyday life, and our baby to be born, whose kicks cheered me in the finalising stage of the dissertation, representing also a seed for ongoing adventures in the life to come.

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Jyväskylä, August 2017
Aino Ruggiero

FIGURES

TABLES

CONTENTS

1 INTRODUCTION

In a fluid world, wise people know they don't fully understand what is happening right now, because they have never seen precisely this event before. Extreme confidence and extreme caution both can destroy what organizations most need in changing times, namely, curiosity, openness, and complex sensing. […] It is this sense in which wisdom, which avoids extremes, improves adaptability.

Karl Weick (1993, p. 641)

Current society, also described as a risk society, is marked by insecurities, turbulence and dynamic changes that emerge from unnatural and human-made uncertainties and risks that are uncontrollable (Beck 2002, Beck 1992). Such risks cross geographical, temporal, social and sectoral boundaries, which makes them challenging and difficult to manage (Boin 2009, Beck 2002). Global terrorism is an example of these risks. Although terrorism is not a new phenomenon (see Malkki et al. 2007), the environment in which it exists has dramatically changed. The development of financial and communication technology has enabled the very existence of global terrorism (Beck 2002), making it a globally networked risk with potentially cascading effects across the globe (Galaz et al. 2017). Terrorist attacks receive immediate media attention, and through a real-time exchange of information and a production and consumption of media outputs, they are brought into the everyday realm of people around the world. Terrorism implies an intentional use of violence, which is usually targeted against innocent people with the aim of creating terror and fear beyond the direct victims of the attacks for political purposes (Malkki et al. 2007, Schmid 2004). The unpredictable, hazardous nature of terrorism, as well as the fact that innocent people are attacked, indicates that anyone could become a target. Thus, terrorism affects all members of society.

Although Europe is not in the epicentre of terrorist attacks, the past two years have been significant in the history of terrorist attacks on European soil, as the terrorist attacks in Paris in January and November 2015, those in Brussels, Nice and Berlin in 2016 (Malkki 2017, National Consortium for the Study of Terrorism and Responses to Terrorism (START) 2016) and those in London, St Petersburg, Stockholm, Paris, Manchester, Barcelona and possibly Turku in

2017 show. This has also been reflected in the public perception, as indicated by the findings of the Eurobarometer surveys: terrorism, along with immigration, has been the main concern of the citizens of Europe since 2015 (European Union 2016). Many of the most severe global attacks in the history of terrorist events occurred in the 2000s, which may in part explain the growing concerns, though the direct material destruction and fatalities caused by terror attacks are still marginal compared to many other threats (Malkki 2017). The real impact of terrorism lies in its indirect effects. This relates to how terrorist attacks are interpreted, and consequently, how they affect people and their perceptions and behaviours (Malkki 2005). While the direct impacts of terrorism primarily depend on operational factors, including terrorist organisations' actions and counter-terrorism activities by governments, the indirect effects rest principally on the success or failure of communication, such as how effectively terrorists spread anxiety, fear, distrust and uncertainty vs. how well governments and other actors provide assurance, confidence and hope (Fischhoff 2011, p. 520). This illustrates the importance of communication in balancing the impacts of terrorism.

Based on this background, this thesis focuses on communication related to terrorism. Communication was examined from the perspective of the crisis communication of public authorities with citizens before, during and after terrorist attacks in consideration of both risks and crises. The focus of this thesis is a specific form of terrorism, namely terrorism that utilises chemical, biological or nuclear (CBRN) materials to carry out terrorist attacks. In a context in which terrorists continuously invent new ways to create terror and to terrorise and any human invention could be turned into a terrorist agent when intentionally used, there are concerns regarding potential CBRN attacks (Beck 2002, Slovic 2002). Fortunately, previous cases of CBRN attacks in recent history are few, including the Sarin gas attacks in the Tokyo subway system in 1995 and the anthrax crisis following the 9/11 attacks in the US in 2001; however, while the likelihood of such an attack is uncertain and not easily quantifiable (Mäkelä 2007, Slovic 2002), the potential damage caused by a terrorist attack using any of these materials, C, B, R or N, could be devastating, creating demanding circumstances for both crisis management and communication. The combination of hazardous materials and their use for terrorist purposes could cause immense material and immaterial damage, including mass casualties and an array of uncertainties, resulting in psychological turmoil with an unexpected response among public groups. While deemed challenging, timely crisis management and communication actions would become life or death necessities (e.g. Ruggiero & Vos 2015, Sparks et al. 2005).

The European Union anticipated the need to counteract such challenges in its research funding under the 7th Framework Programme (FP7) (2007–2013), and it enabled the emergence of the project CATO (CBRN Crisis Management: Architecture, Technologies and Operational Procedures), which ran from 2012–2014 (European Commission 2015). The purpose of the project was to increase preparedness and resilience for CBRN terrorism crises by combining multidisciplinary expertise and know-how from both research and practice, including crisis communication. The empirical research of this thesis was conducted for

and funded by the CATO project. In particular, the purpose of the present research was to clarify which challenges CBRN terrorism crises present to communication and how these challenges could be addressed in the communication supporting crisis management by public authorities. In addition, the research aimed to contribute to the societal call described in the EU CBRN action plan (Council of the European Union 2009) to improve communication with publics throughout the lifespan of CBRN terrorism crises. From a scientific perspective, crisis communication in the context of terrorism is a new field of inquiry, which emerged in the aftermath of the 9/11 terrorist attacks in 2001 (Heilbrun et al. 2010, Sparks et al. 2005), and several gaps in research still must be explored, including worst-case scenarios involving CBRN materials (Schmid 2011, Falkheimer 2014, Hargie & Irving 2016). Hence, this thesis aims to contribute to filling these gaps in the research by exploring the challenges involved.

Initially, it was unclear whether CBRN terrorism would require an approach that would be different from mainstream crisis communication or whether it would require the scaling up of standard crisis processes to meet heightened intensity requirements. Towards the end of this research, it could be concluded that CBRN terrorism crises are not considered different per se, but they are an example of a considerably complex and demanding type of crisis. Hence, in the context of this thesis, terrorism is the wider topical framework, of which CBRN terrorism is the most complex form. From a practice perspective, preparedness for the most severe types of crises can enhance resilience for less demanding events when promoted as part of a multi-hazard approach to crisis management and communication.

1.1 Research purpose and approach

The purpose of this research was to better understand and describe the challenges of communication in CBRN terrorism crises, and how these challenges can be addressed in the communication supporting crisis management of public authorities under these circumstances. Empirical research was conducted for this thesis, and this thesis shell provides a synthesis of the empirical findings and theoretical insights obtained from the crisis communication literature.

Crisis communication, the primary theoretical focus of this thesis, is classified as a sub-discipline of communication sciences (see Coombs 2010, Heide 2009). Crisis communication was examined from the perspective of the interactions between organisations, public authorities in particular and public groups in the context of CBRN terrorism. A developmental approach was adopted for this thesis. That is, crisis communication was investigated from a life-cycle perspective comprising the pre-crisis, crisis and post-crisis phases with an integrated view of risks and crises (e.g. Reynolds & Seeger 2005, Veil et al. 2008). While crisis communication is considered a part of communication functions, it also contributes to crisis management. In addition to its instrumental and functional aims, crisis communication also has a co-creational aspect, which enables

sensemaking and serves as a foundation for the creation and maintenance of relationships between organisations and public groups (Botan & Taylor 2004, Sellnow & Seeger 2013, Calton & Kurland 1996). As CBRN terrorism crisis management involves multiple actors, a stakeholder network perspective was adopted (see e.g. Roloff 2008, Palttala & Vos 2012, Adkins 2010). Drawing from multiple disciplines, including communication theory, psychology, organisational studies and emergency management, the theoretical approach adopted was multidisciplinary in nature.

As Sellnow and Seeger (2013, p. 243) aptly pointed out, the ultimate objective of studying crisis communication is to make the world a safer place for those who are impacted by crises. In the same way, this thesis has a practical component and a mission: to contribute to societal problem solving. The interplay between theory and practice is reflected in what Barge and Craig (2009, p. 55) described as practical theory "designed to address practical problems and generate new possibilities for action" by bridging theory and practice (see also Sellnow & Seeger 2013). The research is grounded in a social constructionist ontology, according to which reality, consisting of multiple meanings, is viewed as communicatively constructed (e.g. Heide 2009). This approach coincides with an interpretive epistemology, which views knowledge as an outcome of co-created meaning-making processes, further guiding the methodological choices and design of this research (e.g. Yanow & Schwartz-Shea 2006a). In the approach adopted for this thesis, social constructionism is considered a meta-perspective that allows for different constitutions of communication processes (see Craig 1999, Deetz 2001). Hence, different communication approaches, even when pertaining to seemingly conflicting paradigmatic premises, such as the functional vs. the co-creative, are viewed as complementary ways to solve practical problems contributing to a an integrated theoretical approach which is based on holistic understanding. From a pragmatic perspective, selecting appropriate means depends on the problem at hand (see Beck 2000). Complex problems, such as CBRN terrorism, call for multidimensional solutions based on multiple perspectives.

1.2 Research process and thesis structure

This thesis combines insights obtained from five sub-studies and the related published papers (see Table 1), which are further synthesised in this thesis shell to clarify the challenges of communication in CBRN terrorism crises and the ways these challenges can be addressed using communication supporting crisis management. Study I, which examined communication premises, focussed on the characteristic features of communication in CBRN terrorism crises. Because it is a new area of research and an example of a complex crisis type, there is a need to explore and understand the different dimensions and aspects of this multi-faceted type of crisis and the communication required in response. In Study II, the assumption that communication in such crises is demanding was further explored. Hence, the focus of the study was on challenges as well as in-

spirational practices to overcome the challenges of communication with citizen groups in these types of crises.

Due to the strong operational needs and damage potential of these types of devastating crises, in Study III, the results from Studies I, II and IV were concretised in the form of a process-based audit instrument for practitioners to use for reflection and learning. Study IV focussed on social media monitoring and the process that underlies the collection and interpretation of changing information in social media. Due to the quickly evolving nature of these types of crises, including fuzzy boundaries and emotional responses of public groups, this knowledge is necessary. Finally, Study V examined the ways challenges are met and managed in practice when determining which communication actions should be taken. Due to the urgency of the situation, there is a need for timely and fast communication actions. Currently, communication strategy making, which in this thesis refers to the ways communication experts deal with complexities in crisis situations, is largely a black box.

TABLE 1 Overview of the studies, their foci and publication locations

Study	Focus	Where reported
I Communication premises	Characteristic features of communication in CBRN terrorism crises	Ruggiero, A. & Vos, M. 2013. Terrorism communication: Characteristics and emerging perspectives in the scientific literature 2002–2011. Journal of Contingencies and Crisis Management 21 (3), 153–166.
II Communication challenges	Perceived challenges and inspirational practices when communicating with citizens in CBRN terrorism crises	Ruggiero, A. & Vos, M. 2015. Communication challenges in CBRN terrorism crises: Expert perceptions. Journal of Contingencies and Crisis Management 23 (3), 138–148.
III Reflection and learning	Reflection and learning through a process-based audit instrument supporting preparedness, response and recovery in CBRN terrorism crises	Ruggiero, A., Vos, M. & Palttala, P. 2015. The CBRN communication scorecard. In S. Schmidt & M. Vos (Eds) Behaviour and communication in CBRN crisis. Findings and recommendations in case of chemical, biological, radiological, and nuclear attacks on society. Pabst Science Publishers, Lengerich, 106–139.
IV Social media monitoring	Social media monitoring in crisis situation: methods and the process	Ruggiero, A. & Vos, M. 2014. Social media monitoring for crisis communication: Process, methods and trends in the scientific literature. Online Journal of Communication and Media Technologies 4 (1), 105–130.
V Communication strategy making	The process of communication strategy making in CBRN terrorism crises	Ruggiero, A. 2016. Making communication strategy choices in a fast-evolving crisis situation – Results from a table-top discussion on an anthrax scenario. Social Sciences 5 (2), 19.

Four of the articles were published in peer-reviewed scientific journals, and one was published as a chapter in an edited book. Four articles are co-authored, with the author of this thesis, Ruggiero, being the first author. In the final article, Ruggiero was the sole author. In the following, the responsibilities of each author are listed and described.

Article I: Ruggiero designed the study in collaboration with Vos. Based on a pre-study, Ruggiero further developed the process of a structured literature review, which was later also used by other doctoral students. Next, she collected and analysed the data using a data extraction table. Part of the final analysis was conducted in collaboration with Vos. Ruggiero compiled the article and wrote the majority with some parts written by Vos, who was the contact for the correspondence with the editor and the adaptations after reviews.

Article II: Ruggiero designed the study with Vos. The pilot study and the data collection were conducted in cooperation with the researchers of the project Public Empowerment Policies for Crisis Management, of which Vos was the consortium leader. Ruggiero prepared the data for the analysis in ATLAS.ti and conducted the analysis. She wrote the article and made the tables with Vos, who was the contact for the correspondence with the editor. Revisions were made by both Ruggiero and Vos.

Article III: Ruggiero designed the study with Vos. She adapted the general crisis communication scorecard (Palttala & Vos 2012) based on user feedback in collaboration with Vos. Ruggiero re-analysed the findings of the Studies I, II and IV, compiling a data extraction table. She updated the task descriptions and wrote the CBRN crisis communication scorecard with Vos.

Article IV: Ruggiero designed the study while in contact with Vos. Ruggiero collected the data and analysed them using ATLAS.ti. She wrote the article, while Vos contributed some parts. Ruggiero was the contact for the correspondence with the editor.

Article V: Ruggiero designed the study in collaboration with Vos and other researchers of the CATO project. Ruggiero collected the data in conjunction with a workshop organised by the CATO project. She conducted the data analysis using ATLAS.ti. She was the sole author and responsible for the correspondence with the editor as well as the revisions.

This thesis consists of five chapters. Following the introduction, the theoretical framework is presented in Chapter 2. The methods and data sections in Chapter 3 describe the methodological choices involving the collection and analysis of data for this research. Chapter 4 explores the central findings. Chapter 5 con-

cludes the dissertation by introducing and discussing a model based on the study findings, presenting conclusions, evaluating the study and suggesting future research avenues.

2 THEORETICAL FRAMEWORK

In this chapter, the theoretical framework of this thesis is presented. Theories can be described as "sensemaking devices" that account for sets of concepts, definitions and ideas, which help organise observations made about reality and explain relationships between phenomena (Sellnow & Seeger 2013, p. 15). Theories have multiple roles: to organise, describe and explain to facilitate critical reflection and inform practice, for example. The concept of the practical theory, which emphasises the connection between theory and practice, helps explain how theory is viewed in this work, which focusses on crisis communication and terrorism. In particular, theory can be used to address problems and challenges that exist in practice and to identify potential solutions to address the problems (Barge & Craig 2009). From this perspective, theory is not viewed as an opposite of practice, but rather theory and practice are viewed as interrelated in a way that each informs the other (Frey & SunWolf 2009). This perspective is useful for crisis communication theories, which have emerged to help explain and understand societal problems and provide solutions (see Sellnow & Seeger 2013). The study of "real-world communication concerns, issues, and problems" is characteristic of applied communication research, such as in the present thesis (Cissna & Frey 2009, p. xxix).

Two approaches further explain the connection between theory and practice: practical theorising as mapping and as engaged reflection (Barge 2001). Accordingly, theory contributes to plotting or constructing reality and involves "mapping problems, puzzles, dilemmas, or challenges" that exist in practice and "describing communicative strategies, moves and structures" as solutions to manage them. Hence, theory is "a reflexive resource" that can be used to describe but also to critique, and potentially, to ultimately transform practice (Barge & Craig 2009, p. 62.) Moreover, reflexivity allows for rethinking and reconceptualising theory based on research findings. Therefore, the lens between theory and practice functions in two ways: for viewing practices from a theory perspective and for reflecting on the theory from a practice perspective (Barge & Craig 2009). Thus, both theory (researchers) and practice (practitioners) play a role in the social construction of realities.

While inspired by a social constructionist stance, this thesis incorporates an integrated approach to theory, encompassing multiple theoretical orientations and perspectives. For this approach, social constructionism, which views reality, or realities, and meanings as communicatively constructed and constituted (Miller 2014, 83), is considered meta-perspective (see Craig 1999, Deetz 2001). Thus, even when pertaining to different theoretical orientations, other models of communication are regarded as alternative ways of constituting communication for specific purposes and contexts (Craig 1999). This way, opposite perspectives, such as the functional perspective (Botan & Taylor 2004), which is useful in crisis situations when an efficient delivery of emergency messages is needed, and the co-creational perspective (Botan & Taylor 2004), which considers communication the co-creation of shared meanings, such as when rebuilding a community after a crisis, are not seen as contradictory but rather complementary ways of explaining and describing communication processes relevant to terrorism crises. Similarly, the concept of crisis can be considered from an integrated perspective. While an objectivist or realistic view focusses on the existence of a threat as a real, observable event, a constructionist view places emphasis on the perceptual nature of crises shaped by stakeholder views (Renn 2008, Voss & Lorenz 2016).

An integrated approach to theory complements the concept of practical theory in the sense that problems in today's organisational life are complex and thus call for a thinking that is similarly multifaceted (see Miller 2014, Craig 1999). This is especially true in the case of terrorism (Falkheimer 2014), meaning that multi-dimensional solutions incorporating multiple perspectives may be needed to tackle a complexity and ambivalence in relation to risks and crises that goes beyond customary lines of thinking and one-size-fits-all approaches (see also Beck 2000). This blurring of paradigmatic boundaries is also a current trend in social sciences (Guba & Lincoln 2005). As a downside to this, however, underlying belief systems and values representing particular world views, the stating of which makes the direction of research clearer and more transparent, may also become blurred (Denzin & Lincoln 2008). While contributing to a broad, rich and holistic understanding of reality, or of better realities, in which, in the case of the present thesis, the authorities in CBRN terrorism crises need to communicate, a complementary theoretical approach could be criticised for a lack of the depth which can be afforded by immersing deeply into a single theoretical orientation or tradition. In research practise, this can be tackled by interdisciplinary approaches combining knowhow and knowledge from various perspectives and moving from theoretical fragmentation (Craig 1999) to a holistic awareness and understanding and – ultimately, in the best of cases – wisdom in research.

This chapter aims to provide a holistic approach that comprises perspectives and insights from the general crisis communication literature that are considered relevant for communication in CBRN terrorism crises. The overall approach, as described, creates a frame in which the more specific theoretical insights, which are described in the following sections, provide the content. These

include perspectives on crisis communication and terrorism, the process approach to risk and crisis communication, risk perceptions, community approach and ethics, organisational preparedness and resilience, sensemaking, mindful action and learning. Together, the frame and the content constitute the theoretical framework of this thesis.

2.1 Crisis communication and terrorism

In this chapter, basic definitions of crisis communication, the primary theoretical focus, are given, and the scope is described.

This thesis focusses on crisis communication in the context of CBRN terrorism. Crisis communication can be positioned as a sub-discipline of communication sciences (see Coombs 2010, Heide 2009) with an interdisciplinary theory basis drawing from several allied fields, such as organisational studies, sociology, psychology and public health (Sellnow & Seeger 2013). Crisis communication related to terrorism, the focus of this thesis, is a field of inquiry that gained importance in the aftermath of the 9/11 terrorist attacks in 2001 (Heilbrun et al. 2010). Hence, it is a young field of study that does not yet have a fully developed theoretical basis (Falkheimer 2014, Ruggiero & Vos 2013). As crisis communication and terrorism is a field of inquiry that involves different disciplinary perspectives, consists of various crisis types and crosses national and cultural boundaries and perspectives, an integrated approach to crisis communication is appropriate (see Schwarz, Seeger & Auer 2016).

There are several definitions of terrorism, and they are debated both in academia and practice (Schmid 2004, Easson & Schmid 2011). The elements presented in these definitions that characterise terrorism include an intentional use of, or a threat of, violence targeted against civilians and other innocent people by an intentional creation of terror or fear for political purposes. While the direct effects often reach only a limited number of people, the broader consequences and the message of violence are aimed at larger audiences. These acts are illegal, criminal and immoral in nature based on psychologically effective symbolic violence used to mobilise or immobilise public groups and to create conflicts in society. (Schmid 2004, Malkki et al. 2007.) The largely symbolic dimension of terrorism acting through message of violence makes terrorist events to a large extent communicational. In fact, terrorism could be regarded as a form of strategic communication engaged in by terrorist organisations that aim, while and through creating fear, at polarising public opinion via news and social media coverage and gaining publicity for their cause (Falkheimer 2014). Essential to this thesis is that terrorism constitutes a risk that becomes a crisis when a terrorist attack is executed. Hence, this thesis examines terrorism crises from a crisis life-cycle perspective, including the pre-crisis, crisis and post-crisis phases. The perspective chosen is that of organisational crisis management and communication. Thus, terrorism as, for example, a social or historical phenomenon is not further explored in this work.

In this work, crises caused by terrorism, also referred to as terrorism or terrorist crises, are defined as "an unexpected, non-routine event or series of events that create high levels of uncertainty" and threaten high-priority goals of both organisations and citizen groups either directly or indirectly involved (Ulmer, Sellnow & Seeger 2015, p. 8). These crises vary in terms of severity but often involve a situation in which a loss of life and severe damage to property and infrastructure occur; hence, the terms 'disaster' or 'catastrophe' would also apply (Boin & McConnell 2007). The catastrophic potential also depends on the type of device that is used to carry out a terrorist attack. A terrorism crisis involving the use of chemical, biological, radiological or nuclear (CBRN) agents, the focus of this thesis, could have devastating consequences (Council of the European Union 2009); however, in this work, the term 'crisis' is adopted for the sake of consistency and clarity. Moreover, it serves as a general term, which allows conceptual space for and accommodates various types of terrorist risks and crises from hoaxes to planned but failed attacks to potentially catastrophic CBRN attacks not previously witnessed. One characteristic of crises is that they require a fast response from all actors who are involved or affected by them. It is the communication actions of public authorities with citizens in the pre-crisis, crisis and post-terrorism crisis phases to mitigate the impacts of such crises that constitute the focus of this thesis.

On a general level, in this work, crisis communication is understood as an ongoing process of creating shared meanings among and between various groups to create preparedness for and to respond to terrorism risks and crises (see Sellnow & Seeger 2013, p. 13). This reflects a social constructionist view of crisis communication, according to which communication is a sensemaking process in which an organisation and its members along with members of public groups and other actors create a mutual understanding of the reality and thus enact a social reality (Heide 2009). In this way, communication processes can be regarded as "sensemaking methodologies" (Sellnow & Seeger 2013, p. 13), which enable the co-creation of common frameworks of understanding and actions. This view, also known as the co-creational perspective in communication sciences, places an implicit value on relationships (Botan & Taylor 2004). Social constructionism is especially valuable for crisis situations, which pose a challenge to sensemaking processes due to their unexpected nature. This is captured by the concept of a cosmology episode discussed by Weick (1993, p. 633), which described a situation in which "both the sense of what is occurring and the means to rebuild that sense collapse together". Hence, when a situation is beyond customary explanations, new understanding must be constructed. In the case of terrorism, meanings people assign to terrorist events are communicatively constructed among various parties.

Falkheimer and Heide (2010) grouped different perspectives within the crisis communication literature into two broad categories: traditional and late modern. A relational perspective that draws from a complexity based type of crisis management and acknowledges the socially constructed nature of crises reflects a more modern paradigm in crisis communication in contrast to older,

positivist thinking (Gilpin & Murphy 2010, Gilpin & Murphy 2006); however, traditionally, crisis management draws more from the traditional school of thought that emerged in the aftermath of the World Wars (Helsloot & Ruitenberg 2004), which has influenced crisis communication as well. Traditional crisis communication is centrally organised, focusses on the response phase and thus is operational and exercises leadership and control via rational planning through rules and regulations (Falkheimer & Heide 2010). For the late modern perspective, on the other hand, crisis communication is organised in the form of decentralised, networked systems, is more strategic in its process orientation by taking into account pre- and post-crisis phases and considers public groups to be partners whose views are relevant rather than merely recipients (Falkheimer & Heide 2010).

In practice, crisis communication is closely related to and supports crisis management. Hence, it also has functional and instrumental roles that complement each other. The functional approach focusses on the outcomes of communication processes, such as increasing public awareness and preparedness for crises and building trust via risk communication in the pre-crisis phase, while the instrumental approach positions communication as a means to support the achievement of other crisis management goals, such as facilitating cooperation between and among different actors (Sellnow & Seeger 2013). Falkheimer (2014) suggested that complex crises, such as terrorism, can be better explained by modern approaches that emphasise concepts such as flexibility and improvisation. Complexity can be described as a combination of the following features and principles: 1) interacting agents, 2) continuous changes resulting from agents' interactions, 3) coevolution emerging from a process of self-organisation, 4) instability as a by-product of continuous changes, 5) dynamism blending with elements from their own histories, 6) permeable and fuzzy boundaries and 7) irreducibility of the whole to its components (Gilpin & Murphy 2008).

In this work, different actors and groups of actors who interact are called stakeholders. The concept of a stakeholder originates from the management theory (Näsi 1995) and became known through the seminal work of Freeman (2010, originally published in 1984): 'Strategic management: A stakeholder approach'. The general idea behind the stakeholder concept is that various actors who can affect or are affected by an organisation interact with the organisation and thus make its operation possible (Näsi 1995). Hence, communication and interaction are embedded in the stakeholder concept. A group of stakeholders, which is of particular interest in this work which is focussed on the communication of public authorities, is the citizens as the guiding line of governmental communication in democratic societies is to serve citizens (e.g. Valtioneuvoston kanslia 2016). While the concept of 'the public', often used in the communication theory, indicates an anonymous mass, the term 'stakeholder' assigns a more active role to the actors who are influenced by and are also able to influence the operations of the organisations that they interact with (Luoma-aho 2005). For example, a stakeholder analysis involves assigning an identity to groups of stakeholders by segmenting, grouping and categorising them to clari-

fy their salience, involvement and roles in a situation. Parallel to the notion of stakeholders, the terms 'citizens', 'citizen groups' and 'public groups' are used in this work.

The understanding regarding the nature of stakes, or what these stakes consist of, differs across authors and disciplines, which is indicative of the evolution of stakeholder thinking. While modern theories of stakeholder management emphasise the need to manage stakeholders, a post-modern view to stakeholder relations is that of enabling them (Calton & Kurland 1996). From a crisis communication point of view, the perspective of stakeholder enabling indicates that the purpose of communication is to enable stakeholders to act, express their needs and views and participate in the decisions that concern their lives jointly with other actors in the crisis management network. The purpose of crisis communication is thus to create resilience (further explained in Section 2.4). While enabling may be relevant, especially for the pre- and post-crisis phases, managing is not without importance in CBRN terrorism crises, which may pose an actual life-threatening situation requiring a response in which the emergency responders may need to assume a leading role.

By developing stakeholder maps that represent the interactions of an organisation with multiple groups of stakeholders, a relational, networked view to a communication in crisis situations can be illustrated. This is particularly useful in complex crises, such as those caused by terrorist attacks (Falkheimer 2014), which impact all levels of society and thus affect a variety of actors. For this work, a network view instead of a single organisational approach (see Adkins 2010) was adopted to investigate the crisis communication activities of public authorities involved in terrorism crises. Regarding terrorism, a network of actors, viewed as a multi-stakeholder network focussed on a common problem to be solved (Roloff 2008), is referred to as the crisis management network (Palttala & Vos 2012). The places in which problems are discussed are referred to as 'issue arenas' (Vos, Schoemaker & Luoma-aho 2014). They involve multiple actors and perspectives that may compete for attention and show conflicting interests at times. Similarly, the concept of a rhetorical arena has been proposed to point out that multiple crisis interpretations expressed by various interacting voices result in a high complexity of crisis situations (Frandsen & Johansen 2017). Thus, a terrorism crisis creates a communicative space that is fuelled by a lack of clarity and a meaning deficit, and where various narratives of those affected by it co-exist and compete for attention (Seeger & Sellnow 2016). The construction of meanings and ways in which people interpret crisis communication messages related to terrorism crises depend on public perceptions (see also 2.5), which are filtered by, for example, the media coverage of an incident, culture and context, the personal beliefs and experiences of those experiencing the crisis and the nature of the incident, shaped by who the perpetrators and what their (political) objectives are (Hargie & Irving 2016).

Such arenas of narrative co-existence and competition include traditional media, while, in the current organisational environment, virtual and social media are especially important venues of interaction. Social media include inter-

net-based applications that draw from the functionalities of Web 2.0 and the creation and exchange of user-generated content (Kaplan & Haenlein 2010). Monitoring interactions in these multiple arenas is of central importance to monitor developments and changes in the environment, which is dynamic, fluid and ever-changing (Luoma-aho & Vos 2010, Frandsen & Johansen 2017). As crises, especially CBRN terrorism, are characterised by uncertainties and rapid changes, monitoring is a key process of crisis communication (Prue et al. 2003).

2.2 Process approach to risk and crisis communication

This section further clarifies the approach of this thesis, which involved drawing from the phase-based approaches to crisis communication and management. Criticism is also acknowledged, and in line with a social constructionist and an interpretative approach, the phases are not regarded as the one and only truth but rather one lens through which the reality can be perceived and interpreted.

While crisis situations constitute a disruption in the everyday operations of organisations, anticipating and preparing for crises makes crisis management and crisis communication part of everyday functions (Coombs 2015). Crisis communication is an ongoing process, and thus crises are examined from a life-cycle perspective, consisting of pre-crisis, crisis and post-crisis phases. As their definition indicates, crises are non-routine events that are sudden and challenge everyday practices (Ulmer, Sellnow & Seeger 2015); however, when observing several crisis events over extended periods of time, researchers have been able to identify order beneath the chaotic surface (Sellnow & Seeger 2013). Developmental or phased (Coombs 2015) approaches to crises focus on this underlying order and the patterns of crises by dividing them into subsequent phases. These approaches consider crisis management and communication an ongoing process (e.g. Coombs 2015), which is why the term 'process approach' applies.

Assumptions embedded in the developmental approaches include an acknowledgement of crises as non-linear, unpredictable, complex and dynamic events that involve multiple actors (Seeger, Sellnow & Ulmer 2003, Sellnow & Seeger 2013). Decisions and actions taken in one phase affect the evolution of a crisis in the subsequent phases in ways that are difficult to predict. Moreover, crises are considered time-ordered and time-sensitive: they are moments in time beyond normality (Seeger, Sellnow & Ulmer 2003). These approaches have been developed through a grounded theory approach by seeking to understand and systemise lessons learned in practice (Veil et al. 2008). Phased approaches are among the most widely used crisis theories by both practitioners and scholars. The three-phase model has been employed by several scholars (Seeger, Sellnow & Ulmer 2001, Ray 1999) and was popularised by Coombs (see Sellnow & Seeger 2013, 2015). Accordingly, crises can be split into pre-crisis, crisis and post-crisis phases. This thesis was mostly influenced by the Crisis and Emergency Risk Communication Model (CERC) (Reynolds & Seeger 2005).

The CERC focusses explicitly on communication processes and divides them into five phases: 1) pre-crisis, 2) initial event, 3) maintenance, 4) resolution and 5) evaluation (Reynolds & Seeger 2005). The pre-crisis phase focusses on monitoring risk perceptions, public education and risk messages and preparations in the crisis management network. The crisis phase includes the initial event and maintenance. The initial event includes measures for reducing uncertainty, increasing self-efficacy and providing reassurance. The third phase, maintenance, is comprised of continuing efforts initiated in the previous phase towards increasing public understanding of the event and the related risks, facilitating personal response activities and reassuring affected public groups and the wider audience. Resolution and evaluation occur in the post-crisis phase. Resolution focusses on recovery efforts, discussions on issues related to cause, blame and responsibility and promoting understanding of new and existing risks. Evaluation involves the adequacy of crisis response and assessing lessons learned, including identifying areas for future improvements. From the evaluation phase, a link is created to the pre-crisis activities; hence, a new crisis management cycle begins.

An advantage of the CERC model is that it incorporates communication of risks and crises in one model and thus presents an integrated view of risks and crises (Veil et al. 2008). Traditionally, risk communication has had a pre-event focus with a principally persuasive aim to educate publics about existing risks, while crisis communication has begun after an escalation of an event into a crisis with the main purpose of informing and advising public groups regarding how to act (Reynolds & Seeger 2005). A holistic view of risks and crises is relevant for communication in the case of terrorism, as terrorism is not a crisis but a risk that once manifested in the form of an executed attack becomes a crisis. As a risk in the pre-crisis phase, terrorism requires preparedness from both public authorities and citizens alike. Moreover, the resolution of terrorist attacks is often challenging, and after an attack, there may be ongoing uncertainty and a risk of repetition, further blurring the boundaries between risks and crises (see also Burns & Slovic 2010). The CERC model was used in the development of a crisis communication scorecard, which can be used in evaluating and improving crisis communication preparedness and the performance of public authorities (Palttala & Vos 2012).

The phased approaches have also been criticised. For example, the description of phases and the related activities in a sequential fashion as steps has been criticised for suggesting a linear view of crises and their management (Jaques 2007). Moreover, the prediction of how crises systematically evolve could be regarded as overly optimistic at the cost of ignoring an array of unexpected possibilities, such as the extension of some crises for prolonged periods of time (Sellnow & Seeger 2013, p. 44). This work, which is mainly based on the CERC, considers the phased approach a framework that can facilitate sensemaking and learning (see Section 2.6) in organisations in the context of terrorism crises. Originally introduced as a general framework, the CERC is not grounded in one philosophical approach or a research orientation (Veil et al.

2008) but rather allows for different interpretations and constructions of communication processes.

2.3 Organisational preparedness and resilience

This section explains what organisational preparedness entails, the underlying assumptions and how it can contribute to resilience. According to a process view, the core functions of crisis management are divided into distinct phases, as explained in Section 2.2. Communication plays a key role in all these phases and is closely related to crisis management (Reynolds & Seeger 2005, Palttala & Vos 2012). Approaches to communication, which consider communication in its relation to emergency management, usually focus on the functional and instrumental aspects of communication in crises (Sellnow & Seeger 2013). The pre-crisis phase includes preparations and planning in the crisis management network, which are needed to be able to respond to crises in a timely and efficient manner. Crisis planning generally involves creating a crisis management plan, including the development of a crisis team, outlining crisis scenarios and checklists and maintaining crisis response capacities (Seeger, Sellnow & Ulmer 2001). This includes establishing a crisis communication system, analysing potential crisis types and identifying relevant stakeholders (Coombs 2015). Establishing a listening infrastructure, including environmental scanning and media monitoring systems and procedures, is part of the preparations phase. The basic idea is that the planning processes contribute to organisational preparedness for crises.

The philosophical assumptions underlying approaches that stress the importance of preparedness and planning, which are dominant in crisis management, are based on a view that at least to some extent, future crisis events can be predicted and controlled by means of analysis, preparation and planning (Gilpin & Murphy 2006, Seeger, Sellnow & Ulmer 2001). Thus, the core of planning is to help managers anticipate how crises may evolve and how publics and organisations would respond to anticipate the outcomes; however, as crises by definition are unexpected events accompanied by high levels of uncertainty and surprising elements, planning for each potential contingency of crisis situations is simply not possible (Coombs 2015, Seeger, Sellnow & Ulmer 2001). Hence, crisis teams also need skills for improvisation, creative problem solving and flexibility to act in the face of the unknown. These skills can be rehearsed during crisis training and exercises. When approached from this perspective, the planning literature has intersecting points with more contemporary approaches in the crisis management literature, encapsulated in concepts such as complexity (Gilpin & Murphy 2006, Gilpin & Murphy 2010, Gilpin & Murphy 2008). For example, Falkheimer and Heide (2010, p. 523) referred to "improvisation within a trained strategic framework", and Gilpin and Murphy (2006, p. 383) discussed the expertise needed for "skilful improvisation".

A multi-hazard approach (also called an all-hazard approach) to crisis preparedness education and planning entails simultaneous preparations for a variety of hazards. It is based on the assumption that crises share certain commonalities, which call for a common set of response processes and patterns and which can consequently be addressed in the form of general preparedness education and planning (see also Hyvärinen & Vos 2015). Its usefulness to terrorism preparedness lies in the rationale that while terrorism is a low-probability threat to most organisations and communities, it can be incorporated in preparedness education and planning with a broad perspective (Waugh & Young 2004). The multi-hazard approach could be viewed as a more flexible form of planning in contrast to a precise formulation of crisis-specific scenarios; however, the related literature has been criticised for reducing the role of communication in crisis management to a purely functional form, such as by a focus on warning systems, and ignoring the subtleties of message content and delivery (Sellnow & Seeger 2013). Hence, it should not be considered an end in itself but rather a basis upon which solutions to crisis and situation-specific complexities may be constructed.

As managing crises involves multiple actors and players, the preparation process must be jointly conducted considering the entire crisis management network. This includes civil society actors, as suggested in the community approach, which will be explained in Section 2.4. Moreover, relations with news media must be established. Cooperation in the preparedness phase can facilitate a coordination of the response, which is one of the biggest challenges in emergency management (Sellnow & Seeger 2013). Moreover, when preparedness is considered from a social constructionist perspective as a basis or capacity to assign meanings to new situations and co-create solutions with know-how and knowledge gained in the past, it can contribute to resilience: resources and capacity to cope with, adapt to, learn from and potentially grow stronger after crises (see Norris et al. 2008, Sellnow & Seeger 2013). Furthermore, an adaptive view on planning stresses the importance of continuous learning, as explained in Section 2.6. If assumed as an ongoing part of the crisis management process, "rapid learning" (Gilpin & Murphy 2010, p. 684) could supplement traditional planning.

2.4 Community approach and ethics

This section further explains the co-creational perspective of crisis communication by describing the interdependence of the crisis management network and the local community in crisis management efforts through the community approach. In addition, the topic of ethics, which is central for crisis communication in the context of terrorism, is introduced and explained.

The community approach to crisis communication and management includes the involvement of various organisations as well as citizens in the crisis management network (Hyvärinen & Vos 2015). In line with a co-creational per-

spective to crisis communication, crisis management is thus produced cooperatively via a collaboration of actors from all sectors: response organisations, including governmental organisations, rescue and emergency services; businesses; and civil society actors, including NGOs and citizen groups. The relational approach is closely related to the concept of community (see e.g. Heath 2004, Botan & Taylor 2004). Relationships, which are constructed and maintained through communication, are embedded in and create communities. The concept of community is also useful for understanding public perceptions as the meaning-making process of an individual, who is a carrier of a social identity, is related to his or her community (Heide 2009).

'Community' does not only refer to a specific geographical location of those directly exposed to a crisis (Quarantelli 1997); its boundaries can be fluid based on perceptional (non)identifications and social networks, which can extend the sense of community and connectedness to those who are indirectly affected (Kirschenbaum 2004). This view is relevant to terrorism, as the aim of terrorist attacks is to create anxiety and to terrorise beyond the primary targets of attacks to create community-wide ripple effects in societies. In other words, although the direct effects of terrorist attacks are often local and limited, their indirect influences affect entire communities and even have impacts on the international level. Moreover, if for example biological substances are used as a terrorist device, the effects could be further dispersed through indirect exposure and contamination.

The community approach is linked to certain core concepts, one of which is resilience. Resilience, on a general level, can be understood as a "coping ability, the ability to bounce back, pull through or adapt" (Sellnow & Seeger 2013, p. 123) and thus to continue functioning in the face of disturbances or disruptions (Norris et al. 2008). Community resilience is defined by Norris et al. (2008) as a set of networked adaptive capacities, including social capital, information and communication and community competences. Hence, communication is one of the core elements that contributes to community resilience, and it enables many of the sub-processes (Sellnow & Seeger 2013). For example, for social capital, resources embedded in social networks can be accessed and mobilised for specific action purposes through interactions (Luoma-aho 2009, Lin 2001).

Hyvärinen and Vos (2015) described the role of communication in facilitating community resilience. In pre-crisis phases, communication can contribute to building networked partnerships and facilitating preparedness education, including bottom-up initiatives, in cooperation with local communities. Terrorism crises often require the involvement of different types of organisations, such as health care organisations, and possibly authorities working with hazardous materials. During and after crises, communication can facilitate collaboration in the response network involving both response organisations and citizen groups. This implies bridging diversity both horizontally and vertically within and between response organisations and citizen groups to be able to as act together smoothly despite differences, such as organisational cultures including varying operational protocols and procedures, world views and priorities. The empow-

erment of citizens is viewed both as a goal and an outcome of communication supporting crisis management in the form of self-efficacy and protecting oneself and others (Palttala & Vos 2012, Ulmer, Sellnow & Seeger 2015, Hyvärinen & Vos 2015). Community resilience can also be considered a disaster response strategy, as developing resilience, including fostering pre-existing social networks and relationships, for example, can contribute to preparedness for crises (Norris et al. 2008). This is in line with Sellnow and Seeger's (2013) positioning of communication and community resilience theories as part of the family of theories on communication and emergency management.

The community approach is based on the assumption that along with various public and private organisations, citizens are participants in crisis management and communication efforts, and citizen response is harnessed to the benefit of the crisis response network. In fact, several authors have noted that citizens are often the first on site to respond to crisis situations, which makes the community the true first responder (Sellnow & Seeger 2013, Helsloot & Ruitenberg 2004, Perry & Lindell 2003). From a crisis management perspective, citizen response comprises all actions of citizens in different phases of crises, before, during or after a terrorist attack, to help themselves or others limit the effects of an attack (see Helsloot & Ruitenberg 2004). One factor that has hindered an active information provision to citizens and their inclusion in response efforts is the widely held, mistaken belief that citizens would panic in crisis situations (Perry & Lindell 2003, Helsloot & Ruitenberg 2004). Contrary to what is believed, in crisis situations, people usually act rationally to the best of their knowledge. In fact, as Quarantelli (1988) pointed out, most problems in disasters are not caused by citizen response but rather arise from difficulties encountered in the crisis management network involving communication processes, decision making and coordination. The involvement of civil society actors, such as NGOs and citizen groups, in crisis management also has a rational underpinning: a broader participation in response activities could complement the scarcity of resources and support the work emergency services in exceptionally demanding circumstances that a terrorist attack using CBRN materials could create, for example.

Involvement of civil society actors in preparedness activities along with other public and private actors can help build trust (Burns & Slovic 2010). Trust is also a basic element of ensuring a smooth collaboration among various actors in crisis situations (Longstaff & Sung-Un Yang 2008). Trust is rooted in two-way communication involving listening to the concerns of people (Renn 2009). Trust is also an element of social capital and can reduce feelings of uncertainty (Rogers et al. 2007). Building relationships, a function of pre-crisis communication that is key to the community approach, can also facilitate building trust.

The community approach could be considered an ethical approach in itself, as it is rooted in ethically grounded principles of empowerment, participation, pluralistic dialogues, collectivistic decision making and civic responsibility (Veil 2008, Seeger et al. 2009, Deetz 1992). Moreover, communicating with a community of stakeholders about risks and crises involves several ethical issues. In fact,

as several authors have acknowledged, ethical questions are embedded in the communication of risks and crises (Sellnow & Seeger 2013, Bowen 2009, Sellnow et al. 2009). These ethical questions draw on values, normative systems and philosophical frameworks to evaluate and "make judgements of good and bad, right and wrong, and acceptable and unacceptable" actions and decisions regarding communication in terrorism crises (Seeger et al. 2009, p. 281). In organisations, ethical principles manifest in the form of ethical codes of conduct, ethics training and specific strategies that contribute to ethically grounded outcomes, such as openness and accessibility (Seeger et al. 2009). In the public sector, crisis communication is guided by several statutes, guidelines and recommendations (see e.g. Valtioneuvoston kanslia 2016).

Ethical judgements are guided by values, which include ideals, principles and norms that are rooted in societies, cultures and communities. Ethical standards or value sets, which are important for crisis communication, include access to information, responsibility and accountability, humanism and care and virtue ethics (Ulmer, Sellnow & Seeger 2015). Access to up-to-date and accurate information is a basic right of those affected by a crisis so they can make informed decisions. This idea is encapsulated in the concept of significant choice, which was introduced in crisis communication research by Nilsen (1974) and is based on the principle that human dignity lies in the capacity and possibility of citizens to make rational choices and decisions (Ulmer, Sellnow & Seeger 2009). Moreover, information should be meaningful for stakeholders, which affirms the importance of a stakeholder analysis (Sellnow et al. 2009).

Overall, it could be said that understanding stakeholder needs, perceptions and values is a starting point for ethical communication in crisis situations. In challenging crises, resources are scarce, which may call for prioritisations regarding the allocation of treatment and medication, for example. Understanding stakeholders implies a need to balance competing values and multiple frames representing different interests among and between individuals, organisations and cultures, creating "dialectic tensions" (Sellnow et al. 2009, p. 150). This is especially important in the public sector, as public sector organisations are designed to serve the interests of all citizens equally. Hence, in crisis situations, it is critical to identify and understand the different stakeholder views to promote public safety.

Access to information further contributes to the actualisation of other principles, such as transparency and accountability. By obtaining adequate information and an account of what went wrong and why, stakeholders should be able to sort out questions of blame and responsibility (Sellnow et al. 2009). While in terrorism situations the organisational crisis responsibility is deemed low, as the organisations involved may also be considered victims (Coombs 2007), the management of the situation and the adequacy of preparedness activities may still be called into question in the aftermath of an attack.

Simola (2003) described two ethical approaches to crisis management: ethics of justice and ethics of care. The two approaches are complementary. While the ethics of justice focus on legal and logical rights and claims of people and

aims for universal righteousness, the ethics of care take into account feelings and relationships and contextual and situational factors. A balance is needed, as legal responses focused on liabilities may fail to take into account stakeholders' perspectives relevant to a particular situation and context. Along these lines, a virtue ethics approach stresses the moral aspect of leadership communication in crisis situations reflected by timely, emotionally supportive and regenerating responses (Seeger & Ulmer 2001).

2.5 Understanding public risk perceptions

This section discusses the importance of understanding perceptions as a basis for all communication actions to address the needs of stakeholders. It also clarifies the reason that terrorism is challenging, which is due to the perceptions that result in psychological reactions, such as anxiety and fear.

The field of psychology contributes to crisis communication by providing an understanding of how people perceive and respond to risks. While psychology draws from an individual level of analysis, it can provide an understanding of the wider impacts of crises on different levels of society (Rogers & Pearce 2016). Psychological insights to crisis communication can be especially useful in the case of terrorism, which is based on the use of psychologically effective symbolic violence with the intention to create terror and fear in the society at large (see e.g. Malkki et al. 2007). In turn, the public response to crises can impact the overall severity and duration of a crisis (Rogers & Pearce 2016). While risk assessment is a discipline that aims to identify, characterise and quantify risks, risk perceptions refer to intuitive judgements of risks made by citizens (Slovic 1987) or other members of stakeholder groups. Perceptions are the primary drivers behind the ways people behave contrary to what are considered facts by risk analysts and scientists (Renn 2008).

The psychometric paradigm in the psychological research of risk perceptions explains that the strategies that people use to assess and evaluate information are based on relatively consistent patterns of perception (Renn 2008, p. 105). Psychometric research, initiated in the 1970s, showed that although different from expert views, which are based on a more narrow, quantitative evaluation of risks, public perceptions are also rational but shaped by a set of qualitative factors (Rogers & Pearce 2016). These factors can be further condensed into two main dimensions, or higher-order characteristics: dread risks and unknown risks. The first dimension deals with the possibility of a risk to cause dread through its catastrophic potential, lack of control by those exposed to it, fatal consequences, involuntary exposure and its potential to threaten future generations. The latter involves whether the risk is observable or not observable, familiar or unfamiliar to those exposed, whether the effects are immediate or delayed, whether the risk is old or new and whether the risk is known or unknown to science. (Slovic, Fischhoff & Lichtenstein 1982, Fischhoff et al. 1978.) The dread dimension in particular has been found to be significant in determin-

ing the perception of risk: the more a risk is dreaded, the higher is the perceived risk, and the more people expect from the authorities in the regulation and reduction of the risk (Slovic 1987).

Cognitive and affective factors, including personal beliefs and emotional affections, further influence the ways people evaluate and interpret risk information (Heath & Palenchar 2016, Renn 2008). More recently, scholars have discovered that emotions play an important role in shaping risk perceptions (see Slovic 2010). This is an important factor in explaining public perceptions of terrorism. In fact, in contrast to the analytic thinking driven by logic, an experimental mode of thinking based on intuitive feelings is the primary way in which people make risk assessments. The former, also referred to as risk as feelings and based on what is called affect heuristic, consists of fast, instinctive and automatic first reactions people have towards risks. The latter, risk as an analysis, is based on logical reasoning and justification via evidence and requires more time for processing. These two systems work in parallel and support each other. (Slovic et al. 2004.)

In addition to the psychological factors, risk perceptions are also shaped by social, political and cultural factors. The socio-political influences emerge from economic and political structures and media institutions and include subtle collective impacts, such as trust in institutions and influences emerging from social values and social reference groups (Renn 2008). Trust is particularly important related to terrorism risk, as a lack of trust can intensify risk perceptions and undermine the feelings of safety among public groups (Gibbs van Brunschot & Sherley 2005). On an individual level, personal values and interests and socio-economic statuses play a role in shaping perceptions (Renn 2008). The influence of the media on risk perceptions is higher in cases when people lack direct experience with an issue, which is often the case with terrorism (Aldoory, Kim & Tindall 2010). Cultural influences are embedded in political, social, economic and organisational cultures and cultural institutions, and on a personal level, they are reflected in personal identities and world views that influence risk perceptions on all levels (Renn 2008). Personal values, world views and social reference groups may also influence intergroup relations, such as among different ethnic groups, and thus can shape the societal context surrounding terrorism risks and crises.

The social amplification of risk model (Kasperson et al. 1988) further explains how the previously described psychological, social and cultural processes involving various actors and institutions interact with risks, risk events and each other, shaping the public perception of and response to them. Because of this interaction, risk perceptions can either be heightened, referred to as amplification of risks, or reduced, referred to as attenuation of risks. Moreover, the amplification process may create ripple effects, as a stone does when dropped into a pond, which may expand the circles of involvement from those who are directly affected to a larger community of stakeholders. Secondary and third-level impacts are created and can affect all levels of society, impacting economic, social and political spheres. (Kasperson et al. 2003.)

Knowledge about public groups and their perceptions is essential in all phases of crises to plan and execute communication activities that address the needs of public groups. In addition to a general understanding of how people perceive risks, which can be obtained through research on risk perceptions, context- and event-specific information on risk perceptions is needed. This requires monitoring public perceptions (Vos & Schoemaker 2006), including reviewing long- or mid-term developments in public opinion about risks through opinion polls, as well as—and more importantly—monitoring news and social media for fast-evolving terrorism crises.

In sum, risk perceptions are formed based on an interplay between various psychological, social and cultural elements and processes and are thus multi-dimensional in nature and origin. Understanding the ways in which people perceive risks and may respond to them can help authorities improve their communication with citizens and plan preparedness and educational activities. Conversely, communication about risks and crises may be futile if not based on an accurate understanding of public groups' perceptions and needs (Slovic 1987).

2.6 Sensemaking, mindful action and learning

This section explains concepts considered central to the process of communication strategy making in CBRN terrorism crises, namely sensemaking, mindful action and learning. As such situations call for quick and timely action, the process that leads to action, also referred to as communication strategy making, is central.

Weick (2001) compared strategic plans with maps. Accordingly, the strategies are different paths, or routes, that can be distinguished on the map and followed to reach a destination. Strategy making could be viewed as orientating with a map, or as taking the needed actions and related steps along the way to a destination. The approach proposed by Weick (2001) is based on a combination of elements from linear, adaptive and interpretive views on strategies. According to Chaffee (1985): 1) the linear perspective on strategies focusses on sequential action following a planning—formulation—implementation cycle, 2) the adaptive view considers strategy as not pre-defined but based on continuous monitoring of the environment and 3) the interpretive approach to strategy intersects with the adaptive view in considering an organisation and the environment interdependently and emphasises the socially constructed nature of reality through symbolic actions and communication. Strategy making, especially when considered from both adaptive and interpretive perspectives, involves sensemaking.

According to Sellnow and Seeger (2013), sensemaking serves as a conceptual framework, which explains how people and organisations cope with and reduce uncertainty in all phases of crises. It is a process by which they "enact and negotiate beliefs and interpretations to construct shared meanings and

common goals" (Choo 2001, p. 200). Crises intensify the need for sensemaking due to the changes they provoke in the organisational environment (Weick 1988, Choo 2001, Gilpin & Murphy 2008). An understanding results from "taking action and observing feedback to that action", while communication plays a key role in interpreting the feedback and coordinating a response (Sellnow & Seeger 2013, p. 83). Weick (2001) explained sensemaking using three inter-related processes: enactment, selection and retention. Enactment refers to action. Action is followed by interpretation, which consists of analysing elements of the enactment selected for a closer examination. Retention contributes to learning (Sellnow & Seeger 2013), as the insights obtained are used for further action and interpretation. Hence, Weick (2001) explained that sensemaking is retrospective in a way that 'knowing' results from 'doing', and vice versa, producing an ongoing cycle.

Sensemaking is connected to learning. Traditionally, learning in crisis management is connected to post-crises phases in the form of lessons learned (Gilpin & Murphy 2010, Veil 2011); however, as Gilpin and Murphy (2010) suggested when presenting a complexity approach to crisis management, learning can also be an integral part of crisis response and thus promote a response that is up-to-date and ready to adjust itself to the changes in the environment. Learning, which takes place while a crisis unfolds, is related to what is referred to by Gilpin and Murphy (2010, p. 686) as adaptive planning. It involves gathering information and processing the information quickly into actions, which are based on evolving situational needs and conditions. In this context, actions are shaped by three adaptive strategies: 1) staying informed about evolving conditions and new events internally and externally, 2) maintaining dynamic intra- and interorganisational networks and 3) maintaining flexibility to reorganise and adapt to changing circumstances (Gilpin & Murphy 2010, p. 688). Assuming a more complex understanding of crises and constantly adapting to changes in a crisis environment also corresponds with a contingent approach to crisis management (Frandsen & Johansen 2017).

Veil (2011) discussed mindful learning and presented a model that addresses barriers to learning in the pre-crisis phase. A mindful organisational culture, which pays attention to warning signals and is ready to adjust and readjust routines in the face of changes in the environment, is needed to overcome obstacles to learning (Weick & Sutcliffe 2007). Mindfulness refers to awareness of the context and its details, including abnormalities. It requires quality attention, which is attention that focusses on what is important 'right here, right now', without being distracted. Thus, it contributes to and is based on a holistic awareness and understanding of the present moment. The past and future are taken into account only insofar as they are meaningful for the present moment. (Weick & Sutcliffe 2007.) The opposite of alertness grounded in the present moment draws from the past and is thus conditioned by old, pre-existing information.

Mindfulness could also be described as a state of mind, which can contribute to an accurate understanding of the environment. An understanding of a

situation based on interpreting the information about a crisis is often referred to as situational awareness, and it is viewed as a prerequisite for decision making related to needed actions (Coombs 2008). Sellnow and Seeger (2013, p. 190) connected mindfulness with monitoring and described mindfulness as "the process of constantly monitoring one's environment in an effort to detect non-routine events or series of events and anticipate their potential for a crisis".

As crises, and even more so terrorist attacks (Wray et al. 2004), involve many unknown aspects, crisis management and communication essentially involve coping and communicating about the unknown and making it gradually more known (Coombs 2015). Hence, monitoring and information processing are central to crises. Aspects of crises that can be monitored and analysed as the crisis evolves include information regarding the nature of the crisis, crisis intensity, dynamics of the situation and interpretations of the crisis among various stakeholder groups (Frandsen & Johansen 2017). Weick (2001) explained the interrelations of monitoring, interpretation and learning. Monitoring includes collecting data from the environment and is followed by interpretation, which involves assigning meaning to the data collected. Finally, learning equals action: enacting the outcomes of interpretation in the form of informed decision making. These steps are not always sequential, but they are intertwined in a way that calls for intense reflexivity, a simultaneous engagement in analysis and meta-analysis, and action (Gephart, Thatchenkery & Boje 1996).

2.7 Synthesis of the theoretical framework

This section presents a synthesis of the theoretical framework. Crisis communication in the context of terrorism constitutes the main theoretical area of this thesis, which is further specified by selected key constructs, approaches and perspectives. Crisis communication was examined from the perspective of public authorities and their communication with citizen groups. As crisis management related to CBRN terrorism involves multiple actors, also referred to as stakeholders, a network perspective was adopted. Hence, the communication by public authorities is viewed as a co-creation among and between various actors in the crisis management network. The co-creational view further implies a social constructionist understanding of reality (see Heide 2009), according to which sensemaking processes are central to crisis communication. Due to its close relation with crisis management, communication also has functional and instrumental roles (Sellnow & Seeger 2013) in supporting operational crisis management.

Complex problems, such as CBRN terrorism, call for multi-dimensional solutions based on multiple perspectives. In line with a developmental perspective of crisis communication, terrorism is viewed as both a risk and a crisis, which require ongoing communicational efforts throughout the life-cycle in pre-crisis, crisis and post-crisis phases. The developmental model that was primarily used for this thesis is the CERC model (Reynolds & Seeger 2005). In this

thesis, which draws from a social constructionist and an interpretative approach, the phases are regarded as a lens through which reality can be perceived and interpreted, allowing for multiple constitutions of communication processes depending on the context and organisations at hand. A developmental approach, including an integrated view of risks and crises, is particularly useful for terrorism, which presents an ongoing, unpredictable risk that takes the form of a crisis when there is a terrorist attack.

Organisational preparedness and resilience further explain assumptions regarding how organisations can prepare themselves to cope with terrorism risks and crises. More traditional views on crisis communication and management are based on an assumption that future crises can be predicted and controlled, and they stress the importance of pre-crisis preparations and planning (Seeger, Sellnow & Ulmer 2001). On the contrary, more recent views that are centred on concepts such as complexity (Gilpin & Murphy 2006) emphasise the unexpected and unique nature of crises and suggest that skills for improvisation, creative problem solving and flexibility to act in the face of the unknown are also needed for organisational preparedness. Rehearsing these skills in pre-crisis training and exercises could help combine these two perspectives. When preparedness and training to cope with complexities of CBRN terrorism is included in simultaneous preparedness activities for various crises, a multi-hazard approach is applied. By combining elements from both traditional and modern views as a way to assign meanings to new situations and to co-create solutions with knowhow and knowledge gained in the past, preparedness can contribute to organisational resilience: resources and capacity to cope with, adapt to, learn from and potentially grow stronger after crises.

The community approach further broadens the crisis communication perspective from the organisation and the core crisis management network to a wider circle of stakeholders, including business organisations, NGOs and civil society actors. This perspective further explains the co-creational aspect of crisis communication by describing the interdependence of the crisis management network and the local community in crisis management efforts. In the case of terrorism, a broad understanding of community is needed based on perceptual boundaries (see Kirschenbaum 2004) to also include those who are indirectly affected, as terrorist attacks often create society-wide consequences beyond the primary target of the attacks. The community approach goes hand in hand with the concept of community resilience, which is understood as a set of networked adaptive capacities (Norris et al. 2008) that are enabled by communication in many ways (Hyvärinen & Vos 2015). Community resilience can help communities cope with and recover from terrorism risks and crises. As the effects of terrorism are targeted towards societies at large, the coping mechanisms also need to be inclusive. In the community approach, the role of citizens as active participants in crisis management efforts is acknowledged. This is especially important for preparedness for CBRN terrorism situations where potentially catastrophic consequences could create a situation in which the scarcity of emergency response resources would need to be compensated for by active citizen

participation. Questions about ethics are also central when communicating with a community of stakeholders about terrorism risks and crises.

Understanding public risk perceptions is crucial, as it can help explain how people perceive risks and respond to them. This is especially true regarding terrorism, which aims to create psychological impacts through the intentional creation of terror and fear. Risk perceptions are shaped by various psychological, social and cultural elements and processes and are thus multidimensional in nature and origin. Understanding public risk perceptions precrises can help authorities plan preparedness and educational activities and improve communication with citizens by adapting it to situational needs during crises. Therefore, monitoring risk perceptions and how they develop is of primary importance regarding CBRN terrorism risks and crises, which are characterised by fast-changing conditions.

Sensemaking is considered a core concept that can help explain the process of communication strategy making in complex CBRN terrorism crises. As such situations call for quick and timely action, the process that leads to action is of primary importance. Sensemaking explains how people and organisations cope with and reduce uncertainty in all phases of crises (Sellnow & Seeger 2013) through three inter-related processes: enactment, selection and retention (Weick 2001). Learning, which takes place while a crisis unfolds and is translated into fine-tuned actions to correspond with situational needs, could be regarded as a flexible form of planning referred to as adaptive planning (Gilpin & Murphy 2010). Action, which is adjusted to a situation and context at hand and draws from a holistic understanding of the present moment, can be described as mindful. Mindful action can be achieved through monitoring the environment, interpreting the gathered information and translating the results of interpretation into action.

The theoretical framework, which was summarised above, is synthesised and illustrated in Figure 1, which shows the building blocks of the theoretical basis for this research.

FIGURE 1 The theoretical framework synthesised

Crisis communication in the case of terrorism is considered part of crisis management and is co-created by multiple actors in the crisis management network. The second level explains the key constructs, which further specify the adopted stance to crisis communication. The bottom level includes two concepts and the related processes, which are considered central for coping with complexities in CBRN terrorism crises.

The theoretical framework presented in this thesis shell and synthesised in this section serves as a broad theoretical basis for the research conducted, which will be explained in detail in the next chapters. Moreover, it constitutes a partial solution to fulfil the purpose of this research, which was to better understand and describe the challenges of communication in CBRN terrorism crises as well as how the challenges are met during communication supporting crisis management by public authorities in such circumstances. This solution is further complemented by the findings of the research. A complemented, integrated view, which is based on a synthesis of the theoretical framework and the empirical findings, is presented in Chapter 5.

3 METHODS AND DATA

This chapter presents the data and the methods of the studies, which were reported in the original articles, and it explains the methodological choices of the research.

The purpose of this research was to better understand and describe the challenges of communication in CBRN terrorism crises and how these challenges are met in the communication supporting crisis management by public authorities in such circumstances. The research purpose was fulfilled through five studies and the related research questions (see Table 2). In this chapter, the research design is clarified, and for each study, the methodology is explained.

3.1 Research design

Five studies are included in this article-based thesis. Table 2 presents the research questions for each study.

TABLE 2 Research questions for each study

Study	Focus	Research questions
I Communication premises	Characteristic features of communication in CBRN terrorism crises	RQ1. Which characteristics of communication in terrorism crises are mentioned in the literature? RQ2. Which themes related to communication in terrorism crises are addressed in the literature? RQ3. Which trends can be found in the literature on communication in terrorism crises?
II Communication challenges	Perceived challenges and inspirational practices when communicating with citizens in CBRN terrorism crises	RQ1. Which communication challenges do CBRN terrorism crises present according to expert views? RQ2. What are considered good practic-

		es when communicating with citizens in CBRN terrorism crises?
III Reflection and learning	Reflection and learning through a process-based audit instrument supporting preparedness, response and recovery in CBRN terrorism crises	RQ. How can a framework constructed for the crisis communication scorecard be developed for reflection and learning in CBRN terrorism crises?
IV Social media monitoring	Social media monitoring in crisis situations: methods and process	RQ. How are the methods for monitoring the social media interactions of citizens described in the academic literature?
V Communication strategy making	The process of communication strategy making in CBRN terrorism crises	RQ1. How do communication experts follow a rapidly evolving and complex crisis situation? RQ2. How do communication experts decide on the communication strategies to implement in such crises?

This research was conducted by applying a qualitative research approach. Qualitative research assumes a socially constructed view of reality, acknowledging the interrelation between the researcher and the studied topic as well as the contextual influences that shape the research process (Denzin & Lincoln 2008). A qualitative research approach was chosen because the purpose of the thesis was to describe and understand the phenomenon of crisis communication in the case of CBRN terrorism, including the complexities and nuances involved. As a new field of study, basic knowledge is needed to examine the phenomenon from a holistic point of view, which is a characteristic of qualitative studies (see Eskola & Suoranta 1998).

Qualitative research involves an interpretive approach. That is, researchers attempt to make sense of and interpret the studied phenomenon in terms of the multiple meanings and dimensions involved. The interpretations are shaped by numerous factors related to both the researcher and the informants and involve issues such as personal histories and contexts in which the research is conducted, indicating the interactive nature of the research process and the socially constructed nature of the knowledge that is produced (Denzin & Lincoln 2008). The interpretive approach in the context of this thesis also has a practical underpinning. Namely, as there are fortunately few past examples of CBRN terrorism crises, studying communication in such crisis scenarios requires interpretation. Hence, knowledge is created as an outcome of co-created meaning making processes through interactions with existing scientific literature, expert perceptions, knowledge gained though the empirical studies and the insights of the researcher. The interpretive and context-bound nature of qualitative research and the fact that it is based on small samples creating an understanding of studied phenomena that may be deep but is not necessarily generalizable beyond the study findings is an issue for which qualitative research is often criticised (Eskola & Suoranta 1998). Hence, the value of qualitative research lies in its descriptive and exploratory nature rather than in offering (causal) explanations. Due to a lack of pre-defined variables or causal mod-

els (Denzin & Lincoln 2008), the qualitative research process may also be time-consuming and hence costly.

As bricoleurs, qualitative researchers use different methods, or "interpretive practices" to create a holistic understanding of their research topics by combining multiple meanings in a way that "is fitted to the specifics of a complex situation" (Denzin & Lincoln 2008, p. 5). This could also be called a craft-like approach to research methods (Seale 2011), according to which a variety of methods can be combined, and a methodological approach that can best meet a research problem at hand can be constructed. In the quest to solve a puzzle (Alasuutari 2012), various paradigms from different philosophical and theoretical orientations can be considered complementary ways of examining a phenomenon that can at best also serve as sources of inspiration and creativity rather than mutually exclusive thought processes. Within this context, as explained in relation to the theoretical framework of this work, social constructionism is viewed as a meta-perspective (Craig 1999, Deetz 2001) that accommodates various constitutions of reality and ways to obtain knowledge of those realities, even when pertaining to seemingly opposite theoretical orientations. Hence, the quantitative analysis of the trends in Studies I and IV and the background-related information in Study II, which could be deemed a positivist-oriented enterprise (Guest, MacQueen & Namey 2012), is not considered contradictory to the mainly interpretive approach adopted for this research.

The interrelation of theory and practice is encapsulated in the concept of practical theory (Sellnow & Seeger 2013, Barge & Craig 2009), which inspired this research. Theory and practice interact in the form of reflexivity in a way in which each shapes the other. This involves a movement between interpretive empirical studies concerning certain communicative practices, such as communication strategy making in Study V, and assessing those practices in the light of theory in what could be described as "a theoretically informed interpretation" of a problematic situation (Barge & Craig 2009, p. 65).

Table 3 shows the theory perspectives that supported the studies that were conducted as part of this thesis. The project context in which the present research was conducted also illustrates the relation between theory and practice in this research. The CATO project, comprised of an international research consortium of 25 partners, included input from science, IT, psychology and practice organisations (European Commission 2015). This provided opportunities for cross-disciplinary contacts and deeper insight into the characteristics of CBRN crises. The value and influence of the project context on the research conducted is evaluated in Section 5.4.

TABLE 3 Theory perspectives supporting studies

Study	Focus	Relevant themes in the theory
I Communication premises	Characterising features of communication in CBRN terrorism crises	Crisis management, crisis and risk communication
II Communication challenges	Perceived challenges and inspirational practices when communicating with citizens in CBRN terrorism crises	Risk perception, multi-hazard and community approaches, ethics
III Reflection and learning	Reflection and learning through a process-based audit instrument supporting preparedness, response and recovery in CBRN terrorism crises	CERC process model, reflection and learning
IV Social media monitoring	Social media monitoring in crisis situations: methods and process	Monitoring methods to investigate communication
V Communication strategy making	Process of communication strategy making in CBRN terrorism crises	Sensemaking, mindfulness, planning and improvisation

The data of this research were generated (Yanow & Schwartz-Shea 2006b) through literature reviews, a qualitative online questionnaire and a table top discussion (see Table 4). The data consisted of scientific articles, qualitative questionnaire responses and table top discussion transcripts and were textual in nature. Data were selected according to a purposive sampling logic; that is, the samples were formed based on their relevance to the research questions and analytical framework of the studies concerned (see Schwandt 2007b). This is common in qualitative studies with exploratory, data-driven analytical approaches in contrast to random or probabilistic sampling logic employed in hypothesis-driven studies (Guest, MacQueen & Namey 2012).

TABLE 4 Data and methods by studies

Study	Data	Data gathering	Data analysis
I	Scientific articles (n=63)	Systematic literature search	Thematic analysis Quantitative analysis
II	Qualitative questionnaire responses (n=28)	Online questionnaire	Thematic analysis
III	Findings of Studies I, II and IV	Derived from Studies I, II and IV	Theory-driven re-analysis of the findings according to phase and stakeholder specific communication tasks
IV	Scientific articles (n=24)	Systematic literature search	Thematic analysis Quantitative analysis
V	Table top discussion transcripts (n=3, 58 pages, 25 570 words)	Table top discussion	Thematic analysis

A thematic analysis was adopted and applied as a data analysis method in all studies except Study III. In Study III, the findings of Studies I, II and IV were analysed according to phase and stakeholder specific communication tasks derived from theory. The thematic approach is the most commonly employed analysis method in qualitative research (Schwandt 2007a, Guest, MacQueen & Namey 2012). For this approach, sections of text are coded based on whether they contribute to themes (Schwandt 2007a). Themes can be understood as units of meaning that can be observed in the data by the researcher (Guest, MacQueen & Namey 2012, p. 50). A thematic analysis was conducted using mainly a data-driven approach. In data-driven or inductive coding, the themes are not pre-defined but are derived from the data by the researcher. This process involves interpretation. Identifying themes can be based on, for example, looking for repetitions, metaphors and analogies, transitions in content, similarities and differences, linguistic connectors or missing data (Ryan & Bernard 2003). An analysis was conducted using ATLAS.ti, version 7 by ATLAS.ti Scientific Software Development GmbH, which is a qualitative data analysis software that facilitates the coding process, helps organise the data and monitor the analysis process, in Studies II, IV and V. In Studies II and V, a combination of inductive and deductive approaches was applied, as a pre-defined structure preceded the process of open coding. In Study II, the main themes were derived from the questionnaire sheet, and in Study V, the phase-specific structure of the discussion served as a basic analytical framework.

Moreover, simple quantitative analyses were conducted in Studies I and IV to examine trends in the reviewed literature and in Study II to analyse background-related data. As explained, the qualitative, interpretive research approach that was applied to the present research does not exclude quantitative sub-analyses of qualitative data (see also Guest, MacQueen & Namey 2012, Alasuutari 2012). To provide a holistic understanding, qualitative and quantitative insights can complement each other, depending on the goals, the stage of the research and the process involved (see Hammersley 1996).

Next, the precise steps involved in data gathering and analysis in the five studies are further explored and described.

3.2 Review of communication in terrorism crises

The focus of Study I was to explore the characteristic features of communication in CBRN terrorism crises. Because it is a new topic of research, a systematic review of scientific literature published in academic journals was carried out. The purpose was to explore the different dimensions and aspects of communication in this area and to establish possible gaps in research by reviewing focal issues, topics, themes and trends in recent scientific literature.

A literature search was conducted in multiple databases available via the University of Jyväskylä Library. The search was limited to scientific articles in peer-reviewed academic journals published from the years 2001–2012. After

testing multiple combinations of search terms, the following were used: [terrorism] and [crisis communication or risk communication or emergency communication]. As CBRN or its synonyms would not add to the results, they were not used. The search produced 453 hits, of which 193 articles were exported to RefWorks, a system for managing references, after initial scanning and read more thoroughly. Inclusion and exclusion criteria were applied (perspective on communication, defined as crisis communication with the public, among and within response organisations; focus on terrorism; English language; scientific quality with a minimum of eight scientific sources as a rule of thumb; and year of publication 2002–2011). Thus, the final coded sample included 63 articles.

Data were extracted from the articles using a data extraction sheet (Jesson, Lacey & Matheson 2011), which consisted of a large table. The categories in the data extraction table included title, informal summary, focus, threat, topic area, aim of research, method, terrorism communication and CBRN terrorism communication. Once filled in with the data, the table extraction sheet consisted of 58 pages. The data analysis was conducted applying principles of a thematic analysis. First, data that contributed to the first two research questions, which were characteristics and themes of communication in CBRN terrorism crises, were colour-coded in the data extraction table. Next, text segments that contributed to the research questions were copy-pasted to Word in a file created per research question. In Word, text segments were further grouped according to emerging themes. Following the principles of inductive thematic coding, the themes were further segmented to reduce the data and to capture key insights. Themes were divided into sub-topics through the identification and categorisation of reoccurring topics, similarities and differences and by paying attention to theoretical constructs and interesting insights (see Ryan & Bernard 2003). The purpose of the analysis was to provide a rich description based on a narrative account of the insights found in the literature in order to explore the different dimensions and aspects of communication in this relatively new area of research. The main themes were then reported and described in the text with references to the reviewed literature. As an example, with regard to the first research question – concerning characteristics of communication in CBRN terrorism crises – two overarching or meta-themes (Guest, MacQueen & Namey 2012) concerned terrorism-related aspects and CBRN-related aspects. The former included as content-driven sub-themes: emotions evoked, the need for sense-making, unexpected behaviour, trust and credibility, and discourse on terrorism.

In addition, to answer the third research question, simple quantitative analyses were conducted regarding research trends and orientations in the studied literature. These included the distribution of articles according to the year of publication, crisis type, methodological approach, authors and journals. The calculations were conducted manually based on the data gathered in the data extraction table in Word.

3.3 Qualitative questionnaire study on expert perceptions

Study II consisted of a qualitative questionnaire study and focussed on the perceived challenges and inspirational practices of communication in CBRN terrorism crises. It was conducted as part of a larger questionnaire study aimed at international crisis management and communication specialists working in Europe. A questionnaire was selected as the data gathering method to reach the international community of specialists who are knowledgeable of CBRN crises. The source of knowledge in this study was experts' perceptions. Being a low probability risk with few past cases to reflect on, studying perceptions was a natural choice. Moreover, experts were selected as informants, as this is a topic that involves highly specialised knowledge.

The sample was drawn from the database of the yearly International Disaster and Risk Conference in Davos of the Global Risk Forum. A pilot study was conducted in May 2012, and the main data were collected between June and September 2012. Following ethical guidelines, an informed consent was signed by all the respondents. The questionnaire was a collaboration with another EU-funded project, Public Empowerment Policies in Crisis Management. Eighty-two experts responded to the questionnaire, while 28 answered the section on CBRN terrorism crises. As the experts could answer the questionnaire in phases and leave any of the questions unanswered, it seemed that only those who felt knowledgeable of CBRN terrorism chose to contribute to this part of the questionnaire. Although resulting in a smaller number of responses, the qualitative insights provided were considered useful in describing the challenges facing communication in CBRN terrorism crises.

The questionnaire mainly consisted of open-ended questions accompanied by two multiple-choice questions. The analysis was conducted using ATLAS.ti, version 7, which is a qualitative data analysis software. For the background and multiple-choice questions, quantitative analyses were conducted. The remainder of the data were analysed following the principles of a thematic analysis. First, the questionnaire data were exported to ATLAS.ti and read through several times. Next, text segments were coded thematically. The main themes were derived from the questionnaire sheet and included preparedness of organisations for communication during CBRN terrorist crises, challenges encountered in communication with citizens, potential solutions and views on ethical issues.

The coding proceeded from the detailed to the general level. First, all responses were assigned a code or codes reflecting potential types of meanings embedded in the text (Guest, MacQueen & Namey 2012), which resulted in the production of multiple codes in ATLAS.ti. Next, these codes were copy-pasted to distinct word files representing the main research questions. Then, the codes were further grouped, segmented and divided into themes and sub-themes using data-driven thematic coding (Riessman & Quinney 2005). Overlapping codes were united or new ones created. Themes were identified based on identifying reoccurring topics and comparing similarities and differences between

coded text segments (Ryan & Bernard 2003). With the help of ATLAS.ti, the original responses were constantly compared to the assigned codes and emerging themes to ensure consistency of the created categories and the themes' representativeness of the views of the respondents. Thus, the data were reduced, summarised and finally reconstructed to answer the research questions concerning: 1) communication challenges and 2) inspirational practices when communicating with citizens. As an example, with regard to the first research question, concerning communication challenges, one of the main themes, nature of the threat, was described with the help of sub-themes, as described in Article II: cannot always be sensed, uncertainty and an evolving situation, differing threat types that involve emotions, lack of time in crisis situations and unpredictable, global threat. When reporting the findings in Article II, quotes were used to illustrate the themes.

In line with an interpretive research approach, knowledge was thus co-created, and the challenges and potentially inspiring practices were reconstructed by interacting with the information provided by the experts. Moreover, the purpose of Study II was to complement the findings of Study I, and finally, to contribute to the construction of a reflection framework in Study III.

3.4 Theory-driven re-analysis of study findings

Study III focused on reflection and learning through a process approach supporting preparedness, response and recovery in CBRN terrorism crises. In light of the strong operational needs that these types of potentially devastating crises require, the aim of this study was to concretise results from previous studies to assist those who need to reflect on practices in preparedness for all phases of CBRN terrorism crises. Furthermore, the purpose was to determine how a framework derived from the crisis communication scorecard developed for different crises (Palttala & Vos 2012) could be customised to CBRN terrorism crises.

In line with the interpretative paradigm, the premise behind this study and the related framework is co-creational. Rather than a recipe-like solution, the framework is viewed as an instrument for joint reflection and learning. The framework covers four different crisis phases with different communication tasks and indicators as explanations, which describe and specify the related tasks. The tasks further relate to groups of stakeholders: the response organisation and network, citizens and news media. Hence, this study consisted of a re-analysis of the findings of Studies I and II according to the phase and stakeholder specific communication tasks and performance indicators to determine how they could be developed to match CBRN terrorism crises. Moreover, the findings of Study IV were used to update the indicators to meet the needs of the social media environment.

First, a data extraction table was created that consisted of phase- and stakeholder-specific communication tasks based on the crisis communication scorecard developed for different crises (Palttala & Vos 2012). Next, the findings

of Studies I, II and IV, including insights gained from scientific literature on communication in CBRN terrorism crises, expert views on challenges and good practices and insights into social media monitoring methods and the process, were re-read and re-analysed considering the reflection framework. Data that matched the communication tasks, which were divided into crisis phases (preparedness, detection and warning, crisis response and recovery and evaluation) and according to stakeholder groups (citizens, response organisation and network, news media) were placed in the data extraction table in the form of summarised key insights (Annex 2 in Ruggiero, Vos & Palttala 2015). Following this, the general framework was updated. Based on user feedback, some indicators describing generic communication tasks were combined, and others were better explained. Finally, the task descriptions were adapted and re-written according to the findings in the data extraction table to reflect the specific demands of CBRN terrorism crises. The analysis could thus be described as a theory-driven, interpretive re-analysis of study findings based on a synthesis of existing knowledge and the expertise of the researchers involved, with the aim of providing a narrative that could be used for the purpose of reflection and learning by practitioners as further described in Section 4.3.

The resulting framework was tested in twelve face-to-face interviews with authority experts in Oslo, Norway, as part of another dissertation research project (see Ruggiero, Vos & Palttala 2015).

3.5 Review of social media monitoring methods

The focus of Study IV was social media monitoring methods and the process underlying the gathering and interpretation of data on fast-developing social media interactions of citizens and other stakeholders in the changing online environment in crisis situations. This study was conducted by carrying out a literature review. As the literature search in the context of terrorism and crisis communication in Study I did not produce results for social media monitoring, a focussed search on social media monitoring methods was carried out to complement the findings of Study I and to provide a theoretical basis for the final study, Study V.

Data collection was carried out following the procedures of a systematic literature review. The literature search was conducted in multiple electronic databases via EBSCOhost, ProQuest and Web of Science, available via the Jyväskylä University Library, in October 2012. The search was limited to scientific articles in peer-reviewed academic journals. The search terms used included [social media] and [monitoring or scanning or tracking or analytics] and [communication or public relations]. Altogether, 102 articles were found. After initial scanning, inclusion and exclusion criteria were applied (focus on social media; perspective on communication, limited to communication with members of external public groups; perspective on monitoring; English language;

and scientific quality). As a result, 24 articles were included in the final sample for coding and analysis.

First, a preliminary coding of the articles was conducted by underlining texts segments that were considered relevant for answering the research question: how are the methods for monitoring the social media interactions of citizens described in the academic literature? A tentative code list was formulated to map key themes in the literature based on identifying recurrent topics. The purpose at this stage was to provide an overview of the content that was considered useful in addressing the research question. Next, all the articles in the final sample were exported to ATLAS.ti, version 7, which assisted in conducting the final analysis and coding.

A thematic analysis was used as an analysis method. Data-driven thematic coding was conducted in ATLAS.ti using the preliminary code list, which was further refined during the coding process. In ATLAS.ti, first, a detailed coding was conducted to provide a descriptive account of the data that had been initially colour-coded as relevant for the research questions. Hence, the analysis proceeded from the general level to the details of the data, as the main themes and topics identified during the preliminary coding were further split into and described with sub-topics. Next, outputs of code lists were created, and following the principles of a thematic analysis, codes were further grouped and categorised thematically by looking for similarities and differences between coded text segments to reduce the data and to capture important insights and concepts (Elo & Kyngäs 2008, Ayres 2008). As a result, five main themes with content-driven sub-topics were established to structure and describe the findings: the concept of monitoring, the monitoring process, monitoring methods, tools and solutions and methodological issues. For example, the concept of monitoring included as sub-topics the purpose, object and focus of monitoring.

In addition to the thematic analysis, simple quantitative analyses were conducted to examine trends in the studied literature. These included the distribution of articles according to the year of publication, methodological approach, context/disciplinary perspective, the focus of the articles and the types of social media studied.

3.6 Table top discussion among experts

The focus of Study V was the process of communication strategy making for CBRN terrorism crises. This study was conducted by observing a table top discussion among crisis communication experts who were knowledgeable of CBRN issues and/or of strategic communication. The objective of this study was to delve into the grass-root level of communication strategy making and to explore how the different challenges are met and dealt with in practice by communication experts when deciding on communication actions. In this work, as explained in Section 2.6, the process of communication strategy making refers to identifying and prioritising problems in CBRN terrorism crises and find-

ing ways to solve these. Accordingly, strategy making is like orientating with a map, where communication strategies are different paths or routes that can be distinguished on the map and followed to reach a destination (see Weick 2001).

Fortunately, as CBRN terrorist attacks are not a recurrent crisis type, a table top discussion on a realistic scenario was considered an optimal venue for data gathering. In comparison to interviews, for example, observation was considered to produce more realistic findings than simply asking questions. Moreover, the synergy created by the discussion provided a fertile ground for a co-creation of ideas and insights compared to interacting with the experts one-on-one. Although not an exercise, the setting resembled a real-time situation with new developments stimulating a vivid discussion among experts.

This study was conducted in conjunction with a workshop organised by the CATO project in Berlin in March 2013. The workshop consisted of three parallel sessions and brought CBRN specialists from different fields together to discuss issues pertaining to CBRN terrorism crisis management. The session on communication was attended by seven experts from five European countries: Belgium (1), the Netherlands (2), Norway (2), Romania (1) and Sweden (1). The participants were selected using a purposive strategy. The selection criteria included: (1) expertise in the field of crisis communication and (2) experience with CBRN issues and/or strategic communication. The participants had extensive experience, ranging between 6 and 18 years, in the field of crisis communication and management. In line with the principles of ethical research, an informed consent form was signed by all participants before beginning the workshop.

The discussion dealt with a fictional but realistic crisis case based on a scenario of an anthrax attack. The scenario was developed by a senior consultant on global health security and bioterrorism along with researchers and CBRN specialists working for the CATO project. The scenario was constructed following a process approach and was comprised of three phases of an escalating crisis: 1) warning, 2) response and 3) recovery. The first sequence of events provided as input for the discussion focussed on the initial impacts of a situation in Brussels, where 14 employees of the European Parliament had been admitted to hospital. Two persons had died, and a diagnosis of anthrax was being considered, including speculation on the possibility of a bio-terrorist attack. The second sequence focussed on the situation during the response phase, when the disease had further spread and the number of victims had risen to over 1000 with 250 deaths. The origin of the incident was confirmed to be terrorism. There were issues regarding access to health facilities and hospitals, fears among the population, with many trying to leave the city, overwhelmed transport hubs and widespread confusion concerning the situation. The third sequence of the session focussed on the recovery phase on day five after the incident had occurred, at which point many more people had died, while a large part of the population was still in the contaminated area. Citizens raised questions concerning medical care, food and water. Furthermore, emergency responders were concerned about their health, and there were also significant international concerns as well as offers of assistance from other countries.

Thus, following the previously outlined process approach, the table top discussion was organised in three consecutive sessions, each of which lasted about one hour. Each session was preceded by an introductory meeting in which the main events were explained. An open approach with few intermediary questions was adopted to allow the experts to express themselves freely and to allow for an emergence of a maximum variety of perspectives. The task of the experts was to discuss communication issues that they considered relevant in each sequence of the evolving crisis. A fact sheet on anthrax was provided as supporting material, and a simulated stream of a realistic social and news media feed was projected on the wall to stimulate the discussion.

The discussion had three moderators, whose roles were that of facilitators: one took notes, while two checked the time and facilitated the discussion with minor intermediary questions and comments if the discussion stagnated or further clarification was needed, for example. Moreover, two researchers observed the discussion and took notes. The discussion was both tape-recorded and videotaped with a panorama camera, allowing a 360° perspective with an overview of all participants sitting around one table. The video recording facilitated the transcribing process and served in recapturing a realistic overview of the discussion and its atmosphere during the analysis. Non-verbal input provided by the video recording was not considered unless it provided missing information of the verbal content for the analysis, which focussed on capturing key themes and topics in the process of communication strategy making in CBRN terrorism crises.

To prepare the data for analysis, the recorded table top discussion was first transcribed. Each of the three crisis phases was covered in one file resulting in altogether 58 pages (approximately 25 570 words) of transcribed text. In the next step, the transcripts were read through several times. Colour-coding was conducted according to the research questions, which focussed on two main topics: 1) how the communication experts followed the evolving crisis situation and 2) how they decided on communication strategies. The colour-coded rtf files were then exported to ATLAS.ti, version 7, which assisted in further analysis.

The analysis was conducted drawing mainly on the thematic analysis following both deductive and inductive approaches. The research questions and the phase-specific structure of the workshop created the basis for the analysis followed by an open coding of the discussion. The analysis had two focusses: the overall strategy making process throughout the three crisis phases and the topics and themes underlying the strategy making process. To begin, the colour-coded text segments were further coded in ATLAS.ti, which contributed to the two research questions. Coding was done per phase. The coding proceeded from the detailed to the general level with the purpose of providing a descriptive account on the data and to indicate potential types of meaning in the text (see Guest, MacQueen & Namey 2012). This resulted in multiple codes in ATLAS.ti. Next, to obtain an overview on the evolution of the discussion across the three phases and to compare the initial coding with the discussion as a whole,

the coding was further refined in Word using a large table in which the running colour-coded transcripts were accompanied by all the codes. This phase in the analysis provided the overview of the strategy making process with the cyclic movement depicted by two arrows, as described in Section 4.5.

Next, based on similarities and differences identified, the codes were further grouped into families of codes in ATLAS.ti. Finally, all the codes were brought together in an overview using the network view of ATLAS.ti. Codes were grouped according to the research questions and then segmented and categorised following the principles of inductive thematic coding to capture key concepts, themes and patterns (Ayres 2008). Themes were identified based on identifying reoccurring topics and through a process of locating similarities and differences between coded text segments (Ryan & Bernard 2003). In this process, some new codes were created, and overlapping codes were discarded and merged. Facilitated by ATLAS.ti, the transcribed discussion could be constantly compared with the given codes and emerging themes to ensure consistency of the created categories and representativeness of the data. A broad treatment of data was employed, aiming to include the voices of all participants and not exclude unusual or deviant cases. In the end, the main themes and topics were listed in Word and described in text with illustrative quotations from the discussion. This part of the analysis provided an answer to the two research questions regarding the core elements involved in the process of communication strategy making in CBRN terrorism crises, as described in Section 4.5. With regard to the first research question, for example, the main themes, or meta-themes (Guest, MacQueen & Namey 2012), identified included gathering input from various actors and creating situational understanding, with the former comprising as sub-themes the gathering of information from the response network and gathering of their own information, which further included content-driven sub-topics as described in the findings of Article 5.

This study concluded the empirical research conducted for this thesis by providing the final link that would bind the dissertation as a whole by explaining how the challenges of communication in CBRN terrorism crises are met by communication strategy making. The main findings of the five studies are described in the next chapter.

4 FINDINGS

This chapter presents the central findings of this thesis. The central findings are based on a synthesis of the results of Studies I—V, as reported in the original articles (see Table 1). In this thesis shell, the article findings are revisited to meet the purpose of this thesis.

The *purpose* of this research was to better understand and describe the challenges of communication in CBRN terrorism crises and how these challenges are met by the communication supporting crisis management of public authorities in such circumstances. Study I, which focussed on communication premises, explored the different dimensions and aspects of this multi-faceted crisis area as well as what is needed from communication in response to such crises. Study II focussed on communication challenges and inspirational practices for communication with citizen groups in such crises. In Study III, the results from Studies I, II and IV were concretised and applied into practice for reflection and learning through a process-based instrument. The purpose of Study IV, which focussed on social media monitoring, was to describe the process underlying the collection and interpretation of changing information in social media. Finally, Study V combined the knowledge from all the studies by examining how challenges are met and dealt with in practice when deciding about communication actions.

The findings are described in more detail in the following sections, which are dedicated to each study in question. The full account of the study findings can be found in the original articles. Here, the results are not merely repeated but revisited insofar as they contribute to the purpose of this dissertation.

4.1 Characterising features of communication in CBRN terrorism crises

Study I focussed on the characteristic features of communication in CBRN terrorism crises. It explored the different dimensions and aspects of this multi-

faceted crisis area as well as the role of communication in response to such crises. The findings were reported in Article I. Table 5 summarises the findings.

TABLE 5 Summary of the findings of Study I

Study	Main findings
I Communication premises	*Scenario-based demands* - Terrorism: emotions evoked, need for sensemaking, unexpected behaviour, trust and credibility, discourse on terrorism - CBRN materials: diverse crisis types, uncertainty and quickly evolving info, fuzzy boundaries, lack of knowledge, diverse needs of public groups *Contribution of communication to crisis management* 1) As a strategic function: - is strategically planned, supporting the goals of crisis management with distinct approaches and strategies - provides understanding of stakeholders and their needs to e.g. target communication with appropriate contents and means - provides understanding of perceptions (including misperceptions) of public groups as a basis for all communication actions - ethical aspects are part of the stakeholder approach to communication 2) As a support function to other functions of crisis management: - plays a part in operational crisis management - constitutes a vehicle for the leadership - facilitates cooperation and coordination in the crisis management network

This study revealed that the demands that the scenario requires for the management of CBRN terrorism crises can be divided into aspects that involve 1) terrorism and 2) CBRN materials in question. These aspects determine the requirements that communication must meet as well as the frame of reference for operation in response to such crises. On the one hand, terrorist attacks evoke emotions, affecting a collective sense of security on a society-wide level for the whole of the international community. Intentional harm targeted towards the innocent concerns everyone, influences world views and values and creates a need for sensemaking, which is manifested in a fierce societal discourse and a public debate following an attack. Trust and credibility issues are at stake, and an unexpected response among public groups may ensue.

On the other hand, CBRN-related aspects comprise diverse crisis types, which citizens generally lack knowledge of. It is difficult to create preparedness for such crises, both from the response organisation and network perspective as well as from the perspective of citizens and communities who might face such a crisis. Uncertainty and quickly evolving information due to scientific uncertainties during a potential crisis may challenge the responding actors and increase fear and anxiety levels. Moreover, fuzzy boundaries of time and geographical space complicate the stakeholder analysis when determining the different levels of exposure and involvement of public groups needed to meet the different needs of citizens. The specific demands depend on the crisis case at hand and the device and chemical, biological, radiological or nuclear materials used.

The contribution of communication to crisis management is two-fold. As can be seen in the findings of Article 1, the basic communication functions in CBRN terrorism crises are not essentially different from those in other kinds of crises. However, certain tasks are more important than others, to which special attention is paid in the subsequent sections, including the discussion and conclusions in Chapter 5. On one hand, communication is *a strategic function* with distinct approaches and strategies and is planned strategically in line with the overall crisis management. A strategic approach to communication includes an understanding of stakeholders and their needs to be able to draft appropriate contents, choose the appropriate means and target communication to those in need. An understanding of the risk perceptions of public groups is a basis for all communication actions. This is elementary because risk perceptions influence behaviours and help explain the ways publics respond to CBRN terrorism crises. Understanding perceptions includes clarifying misperceptions, which can ensue due to a rapid spread of information and misinformation in social media in terrorist situations. In CBRN terrorism crises, due to society-wide consequences, meeting the needs of the indirectly affected publics whose needs are not met via operational crisis management is especially important. The stakeholder approach also implies considering ethical aspects and dilemmas, and there are several in cases of CBRN terrorism. For example, when framing messages about the causes of terrorism, attention can be paid to their potential effects on public debates concerning immigrant minorities.

On the other hand, communication serves as *a support* to the other functions in the crisis management network. As the damage potential due to the hazardous materials involved is catastrophic, communication plays a key role in supporting operational crisis management via information exchange, warnings and instructions, for example. As terrorism is an attack against society with a political dimension that aims to produce society-felt consequences to disrupt the current order, communication is a vehicle of the leadership in defending the values that terrorism seeks to attack. Moreover, as CBRN terrorism crises require cooperation across, within and between organisations, sectors and levels of government, communication plays a key role in facilitating cooperation and coordination in the crisis management network.

The specific circumstances that CBRN terrorism creates were further explored in Study II in the form of the challenges of communication in CBRN terrorism crises and inspirational practices used to overcome some of the challenges.

4.2 Challenges and inspirational practices for communication in CBRN terrorism crises

Study II focussed on the perceived challenges and inspirational practices of communication with citizens in CBRN terrorism crises. This study contributed

to the thesis as a whole by clarifying critical points that required attention regarding communication and by identifying practices that may guide communication planning and preparedness. The findings, which are summarised in Table 6, were reported in Article II.

TABLE 6 Summary of the findings of Study II

II Communication challenges	*Challenges mentioned:* - nature of the threat - public perception and response - resources and competences, cooperation - preparedness communication - communication during a crisis *Inspirational practices mentioned:* - tasks: prepare publics and prevent harm, build trust, mitigate fear by all means of communication - contents: concrete examples, additional info - goals: empowering citizens by involvement - communication approaches: personal, direct, face-to-face communication - to bridge ethical dilemmas: avoid stereotypes, generalisations and stigma, refer to facts, provide advice, inform about concrete threats as part of a multi-hazard approach

Regarding the challenges, this study further confirmed the findings of Study I in demonstrating that the demanding conditions emerge from the nature of the threat and the various dimensions it covers. In Study I, these dimensions were divided into terrorism and CBRN-related aspects, such as a threat that is often not observable. Hence, knowledge and understanding of both CBRN issues and terrorism are needed by the crisis management network to be able to communicate in such situations. As the experts perceived a lack of resources and competences as a challenge, ensuring an adequate level of expertise on CBRN terrorism is a topic that may need more attention in crisis communication preparedness and planning in the future.

According to experts, communication and education in the pre-crisis phase are critical to developing preparedness for risks that are not considered likely and that public groups lack knowledge and understanding of but that require prior education and training due to their complications and damage potential. This relates to the preparedness paradox, as discussed in Article II. Moreover, timely communication and providing information during a crisis when the public response and behaviours may be unexpected requires cooperation among many actors. Due to the many challenges related to CBRN terrorism crises, this crisis area is defined as complex. To address this complexity, networked expertise is needed from actors such as crisis managers, communication specialists and CBRN and terrorism experts.

Inspirational practices include fragments of solutions that could be useful in meeting some of the abovementioned challenges when communicating with citizens. According to the experts, the solutions are not necessarily more complex than in other types of crises. Important tasks for communication include preparing publics, preventing harm, building trust and mitigating fear.

Concrete examples and additional information are to be provided, and all means of communication are to be used following the principles of openness, accuracy, consistency and speed. The experts clearly emphasised what could be called soft approaches to communication, such as personal, direct and face-to-face communication, in balancing emotional reactions, anxiety and fear.

Although there were few responses to the question concerning ethics, those who responded perceived ethical issues in communication related to CBRN terrorism as important. Providing information and guidance as part of a multi-hazard approach was viewed as a way to create preparedness without overemphasising terrorism. Moreover, generalisations, stereotypes and stigmas were to be avoided when drafting messages, and only information related to concrete threats referring to facts should be provided.

The findings of Studies I and II were used in Study III to construct the reflection framework.

4.3 Reflection and learning through a process approach

The focus of Study III was reflection and learning through a process approach that supports preparedness, response and recovery in CBRN terrorism crises. This study contributed to the thesis as a whole by concretising and putting the challenges discovered in Studies I and II into practice in the form of a reflection and learning instrument. This was considered necessary due to the multitude of challenges and demands of operational crisis management. The findings were reported in Article III, and they are summarised in Table 7.

TABLE 7 Summary of the findings of Study III

III Reflection and learning	A process-based reflection and learning instrument that: - covers all the crisis phases: preparedness, detection and warning, response, recovery and evaluation - details of communication tasks with CBRN-specific descriptions • preparedness: CBRN plans & scenarios, multi-hazard approach • warning and response: coordination and cooperation in a multi-actor network; emotionally supportive communication; ethical aspects • recovery and evaluation: long-lasting effects and ripple impacts - addresses three main stakeholder groups: response organisation and network, citizens and news media - provides a framework for joint reflection and learning and a knowledge base that can assist in communication planning and the evaluation of exercises and past events

The study revealed that the framework derived from the crisis communication scorecard, an audit instrument for all crises, could be further developed and customised to CBRN terrorism crises. The instrument covers four phases with

different communication tasks related to three main stakeholder groups: response organisation and network, citizens and news media.

Aspects that require customisation emerged at the meta-level of communication tasks, which is in the indicators describing the communication tasks. The task descriptions further depicted what is needed in terms of plans, strategies and roles and responsibilities, for example, of the various tasks referring to aspects of CBRN terrorism crises. For instance, elements that could be customised in the preparedness phase include the development of communication plans and strategies for C, B, R and N scenarios in the response organisation and the network. On the other hand, for local organisations, special interest groups, institutions and companies, an inclusion of CBRN risks within a multi-hazard approach is recommended.

Another aspect that needs special consideration, especially in the preparedness phase, is that of the potential scale of cooperation and coordination, which, in CBRN terrorism crises, could mean broad network activities on multiple levels crossing organisational, sectoral and geographical borders. Moreover, the need to address people's feelings of safety via empathy and emotionally supportive communication is emphasised in all crisis phases. The consideration of ethical issues plays an important role in media services and leadership communication, including issues related to stereotypes and stigma. In the recovery phase, the long-lasting and wide-ranging impacts, potentially involving a large community of indirectly affected public groups, requires attention.

The instrument provides a framework for reflection and learning in all the phases of a CBRN terrorism crisis. Pre-crises, it can be used for joint preparedness. By assessing preparedness for the different communication tasks in different crisis phases, collective learning is initiated. After a crisis, the scorecard provides a framework for reflecting on the success or failures of conducting different communication tasks throughout the crisis for joint learning from past experiences. The framework can also be viewed as a knowledge base that covers different communication processes in different phases of CBRN terrorism crises. Each crisis situation is different. Hence, the aim of the framework is not to provide a recipe-like solution but rather a framework that can facilitate joint reflection and learning in the crisis management network and thus improve preparedness and enhance recovery from crises. By using the elements included in the framework, new solutions can be co-created. Collective learning can help with coping during crises, not by repeating already simulated exercises but by reconstructing new solutions based on individual and collective learning experiences.

As part of another dissertation, the framework was tested in face-to-face interviews with authority experts, who considered it useful for reflection and learning purposes.

4.4 Social media monitoring methods and process

Study IV focussed on the methods and the process of social media monitoring. Its contribution to this dissertation is that it clarified the prerequisites for following and monitoring interactions on social media in CBRN terrorism crises. Understanding the needs and perceptions of citizens and the public debate about the crisis at hand is a prerequisite for taking necessary, up-to-date communication actions. In the current organisational environment, social media are platforms where public interaction and debates take place. The findings were reported in Article IV. Table 8 summarises the findings.

TABLE 8 Summary of the findings of Study IV

IV Social media monitoring	Social media monitoring is a process with: - four main steps involving different definitions and choices: preparation, data collection, analysis, reporting - basic definitions, e.g.: object (problem area, issue), focus (topics, sub-topics, sentiments), stakeholder groups, social media, geographical focus, purpose of monitoring, resources, timing, tools and solutions, analysis methods - methods & tools: researcher-driven, computer-assisted - methodological issues: privacy, informed consent, accuracy, objectivity, representation, generalisability, technical limitations

Social media monitoring is a process that consists of specific steps that involve different definitions and choices: preparation, data collection, analysis and reporting. It involves various tools based on information and communication technology (ICT). As ICT-based tools do not resolve all issues, researcher-driven work is still needed. For example, in the preparation phase, basic definitions concerning the problem area and related issues must be determined. This includes clarifying the focus of interest, such as topics, sub-topics and sentiments. Moreover, an understanding of stakeholders and a basic know-how of communication is relevant to be able to define whose viewpoints are monitored and in which media form.

Basic planning for the process is also needed in advance, including establishing the purpose of monitoring, defining resources (budget, personnel) and timing (dates, timetable). The selection of monitoring tools and solutions requires cooperation with ICT experts and partly determines the next steps of the process, including how data collection, analysis and reporting unfold; however, traditional communication expertise and knowledge combined with researcher insights are needed to actualise the potential of social media tools and solutions.

Moreover, Study IV revealed that the task of keeping up-to-date with the interactions on social media is difficult because it involves several methodological and technical issues related to collecting and interpreting big data. As a result, the accuracy and reliability of large datasets need critical evaluation. For example, due to a lack of contextual information, subtle meanings, attitudes and motivations may be difficult to capture. Moreover, when taken out of the origi-

nal context, information may lose or change its meaning. Interpretation of relational data can lead to apophenia (Boyd & Crawford 2012), for example, which is a misidentification of patterns where they do not exist. Furthermore, in the case of terrorism, the misuse of social media and intentional provision of false information is possible. Current tools may not be able to manage the volume and speed of rapidly evolving social media data during crises. The representability of the social media monitoring findings is thus limited and requires critical analyses and comparisons with data from other sources.

In sum, this study clarified the process and described the limitations of social media monitoring needed for communication strategy making in CBRN terrorism crises, which is the focus of the final study, Study V, described next.

4.5 Communication strategy making process

The focus of Study V was the process of communication strategy making for CBRN terrorism crises. This study contributes to the thesis by outlining the process of dealing with the challenges of such crises in practice for communication strategy making, which involves deciding on the relevant communication actions to be taken for meeting the challenges. Accordingly, strategy making is like orientating with a map and looking for different communication strategies in the form of paths or routes that can be distinguished on the map and followed to reach a destination (see Weick 2001). It complements the findings of the previous studies by focussing on the grass-root level actions needed during an ongoing crisis situation. The findings, which are summarised in Table 9, were reported in Article V.

TABLE 9 Summary of the findings of Study V

V Communication strategy making	The process of communication strategy making - consists of two main parts, each of which comprises further elements 1) keeping track of the situation; and 2) making communication strategy choices - is a cyclic process, an interaction between different elements - fits with a process view on crisis management and modern views on crisis communication centring on concepts such as flexibility and sensemaking

According to the findings of this study, the process underlying communication strategy making is two-fold. On one hand, it consists of monitoring the situation, and on the other hand, it consists of making communication strategy choices. The movement between these two is cyclic and continuous, as could be observed in the table top discussion throughout the different crisis phases: as the situation evolves, new input is being gathered, and situational understanding is created. This further influences communication strategy choices and includes interpreting the various inputs, considering effects and scenarios, prioritising issues, weighing goals and principles and balancing with preparedness

plans, roles and responsibilities. Within the overall crisis context, including all phases of the crisis in line with a process view on crisis management and communication, there is hence a continuous strategy making cycle, a movement between following the evolving situation and making communication strategy choices (see Figure 2).

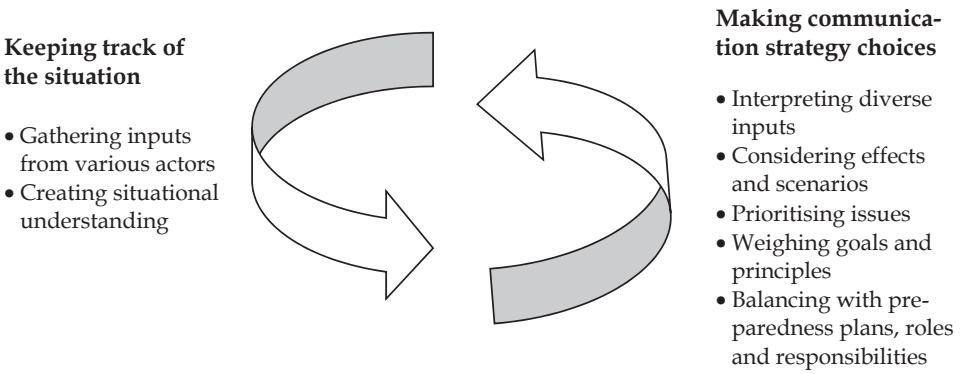

FIGURE 2 Overview of core elements in coping with complexity in evolving crises

One could question how this simple and intuitive practice can adequately describe the strategy making process and meet the complexity requirements described in the previous studies of this dissertation on CBRN terrorism crises. Although seemingly simple, the tasks of communication experts are demanding. They require gathering input while interpreting and analysing it simultaneously when time is short and quick action is needed. While one cycle is still unfolding, a new cycle already begins. This requires flexibility in the face of the unknown and acting at the same time. Moreover, the process of communication strategy making describes only one part of the process of meeting the challenges of communication during CBRN terrorism crises, which is dealing with them in practice. The other pieces needed consist of the findings from Studies I—IV of this thesis. The big picture, which brings these pieces together, is further introduced and discussed in Chapter 5, which presents the discussion and conclusions.

5 DISCUSSION AND CONCLUSIONS

The purpose of this research was to better understand and describe the challenges of communication in CBRN terrorism crises and how these challenges are met by the communication supporting crisis management of public authorities in such circumstances. Empirical research was conducted to fulfil the purpose of this thesis, and this thesis shell provides a synthesis of the empirical findings and theoretical insights obtained from the crisis communication literature.

In this chapter, a model that illustrates how the purpose of this research was met is introduced. Next, the model and the key findings of this research are discussed in light of previous research and scientific literature on the topic. The discussion includes terrorism-specific literature, which was reviewed in Study I (Ruggiero & Vos 2013), and the broader literature elaborated on in the theoretical framework of this thesis shell (see Chapter 2). Conclusions are presented, and theoretical and practical contributions of the research are discussed. Finally, this thesis concludes with an evaluation of the research, including ethical aspects and limitations, and suggestions for future research.

5.1 Integrated approach to crisis communication in the case of CBRN terrorism

How the purpose of this research was fulfilled is illustrated in the following model (see Figure 3), which is based on a synthesis of the research findings and existing literature. The model consists of five interrelated layers, each of which describe one dimension of complexities and how to cope with them in CBRN terrorism crises. The outermost layer includes a macro approach, as it focuses on the crisis and societal context. The two middle layers comprise the meso environment on the level of the response organisation and the crisis management network as well as key stakeholders, including diverse public groups and their perceptions and reactions. The two innermost layers include a micro approach

that involves the communication department and the crisis communication team. In the first and third layers, the main focus is on the challenges that CBRN terrorism and the related public perceptions and responses present to crisis communication. Layers 2, 4 and 5 describe crisis communication activities in response to such challenges, or how those challenges can be met through communication by public authorities in such situations.

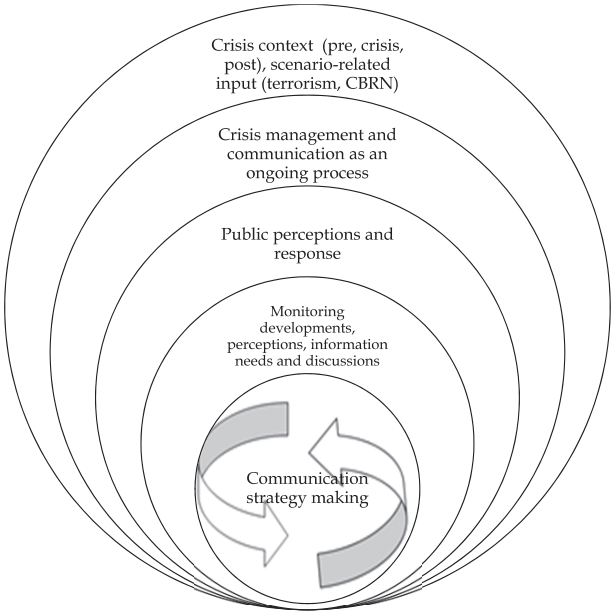

FIGURE 3 Integrated approach to crisis communication in the case of CBRN terrorism

Layer 1

The outermost layer describes the context and the frame of reference within which the other layers are situated. It comprises the crisis context based on a life-cycle perspective to crises embracing the pre-crisis, crisis- and post-crisis phases, thus including an integrated view in which terrorism is included both as a risk and as a crisis.

The scenario-related demands, which shape the context, can be divided into terrorism- and CBRN-related characteristics, as explained in the findings of Study I (Ruggiero & Vos 2013) and elaborated on in Study II (Ruggiero & Vos 2015). These are the main challenges that CBRN terrorism poses to crisis communication.

On one hand, intentional harm targeted towards innocents causes psychological impacts and deeply affects feelings and values, creating a need for sensemaking. Societal discourse, which terrorist attacks trigger and which surrounds terrorism in general, is framed by media institutions, and it involves a political element and puts trust and credibility issues at stake. On the other hand, chemical, biological, radiological or nuclear materials involve different

types of crises, which are difficult to create preparedness for and which people generally lack knowledge of.

When used for terrorist purposes, a variety of uncertainties, including scientific uncertainties, are involved, resulting in quickly evolving information. Moreover, the risk or crisis is situated in a context framed by a specific moment in time, including societal developments and events and cultural factors.

Layer 2

The second layer illustrates that crisis management and communication activities are ongoing processes that take shape in response to terrorism risks and crises in the pre-crisis, crisis and post-crisis phases. This layer draws from the contributions of Study III (Ruggiero, Vos & Palttala 2015) in which an approach to bridging the challenges of CBRN terrorism crises was described. As Study III drew from the findings of Studies I, II and IV, the challenging aspects of communication itself, including resources and competences, cooperation, preparedness communication and communication during a crisis (Ruggiero & Vos 2015), were taken into account. According to this approach, crisis communication tasks are divided into four main phases: preparedness, detection and warning, response and recovery and evaluation with CBRN terrorism-specific indicators describing the related tasks.

The crisis communication tasks and activities take shape as different forms of networked interactions between an organisation and its stakeholders. In this case, three main groups of stakeholders include the response organisation and network, citizens and media organisations. As can be seen in the findings of Study I, many general insights on crisis communication are applicable to CBRN terrorism crises. Aspects that require additional attention were consequently customised in the scorecard include CBRN scenarios in the crisis communication plans and strategies in the response organisation and the network in the preparedness phase. Coordination and cooperation in a multi-actor network, including international partners, is important in all phases. Moreover, ethics and emotions are issues that require attention in CBRN terrorism crises. The recovery phase may be long and its impacts wide-ranging because it also involves a community of indirectly affected people.

This approach constitutes a process-based reflection and learning instrument, which also serves as a knowledge base to enhance crisis communication preparedness and to facilitate response and recovery from crises. In particular, the framework can facilitate cooperation and joint initiatives in the response organisation and the network, especially in the preparedness phase, by offering an instrument through which challenging tasks can be made concrete and can be collaboratively discussed.

Because every crisis is different and unfolds in unique ways, as indicated by the outermost layer of the model describing the crisis context, crisis communication in each case is constituted according to the specific and dynamic organisational, situational and contextual factors and needs. The approach serves as a basis, which draws both from the commonalities that all crises share and the

specific demands that CBRN terrorism crises present, upon which solutions to meet the needs of organisations and stakeholders involved can be co-created and constructed.

Layer 3

The third layer focusses on public perceptions and responses that interact with and emerge in response to crisis-related and contextual factors, which have been explained in relation to the outermost circle. The public perceptions and responses are thus shaped by both the risk or crisis event itself and the context they are embedded in. Moreover, the actions of the crisis management network also interact with and influence them.

This layer draws from the findings of Studies I (Ruggiero & Vos 2013) and II (Ruggiero & Vos 2015), which described public perceptions of and responses to CBRN terrorism and positioned them among the main challenges such crises pose to crisis communication. For example, a lack of understanding and control over unpredictable CBRN terrorism adds to risk perceptions. Furthermore, heightened risk perceptions contribute to adverse psychological reactions, such as anxiety and fear, resulting in unexpected behavioural responses.

Misperceptions, which are easily created in an atmosphere of uncertainty and lack of information surrounding terrorist attacks and which can ensue due to either the intentional or unintentional spreading of misinformation in social media, for example, should also be considered.

Layer 4

In relation to the previous circle, the fourth circle includes monitoring public perceptions, information needs, discussions and developments. This layer mostly draws from the findings of Study IV (Ruggiero & Vos 2014). Monitoring, which refers to the process of collecting data from the environment, is part of the ongoing crisis communication activities and is a task that is relevant in all phases of crises. Thus, it is an integral part of the overall crisis management and communication approach, which was described with regard to the second circle; however, to stress the importance of monitoring the environment in providing ongoing input to the process of communication strategy making, which lies at the core of the model, a separate circle was added.

While the second layer, where crisis management and communication as an ongoing process were described, provides the general basis and an approach for meeting the challenges of communication in CBRN terrorism crises, monitoring activities comprise the primary process by which communication can be adapted to the dynamic and evolving conditions and requirements of the risk or crisis and the context at hand, including publics' perceptions and responses. This is especially important for CBRN terrorism crises, which are high uncertainty situations with many unknown factors and which create a heightened need for sensemaking and understanding.

Study IV contributed to this layer of the model by describing the prerequisites for monitoring social media interactions, which is of primary importance

in the current media environment. As a result, monitoring was described as a process that could be divided into steps involving several definitions and choices. Moreover, the multiple methodological issues, such as a limited accuracy and generalisability of social media findings, revealed by Study IV describe some of the limitations and boundaries of social media monitoring. Consequently, opinion polls and other less timely ways of studying developments and perceptions can be used to complement the results of social media monitoring, reflecting the principle of triangulation in research.

Layer 5
The final circle describes the grass-root level of communication action in CBRN crisis situations, referred to as communication strategy making, which lies at the core of the model. This layer mostly draws from the findings of Study V (Ruggiero 2016) in which this process was described as continuous, cyclic and two-fold, involving monitoring the situation and making communication strategy choices, as illustrated in the core circle of the model. This includes gathering inputs from various actors, interpreting these inputs by considering effects and scenarios, prioritising issues, weighing goals and principles and balancing with preparedness plans, roles and responsibilities to create situational understanding for further action purposes.

As explained, communication strategy making requires continuous input provided by monitoring activities of the crisis, context-specific demands and the perceptions and responses of public groups. Hence, it operates in parallel with the previous layers. Moreover, knowledge of the larger crisis management processes in the second layer can provide a basis or a framework for strategy making. Therefore, the core of the model interacts with all the other layers, drawing from the findings and conclusions of all the studies.

Next, the model is discussed in light of previous research and theoretical insights on the topic.

5.2 Discussion

The model integrates various insights of the existing theory and research on the topic, and thus it presents a holistic, integrated view to crisis communication in the case of CBRN terrorism. The first layer draws on the literature, which explains the characteristics pertaining to the scenario-related inputs to explain why CBRN terrorism is challenging. This literature was reviewed in the first article of this thesis (Ruggiero & Vos 2013). Consequently, the scenario-related demands were divided into terrorism- and CBRN-related aspects, which were explained in Section 5.1. The complexity, urgency and catastrophic potential of CBRN terrorism is determined by these two aspects and the way they materialise in an actual CBRN terrorism crisis case. The difficulty is that because any substance or other human invention could be turned into a terrorist agent when intentionally used (see Beck 2002), all possible worst-case scenarios cannot be

imagined. For example, a terrorist attack on the food supply involving the use of toxins, poisons or other chemical agents against storage facilities, transport containers or packaging materials of large retailers and food services (Stangielu et al. 2013) could lead to the contamination of a large number of people and would require considerable time to resolve. This would result in high levels of uncertainty and a quickly evolving situation with fuzzy boundaries because the crisis would be a multi-faceted, continuously changing event that could be difficult to make sense of and deal with, similar to targeting a moving, semi-invisible object.

The contextual layer could also be viewed as a filter that shapes the interpretation of terrorism and terrorist events (see Hargie & Irving 2016). This includes the nature of the crisis, the crisis intensity and the dynamics of the situation (Frandsen & Johansen 2017), which depend on the type of attack or form of terrorism by perpetrators, their objectives and the media portrayals involved (Hargie & Irving 2016). News media play a significant role in communication related to terrorism because in the absence of direct experience, people rely on indirect experience, including reports by news media, to form their views (Aldoory, Kim & Tindall 2010). The context is also influenced by multiple actors and perspectives based on various crisis interpretations, which can be competing and conflicting at times, that interact and discuss the crisis and issues involved in multiple issue arenas (see also Vos, Schoemaker & Luoma-aho 2014, Frandsen & Johansen 2017).

Moreover, social, political and cultural factors play a role in the contextual framework of crises (Renn 2008). Hence, the impacts terrorism crises create are always linked to wider socio-political and economic developments. In the case of the London polonium incident in 2006, for example, the fact that the James Bond movie Casino Royale had opened in the cinemas just before the event may have influenced the reception of the event and mitigated the following societal impacts (Rubin, Amlôt & Page 2011). Currently, the concern of citizens over terrorism coincides with immigration, which is viewed as a common European-wide issue (European Union 2016) that shapes the context where potential attacks take place and are consequently interpreted.

In sum, the first layer creates the context of complexity that surrounds CBRN terrorism crises as expressed by the following features: multiple, interacting agents, constant changes, evolving conditions, instability resulting from continuous changes, contextual dynamism and permeable and fuzzy boundaries (Gilpin & Murphy 2008).

The second layer of the model, including the meso level of the response organisation and the network, comprises various insights from theory and research on crisis communication and management. It is based on a framework derived from a general crisis communication scorecard developed for different types of crises (Palttala & Vos 2012). First, it assumes a phased or developmental approach to crisis communication that supports crisis management (see also Sellnow & Seeger 2013, Coombs 2015), mostly drawing from the crisis and emergency risk communication model CERC (Reynolds & Seeger 2005). In line

with CERC, communication related to CBRN terrorism risks and crises are viewed from an integrated perspective comprised of the pre-crisis, crisis and post crisis phases. While CERC has five phases, in the customised framework, recovery and evaluation have been merged into one phase, resulting in four distinct phases and related communication processes and tasks. The integrated perspective is useful for terrorism with blurred boundaries between risks and crises. A terrorist attack is often accompanied by a heightened risk of further terrorist activity, and resolutions may require time, if achieved at all (see also Burns & Slovic 2010).

Moreover, the approach assumes a stakeholder orientation and acknowledges different groups of actors, including citizens, as valuable partners with whom the communication processes are co-created. Drawing on a post-modern theory of stakeholder enabling (see Calton & Kurland 1996) and a network perspective (e.g. Roloff 2008, Adkins 2010), the purpose of communication is to enable and empower stakeholders to act, express their needs and views and take part in the decisions that concern their lives jointly with other actors in the crisis management network. This is also consistent with concept of the community approach to crisis management (Hyvärinen & Vos 2015). Cooperation between different actors, such as citizen groups, response organisations and media, is central in all phases of terrorism crises through the creation and maintenance of relationships and related interactions. This includes broad network activities that call for coordination on multiple levels across different organisational, sectoral and geographical zones or areas.

Community involvement in CBRN terrorism crises is important in several ways. Engaging publics in preparedness activities along with other actors in the crisis management network, including first responders and public officials, for example, can help build trust (Burns & Slovic 2010), which has often been shaken in the case of terrorist attacks. Moreover, a high-impact terrorist scenario executed using chemical, biological, radiological or nuclear agents would have such severe consequences that involving the communities and individuals in supporting emergency responses, via conducting self-triage for example, would be vital. Challenges include the attitudes of citizens themselves, according to which terrorism preparedness is considered a responsibility of authorities (Lee, Lemyre & Krewski 2010), and the mistaken belief held by many authorities that people would panic in severe crisis situations (Sheppard et al. 2006, Ruggiero & Vos 2015).

As an instrument for reflection and learning, the theoretical underpinnings are flexible in a sense that by applying a social-constructionist meta-perspective (see Craig 1999) and an interpretive approach, the framework allows for crisis communication processes to be constituted in multiple ways, accommodating various perspectives depending on the organisation, context and case in question. For example, while the structure based on phases, tasks and indicators reflects a functional and instrumental (see Sellnow & Seeger 2013) view to crisis communication, the lessons learned can serve the purpose of dynamic learning and adaptive planning while a crisis unfolds, which is suggest-

ed in a complexity-oriented approach to crisis management (see Gilpin & Murphy 2010). Hence, both the traditional and post-modern perspectives to crisis communication suggested in the literature apply (see Falkheimer & Heide 2010). Here, these two perspectives are viewed as complementary. As in music, when improvising the basic music theory, notes, tones and rhythms are integrated into novel ways of expressing a melody, which are born into a new context and situation. The same principle applies to the relationship between planning and improvisation in crisis communication, reflecting the saying 'practice (or training) makes perfect'. Flexibility and improvisation require "solid knowledge and experience" as well as "substantial training" (Falkheimer & Heide 2010, p. 521).

Although the question of whether or in which ways crisis communication in the case of CBRN terrorism is different from essential communication functions in other crises was not a focus of the present thesis, and to explicitly address that question would merit a comparative study on its own, based on the process of customising the general crisis communication scorecard, some remarks can be made to address that point. Namely, the finding that the basic communication tasks included in the general crisis communication scorecard across different crisis phases remained valid also for the CBRN terrorism specific scorecard and that customisation emerged at the level of indicators and their respective descriptions indicates that crisis communication in the case of CBRN terrorism is not necessarily different per se. What makes it stand out and require special attention, rather, is the complexity of such crises adding to the depth and scale of required communication activities. The elements that cause the complexity emerge from the nature of the threat, reflected in the terrorism and CBRN aspects of such crises, including, for example, the intentional creation of fear and insecurities for political purposes via an exploitation of unknown and fear-inducing weapons and the resulting public perceptions and responses creating ripple effects in all spheres of society that are visible in the public discourse surrounding terrorism.

The elements, which thus call for special attention in terms of customising, and through which the complexity can be tackled, include, for example, the following: CBRN-specific strategies and plans, broad network activities based on multi-level coordination and cooperation across organisational, sectoral and geographical borders, special expertise (including CBRN, terrorism, health and mental health issues), the content of trainings and exercises (to cover CBRN scenarios and the need for flexibility), adjusting the content of messages to the specific needs of CBRN terrorism crises, the heightened need and scale of monitoring activities, the role of leadership in addressing feelings of safety and values that may have been shaken and in facilitating sense-making, the continuous updating of information due to a changing and evolving situation, circles of involvement of affected and involved publics, the scale of citizen involvement and long-lasting effects.

Regarding the third layer, insights from the field of psychology that explain how people perceive risks and respond to them and what influences the process complement the understanding of the challenges to communication in

CBRN terrorism crises that emerge from the macro environment. In particular, the qualitative evaluation characteristics (see Fischhoff et al. 1978, Renn 2008, Slovic 1987, Slovic, Fischhoff & Lichtenstein 1982) help in understanding why CBRN terrorism is perceived as highly risky despite its low probability. This is because it evokes two factors, which are known to add to risk perceptions: the unknown and dread dimensions (Sheppard 2011). The former refers to the risk being non-observable, unfamiliar and a new kind of risk that is unknown to science and has delayed effects. Dread, on the other hand, is caused by potential catastrophic, fatal and global consequences that may threaten future generations through uncontrollability and involuntary exposure. Intentional harm targeted at the innocent adds to fear levels and aggravates public perceptions.

Moreover, social, political and cultural factors also shape perceptions (see Renn 2008) that emerge from the contextual layer (layer 1) in the model. In addition, social amplification processes (Kasperson et al. 1988, Kasperson et al. 2003) explain the interactions of risk perceptions with the previous layers, as a consequence of which they may be amplified or attenuated. If amplified, further impacts and ripple effects are created. In the case of CBRN terrorism, the social amplification effects may be of particular importance, as the terrorist attacks of 9/11 in 2001 showed (Slovic 2002). Consequently, people chose to drive instead of flying, which is statistically riskier (Gray & Ropeik 2002). The use of CBRN materials could result in those who are directly affected and those who are worried-well, storming hospitals, as in the anthrax case of 2001, when people needlessly took antibiotics in fear of anthrax infections and strained the hospitals with fearful phone calls and futile visits (Gray & Ropeik 2002). The media play a significant role in these situations because as explained, in the absence of earlier direct experience, people rely on indirect experience in forming their views about terrorist attacks. The purpose of integrated risk and crisis communication is thus to balance risk perspectives. Reducing the dread and unknown factors enhances resilience (Sheppard 2011), which is why monitoring public perceptions and how they develop is of primary importance in CBRN terrorism crises: to understand how public groups feel so that communication is tailored to suit the needs of various public groups.

The two innermost layers of the model, which focus on a micro level of the communication department and crisis communication team, are closely related and include similar theoretical insights. Monitoring the environment, including societal developments and stakeholder perceptions and needs, is mentioned as a key function (Sellnow & Seeger 2013) and a process (Palttala & Vos 2012) of crisis communication. It is a prerequisite for communication action that is up-to-date and constituted to meet situational demands, as explained, and a process that provides input for communication strategy making. The link between monitoring and strategy making is similar, as shown by Weick (2001), who connected data collection and the following interpretation to action and learning. This is especially needed in CBRN terrorism crises, which have fuzzy boundaries and several uncertainties that result in fast evolving changes (Ruggiero & Vos 2013, Prue et al. 2003) and which call for continuous sensemaking.

Information on the characteristics of an evolving CBRN terrorism crisis may continuously change and call for monitoring and analysis regarding the device and material (C, B, R, or N) used, the perpetrator, the motive and the damage (potentially) created, for example. Crisis intensity depends on the development phase and the dynamics of the situation, including existing and potential uncertainties, risks, issues, scenarios, direct and indirect effects and media portrayals. Perceptions and misperceptions based on interpretations of a crisis vary among various stakeholder groups. In addition, monitoring serves as a vehicle that enables alertness and awareness of the situation and context at hand, also described as mindfulness. This is similar to Sellnow and Seeger's (2013, p. 190) description of mindfulness as "the process of constantly monitoring one's environment". Alertness is needed both for the crisis context itself and for people's perceptions and reactions.

Communication strategy making and actions, which are viewed as a continuous cyclic process based on gathering crisis-related inputs, interpreting such inputs and creating situational understanding, as described based on the findings of Study V, result in a flexible view of strategies and action, as described by Weick (2001). In this flexible view, strategy making is not linear problem solving through which ready-made solutions can be implemented to arrive at pre-defined goals; strategy making is a living process that interacts with situational demands. This is not to say that the process of planning for organisational preparedness is overlooked, but rather it is a question of how the plans are used when needed. For example, as described in the findings of Study V, plans can be used for general guidance and as a source of inspiration to facilitate exploring an evolving situation. This could be viewed as a combination of linear and adaptive views of strategy with an interpretive approach (Chaffee 1985, Weick 2001). As described in relation to the third level of the model, a basis of knowledge is needed as an approach and a framework rather than a recipe-like solution to provide a foundation for creative problem solving and flexible actions.

Weick (2001, p. 352) discussed "just-in-time strategies", which call for "investment in general knowledge, a large skill repertoire, the ability to do a quick study, [and] trust in intuitions". Specialised knowledge and insights of CBRN terrorism crises are needed as building blocks with which situational solutions can be co-created and constructed. This construction resembles bricolage: "using resources and repertoire one has to perform whatever task one faces" (Weick 2001, p. 62). Hence, specific insights on crisis management and crisis communication approaches from the literature on crisis communication and CBRN terrorism crises are also needed as input for communication strategy making in CBRN terrorism crises. For example, knowledge is needed regarding the substances used, which is why subject-matter expertise is needed to support communication experts (Fischhoff 2011). By increasing the understanding of the unknown aspects while also providing accurate information regarding the substances, their impact and what one can do to protect oneself and those nearby, a sense of control can be promoted, and dread can be mitigated. In addition to

instruction, emotionally supportive communication is needed in stressful times (MacGeorge et al. 2007); however, providing non-specific reassurance may be counterproductive and would rather provoke suspicion (Rubin, Amlôt & Page 2011) contributing to further insecurities. Furthermore, overstating the risk of terrorism and offering a venue for the terrorists to receive excessive publicity for their cause is not ethical and would contribute to the terrorists' objectives of creating terror and fear (see also King 2005).

5.3 Conclusions

In this section, both the practical and theoretical contributions of this research are discussed.

This thesis contributes to the practice of crisis communication by clarifying and describing the challenges of CBRN terrorism crises to crisis communication and by providing insights into how these challenges can be met by the communication of public authorities throughout the life-cycle of CBRN terrorism crises. Study I described the general premises of communication in CBRN terrorism crises, including how communication contributes to crisis management. Moreover, it helped clarify the scenario-related demands, which must be considered in the communication approach and activities. Study II provided insight into the challenges experienced and critical aspects that complicate communication in such crises as well as insight into inspirational practices that can guide communication.

In Study III, knowledge gained in Studies I, II and IV was applied to practice in the form of a reflection and learning instrument customised to the demands of CBRN terrorism crises. Hence, this concretised results of earlier research for those who need to reflect on practices of crisis communication in the four phases of CBRN terrorism crises: preparedness, detection and warning, response and recovery and evaluation. As such, the instrument serves as a managerial tool box or knowledge base that offers ingredients for bricolage, that is, collating and co-constructing solutions to challenges of crisis communication in CBRN terrorism situations in practice. It can be used as a self-evaluation tool, which can be conducted by communication experts and others with insights into crisis communication processes (see Palttala & Vos 2012). Individual assessments can further be jointly examined at the team, department and organisation levels. Thus, the instrument facilitates collaboration and joint learning. By offering thorough and detailed insights into a variety of communication tasks, specified according to stakeholder groups, it promotes an educative approach, which if used on a regular basis, can contribute to continuous learning in organisations. By incorporating the latest insights in science, and applying them into practice, a link between research and practice is created in the spirit of practical theory (see Sellnow & Seeger 2013, Barge & Craig 2009).

Study IV contributes to the practice of crisis communication by providing insights into the prerequisites for following and monitoring interactions in so-

cial media during CBRN terrorism crises. This knowledge could be used in organisations that are planning to establish an infrastructure for listening to the concerns and needs of their stakeholders, which is a precondition for two-way interaction and communication. This knowledge can be applied to all situations, but for CBRN terrorism crises, continuous input by monitoring is especially needed due to fast-changing conditions to remain up-to-date with the perceptions, reactions and needs of public groups. By clarifying the link between monitoring and communication strategy making, this thesis can help organisations and communication experts be better prepared for complex and dynamic crises, such as CBRN terrorism crises, with several uncertainties and rapid developments that call for mindful actions to accommodate changes.

Moreover, Study V clarified how the challenges are met and dealt with during communication strategy making. In practice, this means that in addition to planning, flexibility and creative action are also needed. Hence, organisations that aim to create preparedness for CBRN terrorism crises can invest in training and exercises in which skills for creative problem solving are enhanced. In combination, techniques to reduce and manage stress through the practice of mental silence and meditation would be useful (Manocha et al. 2011). Preparedness for CBRN terrorism crises in the work of communication professionals on a grass-root level can facilitate the creation of professional resilience in the field. Preparedness to face the unknown in the most complex type of crises may also facilitate coping with less severe risks and crises. In sum, this thesis contributes to the societal call and urgency, which is also expressed in the EU CBRN action plan (Council of the European Union 2009), to improve communication with publics throughout the life-cycle of CBRN terrorism crises in many ways.

In addition to practical and societal value, this thesis has scientific significance. Recent research has described crisis communication with publics prior, during and after terrorist attacks as an un-researched topic and named the effects of CBRN attacks, which are referred to as worst-case scenarios, also as such (Schmid 2011, Hargie & Irving 2016). Moreover, a need to develop a crisis communication theory specific to terrorism has been identified (Falkheimer 2014). This thesis contributes to the crisis communication theory in the case of terrorism by reviewing and presenting insights into the scientific literature on the topic with a focus on CBRN terrorism. Thus, it provides an understanding of the dimensions of this area of research and clarifies the specific aspects, elements and insights involved. At the beginning of this thesis research, it was unclear whether CBRN terrorism would require an approach that would be different from the general crisis communication or whether it would require scaling-up standard crisis processes to meet heightened intensity demands. Although the present thesis cannot outline the extent to which communication in CBRN terrorism crises is different from communication in other kinds of crises, as this was not an explicit focus of the research, it can, nevertheless, be concluded that CBRN terrorism crises are not considered different per se but are rather an example of the most complex and demanding type of crises; however, the com-

plexity emerging from the nature of these crises can in itself be considered a characteristic that makes crisis communication in these cases stand out.

By combining all insights into one model (see Figure 3), this research showed multi-layered complexities on the macro, meso and micro levels that such crises and their management and the related communication involve, including challenges and solutions to cope with them. In particular, the outermost layer defines the scale of complexities on a societal level, which depends on the case and context in question. Next, the complexities are further reduced layer by layer, as though peeling an onion, until the core of the model represents the nucleus of how these complexities can be dealt with by communication experts. Moreover, through the approach illustrated in Figure 3, this thesis provides a holistic understanding of the topic, emphasising the need for an integrated approach across disciplines and theory perspectives.

The need for integration creates both tension and synergies between competing and conflicting vs. complementing worldviews. For example, the attempt to manage a crisis, which may be pressing at the height of a life-threatening CBRN terrorism event, by trying to control how directly involved citizens behave may be considered a conflict with the principles of empowerment and enabling. When considered from a holistic perspective, these two principles can be viewed as complementary ways to promote and ensure safety in different phases of a crisis. The same concept is encapsulated in the way in which preparedness and planning can ultimately contribute to flexibility and improvisation. In this respect, strategy making may be compared to composing music: to be able to compose new complex musical pieces, one needs creativity but also must master the basic theory in music, which usually implies years of training and practice. Hence, the traditional and late modern schools of thinking in crisis communication can be viewed as complementary. This dialectical tension or movement between opposites, which ultimately complement each other, is reflected in the core figure in the heart of the model (see Figure 3) illustrated as two arrows forming a cycle, similar to the ancient Chinese symbol of yin and yang.

Another way to explain how seemingly opposite perspectives ultimately interact with each other to co-produce a more nuanced understanding of the reality is to view the terrorism risks and crises as comprising both objectivist and constructionist elements. While most terrorist attacks produce a limited impact in terms of casualties, the indirect impact is much broader due to the perceptual ramifications and ripple effects on society. This could further result in increased insecurity and fear or polarisation in society. In fact, how well the needs of the indirectly affected are addressed, a task that is to a large extent communicational (see Fischhoff 2011), may also determine whether terrorists succeed in their main objective, which is to create terror and disrupt society.

These communication efforts involve multiple actors, which emphasises the role of multi-actor interactions in such crises. Insights into how public groups feel, how they perceive the crisis and what needs they have in different phases of the crisis can be obtained through monitoring social and other media

where interactions take place. Specifying the role of monitoring in an integrated approach to crisis communication in the case of CBRN terrorism is novel and is another theoretical contribution of this thesis.

While the likelihood of being directly involved in a terrorist attack is low, the likelihood of being indirectly involved, through an exposure to social and news media contents, for example, is high and affects everyone in society. This underlines the need for mental, physical and spiritual crisis preparedness that focusses on qualitative aspects of pre-crisis education in addition to physical aspects, such as concrete education regarding how to act in case of a terror attack. Moreover, as terrorists attempt to identify new ways to create terror, physical preparedness can never be fully achieved, and investing in mental capacities and resilience would thus be beneficial. In this way, terrorism would not be emphasised, but in the spirit of a multi-hazard approach, preparedness education and training could be embedded in the basic education system, promoting resilience and inner strength for societal insecurities in general. This could be complemented by promoting resilience on a communal level, as it has been suggested that impacts of terrorism may be countered through means of investment in community resilience (Reissman et al. 2005). As the effects of terrorism target societies at large, the coping mechanisms should also have an equal scope and include communities. The approaches should take ethical aspects into account, including how to counter the negative by-products of terrorism, such as polarisation via creation of stereotypes and stigmas. As noted in the aftermath of the 9/11 terrorist attacks in 2001, hate crimes towards ethnic groups resembling perpetrators of attacks have increased (Taintor 2003). Hence, overall preparedness education could contribute to alleviating other current societal dilemmas, such as racism and hate speech, fuelled by an atmosphere of insecurities and fears.

5.4 Evaluation of the research

In this section, an evaluation of the research is presented. First, the research is assessed in terms of research ethics. Next, limitations of the research conducted are discussed. Finally, this thesis concludes with suggestions for future research.

This research was guided by the ethical principles of the 7th Framework Programme of the European Union, from which it received its funding through the CATO project. The importance of research ethics is underlined in research funding by the European Union, and all research proposals undergo an ethics review and are evaluated based on their ethical impacts prior to funding (European Commission 2013). Hence, as part of the CATO consortium research plan, this research was reviewed prior to the beginning of the project. Ethical issues, which are closely considered in the review, involve privacy, data protection and informed consent. Data protection is meant to safeguard the privacy of the research subjects, and it includes technical and security measures to ensure "that all personal data are safe from unforeseen, unintended or malevolent use" (Eu-

ropean Commission 2013, p. 12). Informed consent, on the other hand, refers to the procedure by which the voluntary participation of the research subjects is guaranteed (European Commission 2013).

As this research involved the collection and processing of personal data, an authorisation to conduct the planned research was requested from the national authorities, as required at that time by the European Union. The research plan concerning the work conducted for this thesis received ethics approvals from the Ethical Committee of the University of Jyväskylä. The practices for an ethically sound conduct of research were followed throughout the project. Namely, informed consent forms were made for the research participants in Studies II and V. The informed consent forms included the contact information of the responsible researchers, background information of the project, information on data storing and protection, the purpose of the research conducted and a description of what participation in the study involved, including potential risks, rights of the participants and consent requested. Moreover, the CATO project had an ethics advisory group and an ethics manager whose tasks were to ensure an ethical conduct of the research during the project. Project ethics reviews were conducted at various intervals to ensure that the research was conducted in compliance with ethical principles.

In Finland, an ethically responsible conduct of research is promoted by the Guidelines of the Finnish Advisory Board on Research Integrity. The ethically responsible conduct of research is encapsulated in the concept of research integrity, which emphasises honesty and integrity from researchers in conducting their research activities (Finnish Advisory Board on Research Integrity 2012). Accordingly, principles of meticulousness and accuracy were endorsed throughout the research process, from data collection to analysis, presentation and evaluation of the research results. The research methods applied conformed to scientific criteria and were evaluated in the course of the peer-review process of the related publications. Achievements of other researchers have been acknowledged through appropriate citations. Research ethics approval was requested and received from the Ethical Committee of the University of Jyväskylä pertaining to the Studies II and V, as explained. Throughout the course of the research, the researcher received guidance on responsibilities, such as archiving and accessing data. The funding sources have been duly reported when publishing research results. (see Finnish Advisory Board on Research Integrity 2012.)

While being guided by the ethical principles of the 7th Framework Programme of the European Union, this research has also adhered to the ethical principles of research in the humanities and social and behavioural sciences proposed by the Finnish Advisory Board on Research Integrity, formerly known as the National Advisory Board on Research Ethics. The principles encompass three main areas: 1) respecting autonomy of research participants, 2) avoiding harm and 3) privacy and data protection (National Advisory Board on Research Ethics 2009). The autonomy of research subjects and their voluntary participation were ensured via the provision of informed consent forms, as ex-

plained. The avoidance of harm was ensured by the respectful treatment of study participants, which in Study V, for example, meant polite and respectful interactions with the participants of the table top discussion and arranging breaks in between the three sessions to avoid mental strain and fatigue. Moreover, systematic care was taken when handling their personal data to conform to principles of privacy and data protection. For example, identifiers that were stored for potential further contacts with the research participants were stored separately from the analysed data. Papers copies of the informed consent forms were scanned and destroyed after data collection, and the digital forms were only stored for a limited period in a university password protected digital environment. Moreover, the data were reported in a way that the anonymity of the research participants was ensured both in non-public project reports as well as in the research publications.

Quality considerations and limitations of the research

The criteria for assessing quality in qualitative research have been debated (see Lincoln 2011, Schwartz-Shea 2006). They concern evaluating the truth value, applicability, consistency and neutrality of the work as an alternative to validity and reliability, which are terms used to assess quantitative studies (Schwartz-Shea 2006). Quality in qualitative research intersects with research ethics (Lincoln 2011). In fact, research could hardly qualify as sound without being ethically qualified as well.

Trustworthiness (originally introduced by Lincoln & Guba 1985) could be considered an umbrella term in assessing the quality of qualitative, interpretive research (Schwartz-Shea 2006). It involves reflecting on the question: "Are these findings sufficiently authentic (isomorphic to some reality, trustworthy, related to the way others construct their social worlds) that I may trust myself, [and others], in acting on their implications?" (Guba & Lincoln 2005, p. 205). Quality in qualitative and interpretive research involves a systematic, thorough, thoughtful and conscious consideration, use and description of the methods used (Lincoln 2011). A systematic conduct of research implies a detailed account of the research process and the steps involved in a way that other researchers can judge its quality (Schwartz-Shea 2006).

In the context of the present thesis, the process and steps included in the course of the data collection and analysis of the five studies have been reported phase-by-phase. This was initially done in the original publications and then in this thesis shell to expand the original descriptions when applicable beyond the limitations set by the lengths of the journal articles. Moreover, the thesis shell also provides a more comprehensive account of the methodological background of the studies than what was permitted in the journal articles. Direct quotations from the research participants were provided as illustrations of the findings and examples of the analysis. In Study V, the table top discussions were both tape- and video-recorded and transcribed. The use of ATLAS.ti as a data management tool in Studies II, IV and V added rigour to the analysis and facilitated a constant comparison and re-evaluation of the categories constructed in the

course of the thematic analyses. In Studies I and III, data extraction tables were used for the same purpose. Through a thorough process description, choices made are rendered transparent to ensure that decisions are also ethically sound (Schwartz-Shea 2006). The ethicalness of the present research was reflected upon in the previous chapter.

Reflexivity involves reflection on the role of the researcher in the research process (Schwartz-Shea 2006): "the self as both inquirer and respondent, as teacher and learner, as the one coming to know the self within the processes of research itself" (Guba & Lincoln 2005, p. 210). Reflexivity also involves positionality (Lincoln 2011, p. 7): recognising that results are always partial and incomplete, located in a context, defined by for example social, cultural and historical settings and the personal background of the researcher. This is also related to the limitations of the research in question.

Regarding the present thesis, the research was conducted in the context of the CATO project, which had an impact on the work. On the one hand, it enabled and enriched the research in many ways. For example, data gathering in Study II was conducted for the CATO project in collaboration with another EU-funded project, Public Empowerment Policies in Crisis Management. Moreover, the cooperation of researchers and other experts working in the field of crisis management within the CATO consortium of 25 partner institutes provided the researcher with access to the networks of other researchers, who provided peer support and facilitated an exchange of views with other researchers. For example, the simultaneous co-existence of traditional and more post-modern views of crisis management could also be witnessed among the project partners representing different disciplines and sectors of society. Moreover, the data collection for Study V was conducted in conjunction with a workshop of the CATO project. On the other hand, the project framework did provide some constraints. For example, timetables set in the project plan and monitored by the European Commission set a frame of reference for the research process and obliged fast choices at times. Moreover, matching project-related goals with scientific purposes and requirements for the research to qualify as part of a doctoral thesis, especially for Study V, required negotiation about a protocol for the table top discussion, for example. While it was a research project, the consortium was also comprised of practice-related partners, such as IT companies and consultancies. This relation between research and practice, which influenced the present thesis, has been explained and articulated in this thesis shell using the concept of practical theory.

Moreover, as explained in conjunction with the ontological and epistemological premises of the present work, in qualitative, interpretive research, the researcher plays a central role as an instrument of interpretation. Hence, although the research process and the related steps have been described in detail, the findings of this research, which were shaped by the researcher, research participants, the project background and other contextual factors, may not be reproduced as such by another researcher. This limits the generalisability of the study findings. To tackle these issues, details have been provided to enable the

evaluation of the research by other researchers in the scientific community. Auditability has been proposed as a technique to assess the trustworthiness of qualitative research (Lincoln & Guba 1985, Schwartz-Shea 2006). This means that the description of the research should be detailed enough for an external auditor to assess the process and to achieve a maximum level of transparency. This research, as part of the CATO project, underwent several audits, including formal audits pertaining to the FP7 regulations on ethics as well as informal audits that included peer-checks and feedback from project partners. Moreover, the value of qualitative research lies in its descriptive and exploratory nature through which meanings and insights can be clarified, which was considered needed to meet the purpose of this thesis, that is, to understand and describe the phenomenon of crisis communication in the case of CBRN terrorism, including the challenges and potential solutions.

As completing an article-based dissertation, such as the present thesis, involves studies reported in several articles, which are often conducted in a time span over several years, the process is inevitably a learning experience. For example, the interpretive research approach is more developed in the last study, Study V, and in this thesis shell than in the early part of the process and the related studies. Moreover, while new knowledge is gained, decisions and choices made in the beginning can later be assessed from a new angle, shedding light on the limitations of the initial choices. For example, if the questionnaire of Study II would have been designed at the end of the process, the questions could have been more detailed, and interviews could have been added. Some of the limitations are also due to conscious choices made. For example, although the informants of the present research came from different countries and represented different cultural perspectives, these differences were beyond the scope of this study and hence were not accounted for. Other limitations pertain to unexpected events. For example, in Study II, a limited number of respondents answered the questionnaire study despite various try-outs to invite more responses; however, in qualitative research, the purpose is to generate meaningful rather than broad insights (Eskola & Suoranta 1998). One limitation related to the meaningfulness of the insights could be the limited role of the research participants in the co-production of the research findings. Namely, although the informants' role in the knowledge production was acknowledged, they were not involved in the later stages of the research process to evaluate the accuracy of the interpretations. Nevertheless, the research was rich in qualitative insights and perspectives. Moreover, the end of this dissertation could be a beginning for future studies.

5.5 Future research

As current societal developments indicate, terrorism is likely to increasingly influence the lives of citizens around the globe. Hence, there is a growing need to increase understanding on the topic, including issues pertaining to the field

of crisis communication. The questions that remain after conducting this research could be topics of future research.

As terrorism aims to create insecurity and fear and thus aims to attack society in terms of qualitative rather than quantitative impacts, such as large numbers of casualties, future research could investigate which type of approach could best prepare and protect different societal actors from terrorism and its impacts. As discussed in the conclusions of this study, psychological preparedness, what it consists of and the role of communication in facilitating such preparedness could be clarified. The concept of resilience could further be studied in the same context both on an individual and a community level. Moreover, the role of different societal actors and interactions between them in contributing to or hindering qualitative preparedness could be explored. The research would need to be multidisciplinary in nature, comprising insights in addition to communication studies from the fields of psychology and sociology. Ethical issues would also need to be explored in conjunction with this type of approach.

As public communication surrounding terrorism involves several ethical issues, mentioned in the findings of this thesis, the many ethical issues could be mapped, and an ethical approach to communicating about terrorism could be explored in future research. A relevant topic would be cooperation between communication experts and news media on issues concerning terrorism. As ethical issues intertwine with cultural matters, the research would benefit from an intercultural communication perspective. Similarly, as communication about terrorism crosses national borders and involves the entire international community, representing different nations, cultures, religions and ethnic groups, research on the intercultural aspects would be beneficial to the field.

In the final study, Study V, the process of communication strategy making was clarified. While the study represents a novel attempt to decompose the strategy making process by describing the core elements involved, it leaves room for future research initiatives. Future research could further specify and add depth to the process and the related elements by testing its fittingness in a crisis exercise or by enhancing the model by examining multi-stakeholder interactions. This could include both intragroup and intergroup dynamics, as communication strategy making involves a process of dynamic decision making among crisis communication team members (Coombs 2015) as well as cooperation with other teams in the crisis management network. Such research could investigate strategy making in crisis communication from the perspective of group sensemaking and naturalistic decision making (see Gilpin & Murphy 2008). Furthermore, it would be beneficial for the sensemaking processes of stakeholders to be clarified, such as those of citizens and people who are not centrally involved in the crisis management network as co-producers or managers of crisis communication. Such research would not only shed light on the strategy making process by enhancing its co-productive side but could also contribute to the clarifying premises for the development of the qualitative crisis preparedness of different societal actors, as described above, since perceptual

ramifications have been mentioned among the key challenges of CBRN terrorism crises for crisis communication.

It has been concluded that CBRN terrorism crises are an example of the most complex and demanding type of crises for communication experts and crisis managers. This complexity is illustrated by the layered model in Figure 3. Future research that aims to investigate this complexity would need to adopt a broad and methodologically rich approach. This is challenging, as investigating a topic and defining a scope for research always requires limiting choices. Moreover, as complexity is difficult to capture by definition, operationalising it in research to gather data that are sufficiently trustworthy and authentic is also challenging. Thus, another topic for future research would be to develop a methodology that could further explore the complexity inherent in CBRN terrorism crises and explain the consequences for crisis communication. Such research could also further explore the question of to what extent and in which ways communication in CBRN terrorism crises is different from that in other kinds of crises through a comparative approach. Moreover, attention might be paid to possible differences among C, B, R and N risks and to the implications and specific challenges of these for communication by, for example, interviewing experts with specific expertise and knowledge on each of the different risk categories.

Understanding the complexity would also require insights into terrorism as a phenomenon, including various forms and manifestations of existing terrorist networks, which could be achieved through interdisciplinary research efforts combining terrorism studies and crisis communication research. A broad understanding of the constantly changing and evolving phenomenon would be a necessary starting point to develop communication models and frameworks that can meet the enormous challenges involved. As complexities by nature involve continuous changes, evolving conditions, instability, contextual dynamism and permeable and fuzzy boundaries (Gilpin & Murphy 2008), monitoring methods and sensemaking processes are likely to be central for such models and thus warrant more research in the future. While this research has described the role of social media monitoring and the related process and mapped the methodological challenges involved, cross-disciplinary research efforts could further develop insights into potential tools and solutions, the development of which is currently challenged by the fact that emergency managers do not acknowledge their potential for creating accurate and timely situational awareness. Moreover, the appeals for continuous agility, as expressed in the yin and yang approach, could be further explored. This would include further investigating the tension between different approaches, such as the traditional, expressed in an aim to be strategic in a classical way, and the late-modern schools of thinking, emphasising the need for flexibility and improvisation to accompany a rational planning logic. Future research is needed to determine how crisis communication can enhance skills for flexible action and interaction, creativity and bricolage in coping with the unexpected and in meeting the extreme complexity posed by CBRN terrorism.

FINNISH SUMMARY

Kriisiviestintä ja terrorismi: haasteita kartoittamassa ja ratkaisuja rakentamassa

Tämä väitöskirjatutkimus käsittelee kriisiviestintää terrorismin yhteydessä. Terrorismi ymmärretään tarkoitukselliseksi väkivallankäytöksi, joka kohdistuu siviileihin sekä muihin viattomiin ihmisiin ja jonka tarkoituksena on tuottaa pelkoa poliittisten päämäärien saavuttamiseksi. Terrorismin suorien vaikutusten ollessa usein rajallisia sen tärkein päämäärä on yhteiskunnallisen epävarmuuden ja konfliktien ruokkiminen. Tässä tutkimuksessa terrorismia lähestytään organisaatioiden kriisiviestinnän näkökulmasta. Tutkimus keskittyy erityisesti CBRN-terrorismiin, joka hyödyntää kemiallisia, biologisia tai ydinmateriaaleja (chemical, biological, radiological, nuclear – CBRN) välineenä pelon tuottamisessa. Esimerkkejä CBRN-iskuista ei lähihistoriassa onneksi ole useita, lukuun ottamatta Tokion metrossa vuonna 1995 tapahtunutta sariini-iskua, syyskuun 11. iskujen jälkeistä pernaruttokriisiä Yhdysvalloissa vuonna 2001 sekä kemiallisten aseiden käyttöä Syyrian sodassa. CBRN-materiaalien käyttö terroristisessa tarkoituksessa muodostaa kuitenkin pahimmanlaatuisen uhkakuvan, jollaisen toteutuessa viestinnällä olisi keskeinen rooli vahinkojen vaikutusten minimoinnissa ja korjaamisessa.

Tutkimuksen tarkoituksena on lisätä ymmärrystä CBRN-terrorismin viranomaisviestinnälle aiheuttamista haasteista häiriötilanteissa ja poikkeusoloissa sekä kuvata ratkaisuja näihin haasteisiin. Tutkimuksen teoreettisen viitekehyksen pääpaino on kriisiviestinnän kirjallisuudessa. Kriisiviestintää tarkastellaan verkostonäkökulmasta, koska kriisinhallinta CBRN-terrorismin yhteydessä vaatii lukuisten eri toimijoiden välisen yhteistyön. Tässä tutkimuksessa kriisiviestintä luetaan osaksi kriisinhallinnan kokonaisuutta ja sitä tarkastellaan kriisien koko elinkaari huomioon ottaen. Kriisien elinkaari kattaa karkeasti jaoteltuna kolme eri vaihetta: ennen kriisiä, kriisin aikana ja sen jälkeen. Kriisiviestintää lähestytään sosiaalisen konstruktionismin näkökulmasta yhteisöllisen merkityksenannon mahdollistajana sekä perustana suhteiden luomiselle ja ylläpitämiselle organisaation sekä sen eri yhteistyö- ja sidosryhmien välillä. Tässä tutkimuksessa sosiaalinen konstruktionismi saa aseman meta-perspektiivinä, jonka puitteissa viestintää voidaan luoda ja rakentaa kulloisenkin tilanteen vaatimien olosuhteiden mukaisesti. Pragmatismin hengen mukaisesti erilaiset teoreettiset lähestymistavat nähdään toisiaan täydentävinä mahdollisuuksina ratkaista kriisitilanteisiin liittyviä ongelmia. Vakavassa kriisitilanteessa hätäviestit ja ihmisten toimintakyvyn ylläpitäminen ohjeiden avulla funktionalistisessa merkityksessä on yhtä lailla tarpeen kuin ymmärryksen yhteisöllinen rakentaminen kriisin syistä ja seurauksista. Näin ollen tutkimuksen teoreettinen lähestymistapa on holistinen. Tämä on erityisen tärkeää, kun ollaan ratkaisemassa monimutkaisia haasteita, jollaiseksi CBRN-terrorismi nähdään lukeutuvan. Teorian ja käytännön nivoutumista yhteen on tutkimuksessa avattu käytännöllisen teorian (practical theory) käsitteen avulla. Teoreettinen lähestymistapa on

monitieteellinen tutkimuksen hyödyntäessä viestinnän teorioiden lisäksi kriisienhallinnan, organisaatiotutkimuksen sekä psykologian kirjallisuutta.

Väitöskirja sisältää viisi osatutkimusta sekä niihin liittyvät tieteelliset julkaisut sekä kokoavan osan, joka muodostaa synteesin tutkimustulosten ja kriisiviestinnän teoriakirjallisuudesta saatujen näkemysten välille. Tutkimus perustuu laadulliseen tutkimusotteeseen, joka nojaa sosiaalisen konstruktionismin mukaiseen käsitykseen todellisuuden ja tiedon tulkinnallisesta ja monimerkityksisestä luonteesta, jota viestinnän kautta yhteisöllisesti merkityksellistetään ja luodaan. Väitöskirjaan sisältyvä empiirinen tutkimus toteutettiin ja rahoitettiin Euroopan unionin seitsemännen puiteohjelman rahoittaman CATO-hankkeen (CBRN Crisis Management: Architecture, Technologies and Operational Procedures) aikana (FP7/2007–2013, apurahasopimus n° 261693) vuosina 2012–2014.

Ensimmäinen osatutkimus (tutkimus I) keskittyi terrorismiin liittyvän kriisiviestinnän lähtökohtiin ja selvitti ko. tilanteiden viestinnälle ominaisia piirteitä kirjallisuuskatsauksen avulla. Toisessa osatutkimuksessa (tutkimus II) selvitettiin terrorismiin liittyvän kriisiviestinnän haasteita. Se toteutettiin kriisiviestinnän ammattilaisille suunnatulla kyselytutkimuksella. Kolmannessa osatutkimuksessa (tutkimus III) tutkimusten I-II sekä IV tuloksia sovellettiin kriisiviestinnän arviointiin tarkoitetun viitekehyksen räätälöimiseen CBRN-terrorismin varalle. Neljäs osatutkimus (tutkimus IV) keskittyi sosiaalisen median luotaamiseen tavoitteena selvittää sosiaalisessa mediassa esiintyvän tiedon keruuseen ja tulkintaan liittyvää prosessia sekä mahdollisia haasteita kirjallisuuskatsauksen avulla. Viidennen, viimeisen osatutkimuksen (tutkimus V), tavoitteena oli selvittää CBRN-terrorismiin liittyvien viestinnän haasteiden ratkomista pernaruttokriisiin keskittyvän tabletop-keskustelun kautta. Tutkimusaineistot analysoitiin kolmatta osatutkimusta lukuun ottamatta laadullisen teema-analyysin keinoja soveltaen. Kolmannessa tutkimuksessa tutkimusaineisto analysoitiin teoriasta johdettujen kriisivaihe- ja sidosryhmäkohtaisten viestintätehtävien valossa.

Tutkimusten keskeiset tulokset yhdessä teoriakirjallisuudesta saatujen näkemysten avulla on syntetisoitu ja kuvattu väitöskirjan kokoavassa osassa esitetyssä integroidun kriisiviestinnän mallissa, joka kuvaa terrorismiin liittyvän kriisiviestinnän haasteita sekä ratkaisuja näihin haasteisiin. Haasteet nousevat terrori-iskukohtaisesta yhteiskunnallisesta kontekstista sekä kansalaisten terrorismiin ja terrori-iskuihin liittämistä merkityksistä ja reaktioista. Ratkaisujen osalta merkittävässä roolissa on kriisinhallintaverkoston toiminta terrorikriisien elinkaaren eri vaiheissa, kansalaisten käsitysten, tiedontarpeiden ja keskustelujen luotaaminen, sekä kriisiviestintästrategioiden muodostus jatkuvana tiedonkeruuseen, muuttuvan tilannetiedon tulkitsemiseen ja joustavaan, luovaan päätöksentekoon ja ongelmanratkaisuun nojaavana prosessina. Tutkimuksen tulokset tarjoavat näkökulmia sekä käytännön ratkaisuja monimutkaisia kriisiviestintätilanteita varten ja ne ovat siten hyödynnettävissä kriisiviestinnän ammattilaisten työssä. Esimerkkinä tästä on kolmannessa osatutkimuksessa räätälöity kriisiviestinnän arviointiin ja suunnitteluun sekä yhteistyötä ja yhteisöllis-

tä oppimista tukemaan tarkoitettu viitekehys, joka on käytettävissä organisaatioissa. Teoreettisesta näkökulmasta tutkimuksen tulokset kasvattavat ymmärrystä tämän verrattain uuden, monitieteellisen tutkimusalueen tieteellisistä ulottuvuuksista, erityispiirteistä ja rajoista.

Kuten vuonna 2017 sattuneet lukuisat terrori-iskut osoittavat, kriisiviestintä terrorismin yhteydessä tulee olemaan tärkeä tutkimusaihe myös jatkossa. Koska terrorismi muuttaa jatkuvasti muotoaan eikä siihen siten voida ehkä koskaan täysin varautua, henkinen kriisinkestävyys nousee merkittävään rooliin terrorismin ja sen epävarmuutta ja pelkoja aiheuttavien vaikutusten käsittelemisessä. Niinpä tärkeäksi jatkotutkimuskohteeksi nousee henkinen kriisinkestävyys sekä eri yhteiskunnallisten toimijoiden välisen viestinnän roolin selvittäminen osana henkistä kriisinkestävyyttä. Toinen tärkeä jatkotutkimuksen kohde CBRN-terrorismin kaltaisiin monimutkaisiin yhteiskunnallisiin ongelmiin varautumisessa on joustavan päätöksenteon sekä luovan ongelmanratkaisun tutkiminen kriisiviestinnän kontekstissa. Tutkimuksen avulla voitaisiin esimerkiksi kartoittaa viestinnälliseen luovuuteen ja joustavuuteen tarvittavia taitoja sekä miten näitä taitoja voisi etukäteen harjoitella. Toinen tärkeä tulokulma tähän olisi perinteisen rationaalisen suunnittelun ja varautumisen sekä joustavan päätöksenteon ja luovan ongelmanratkaisun välisen suhteen sekä siihen liittyvän jännitteen tutkiminen.

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ORIGINAL PAPERS

I

TERRORISM COMMUNICATION: CHARACTERISTICS AND EMERGING PERSPECTIVES IN THE SCIENTIFIC LITERATURE 2002–2011

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Terrorism Communication: Characteristics and Emerging Perspectives in the Scientific Literature 2002–2011

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This paper aims to clarify current knowledge on the contribution of communication to crisis management in the case of terrorism incidents. This is done by means of a systematic review of the scientific literature on terrorism communication over the last 10 years to identify the many challenges facing communication in such crises, and represents the first attempt of its kind. To date, within the literature on terrorism communication, much attention has been paid to chemical, biological, radiological or nuclear hazards. Terrorism crises are complex and challenging. Preparedness for such diverse low-probability high-impact crises can best be included in a wider educative approach. Terrorism crises call for fast information updates that, using a multi-channel approach, can be tailored to fit different needs and (social) media habits.

1. Introduction

Although terrorism as such is not a new phenomenon (Slovic, 2002), the events of 9/11 put it on the list of top priority security concerns in the West (Mythen & Walklate, 2006) and at the same time revived scholarly interest in the topic (Schmid, 2011a). Similarly, as the Eurobarometer 75 public opinion survey conducted by the European Commission (2011) reveals, citizens are also concerned about terrorism and perceive it as one of the main problems facing the European Union. The increased worry over terrorism in general has also given rise to concern about new forms and means of terrorism (Slovic, 2002), in particular the potential terrorist use of chemical, biological, radiological or nuclear (CBRN) agents and materials (e.g., Normark, 2011). This has resulted in a number of publications, both professional and academic, on this issue (see Price, 2010). Thus, the question of what has been studied in the field of terrorism studies from a crisis communication point of view – asserted recently to be an under-researched topic (Schmid, 2011b) – is timely.

Hence, the purpose of this study[1] is to clarify current knowledge on communication contributing to crisis management in the case of terrorism incidents. In particular, it aims at explaining what characterizes crisis communication in the case of terrorism and what CBRN aspects add to this, in order to identify its typical features and challenges. An additional aim is to find out what topics have been addressed, and to identify research trends and gaps in the literature on crisis communication in the event of terrorism. As many authors have noted that interest in crisis communication in the case of terrorism has largely developed since 9/11 (Heilbrun, Wolbransky, Shah, & Kelly, 2010), the time span covered is 10 years, 2002–2011.

Crisis communication is studied here as communication with publics that supports crisis management, following the process approach of Reynolds and Seeger (2005) concerning integrated risk and crisis communication throughout all the phases of a crisis. Crisis

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communication can contribute in various ways to crisis management by public organizations. Means to this end include enhanced empowerment of stakeholder groups, increasing societal understanding of risks and fostering cooperation with response organizations. This in turn is done by monitoring stakeholder needs, implementing communication activities with citizen groups and the new media, and by supporting decision-making on joint communication strategies in the response network (Palttala & Vos, 2012).

The communication tasks that contribute to crisis management by public organizations are further explained for the various phases of a crisis in the crisis and emergency risk communication model (Reynolds & Seeger, 2005). These phases are (1) pre-crisis risk messages, warnings and preparations, (2) initial event uncertainty reduction and reassurance, (3) ongoing support of personal response, (4) resolution updates and discussions about rebuilding efforts and (5) evaluation and lessons learned. The model helps plan communication activities throughout a crisis (Veil, Reynolds, Sellnow, & Seeger, 2008; Seeger, Reynolds, & Sellnow, 2009). It was utilized as the basis of a scorecard developed for crisis communication that specifies the communication tasks of response organizations in all crisis phases, referring to communication with public groups and maintaining media relations and internal communication within the response organization and network (Palttala & Vos, 2011). Crisis communication can also strengthen community resilience on the level of family, neighbourhood and wider community networks (Kirschenbaum, 2004).

This paper consists of four sections. Following this introduction, the method, including research questions, sample, data extraction and analysis, is described. The third section presents the results on the characteristics of communication in terrorism crises, including the themes discussed in the literature on risk perception and communication in terrorism crises, along with trends and gaps in the field. Section four concludes the paper.

2. Method

This study aims at clarifying what characterizes crisis communication in the case of terrorism and what challenges it presents for communication. The study also seeks to find out what themes have been addressed, and to identify research trends, orientations and focal issues in the crisis communication literature on terrorism over the past 10 years. The research questions are as follows.

2.1. Research questions

RQ1. What characteristics of communication in terrorism crises are mentioned in the literature?

RQ2. What themes related to communication in terrorism crises are addressed in the literature?

RQ3. What trends can be seen in the literature on communication in terrorism crises?

The first research question was aimed at identifying typical features and challenges mentioned in the scientific literature, while the second research question was designed to gain more in-depth insights into the themes that have received attention in the literature. The purpose of the third research question was to identify trends and possible gaps in the literature.

2.2. Sample

The present study was conducted following the protocol of a systematic literature review (e.g., Jesson, Matheson, & Lacey, 2011). The search was conducted in multiple databases via EBSCOhost, ProQuest and Web of Science in February 2012. The search terms used included [terrorism] and [crisis communication or risk communication or emergency communication]. The selection of optimal search terms was a result of several tryouts. The terms CBRN, weapons of mass destruction, dual-use weapons, non-conventional weapons, chemical weapons, biological weapons, radiological weapons or nuclear weapons instead of or combined with terrorism did not add to the results in the selected databases and were, therefore, not used.

The search fields covered abstracts, titles and keywords. Moreover, the search was limited to scientific articles in peer-reviewed journals. Other document types, such as book reviews, opinion pieces and commentaries, were excluded. In addition, the availability of the full article in the databases of Jyväskylä University Library or on the Internet was a prerequisite. Table 1 clarifies the process.

In the first step, the abstract, title and keywords of all the results from the different databases, 435 articles altogether (see Table 1) were checked to assess their potential for the study. If needed, the introduction and/or conclusions were also read. After this initial scan, articles considered to be adequate in scope were exported to RefWorks, a system for managing references.

This resulted in a total of 193 articles that were then read through more thoroughly and from which, on the basis of the inclusion/exclusion criteria, a further selection was made. The inclusion criteria were perspective on communication, defined as crisis communication with the public, among and within response organizations; focus on terrorism; English language; scientific quality (minimum of eight scientific sources as a rule of thumb); and year of publication 2002–2011. Excluded articles, such as articles dealing with internal communi-

Table 1. Search Results per Database (*Number Includes Some Duplicates)

Keywords	Database	First results	After initial scanning	After applying criteria	Final sample coded
[terrorism] and [crisis communication or risk communication or emergency communication]	EBSCOhost	103 (13.2.2012)	57	31	24
	Web of Science	116 (16.2.2012)	62	25	19
	ProQuest	216 (21.2.2012)	74	25	20
	Total	435*	193	81	63

cation in the case of corporate crises and articles based on content analysis of news coverage were kept on record, as the focus was on communication with the public by response organizations. After applying the inclusion/exclusion criteria, the final sample for the literature review consisted of 81 articles.

2.3. Data extraction and analysis

The 81 articles in the final sample were read through and relevant data written down with the help of a predesigned data extraction sheet (Jesson et al., 2011). Categories in the data extraction sheet included title, informal summary, focus, threat, topic area, aim of research, method, terrorism communication and CBRN terrorism communication. While coding the data, some articles were further excluded, resulting in a final total 63 articles in the table.

The analysis was conducted using thematic analysis. Thematic analysis is a common approach used for analyzing qualitative data (e.g., Schwandt, 2007). In this approach, the analyst codes sections of text based on whether they contribute to emerging themes (Schwandt, 2007). In addition to identifying emerging trends in the literature, some simple quantitative analyses were conducted, covering, for example, the distribution of articles according to year of publication and crisis type. The unit of analysis was one article. At this stage, only data that were relevant to answering the previously outlined three research questions were analyzed, that is, characteristics of and themes related to communication in terrorism crises as well as trends found in the literature. These are reported next.

As among the 63 articles on terrorism, 34 or more than half focused on CBRN terrorism, we analyzed these articles separately, to be able to report CBRN-related aspects of these crises that have relevance for communication. CBRN substances can cause great harm and contamination, complicating, for example, hospital treatment (Scanlon, 2010; Covello, Peters, Wojtecki, & Hyde, 2001). An example of CBRN terrorism was the nerve gas sarin released in 1994 in Matsumoto, and in 1995 in the Tokyo subway (Okumura, Suzuki, Fukada, Kohama, Takasu, Ishimatsu & Hinohara, 1998a and 1998b). The communication aspects of CBRN terrorism crises gained attention during the period investigated here.

3. Results

Here, we discuss the main topics addressed in the literature related to communication in the case of terrorism crises. The analysis of the scientific literature concentrated on the following perspectives:

- Characteristics of communication in terrorism crises mentioned in the literature.
- Themes discussed in the literature on risk perception and communication in terrorism crises.
- Trends and gaps in the literature on communication in terrorism crises.

First, we report the typical features and challenges of communication mentioned in the scientific literature on *terrorism crises*. Second, we focus more specifically on the insights found in the literature on points of attention for *communication* with various public groups and *risk perception*, as an understanding of risk perception by public groups is a precondition for initiating effective communication. Finally, we discuss *trends and gaps* in the literature on communication in terrorism crises. Since a large proportion of the articles focused on CBRN terrorism crises, we brought the CBRN-related aspects together in a separate section to see what challenges these add for communication.

3.1. Characteristics of communication in terrorism crises mentioned in the literature (RQ1)

Below, the various themes present in the literature are reported. We first report on the themes clarifying the challenges for communication in the case of terrorism. Second, CBRN-related aspects are explained. Thus, both terrorism- and CBRN-related aspects are considered.

3.1.1. Terrorism-related aspects

In the articles, many different terrorism-related aspects of crises are mentioned that illuminate the complexity

of crisis situations of this kind. These concern the emotions evoked, the need for sense-making, unexpected behaviour, trust and credibility, and the discourse on terrorism.

3.1.1.1. Emotions evoked

Terrorism risk is seen as uncontrollable (Sheppard, 2011), which may add to the level of fear experienced, as risks that are perceived as 'low control' are related to worrying (Lee, Lemyre, & Krewski, 2010). There are concerns that repeated sensationalist reports increase emotions, for example, in cases of bioterrorism (Aldoory & van Dyke, 2006). Terrorists seek to cause terror, while society attempts to reduce dread of terrorism (Sheppard, 2011).

3.1.1.2. The need for sense-making

Terrorism implies intentionality, vulnerability and psychological impact (Goldstein, 2005). It also includes a threat of further terrorist activity (Gibbs van Brunschot & Sherley, 2005). Therefore, it creates more fear and anxiety than a naturally occurring crisis with similar consequences (King, 2005). Fear in itself is a health risk (Gray & Ropeik, 2002), as it may lead to a variety of stress-related illnesses (Hyams, Murphy, & Wessely, 2002).

During and after crises, people may experience changes in the way they view the world or themselves (Rubin, Amlôt, Page, & Wessely, 2008). A study analyzing 9/11 from a communication perspective suggested that leaders in the public sector can facilitate sense-making and address a wider audience that may also be susceptible to traumatization by the events (Griffin-Padgett & Allison, 2010). This includes addressing core values in society (Ulmer & Sellnow, 2002; Griffin-Padgett & Allison, 2010). For example, a leader's focus on threats to values rather than the terrorist act itself may convey that what we are struggling with is a state of mind and with maintaining adherence to basic values that are important for all (Gibbs van Brunschot & Sherley, 2005).

Stressful times call for support to be given to relationships or social groups, and emotionally supportive communication may provide an antidote to the stress provoked by terrorism (MacGeorge, Samter, Feng, Gillihan & Graves, 2007). As mentioned by Palenchar, Heath, and Orberton (2005, p. 65) in a study on terrorism and industrial chemical production, 'A resilient community can live with rather than in fear'.

3.1.1.3. Unexpected behaviour

Fear and misperceptions may lead people to place themselves in greater danger than that posed by the original incident itself (Rubin et al., 2008, following Gray & Ropeik, 2002). There are large gaps between advised and real behaviour in the case of terrorism threats (Rogers, Amlôt, Rubin, Wessely, & Krieger, 2007). An evaluation of existing case studies showed that, the notion of a panic-prone public can be considered a myth, although behaviour can be different than expected, while behavioural responses contrary to advice may include acts of omission (e.g., travelling, but perhaps at higher statistical risk) and of commission (e.g., taking medication, but possibly not at the right moment; Sheppard, Rubin, Wardman, & Wessely, 2006).

3.1.1.4. Trust and credibility

A study conducted in New York City, 2 years after the 9/11 attacks, showed that low education can be considered a risk factor for high terrorism risk perception and fear (Boscarino, Adams, Figley, Galea, & Foa, 2006), a finding that was confirmed in a study on terrorism threats in Australia (Stevens, Agho, Taylor, Barr, Raphael, & Jorm, 2009). Furthermore, during the anthrax crisis in 2001, disparities in treatment on the basis of race or social class and among minority groups were suspected (Blanchard, Haywood, Stein, & Tanielian, 2005). This calls both for ethical decisions and for tailored information disseminated with sincerity by credible sources, such as suggested in a study on a bioterrorist threat and trust in public health institutes among the African American population (Meredith, Eisenman, Rhodes, Ryan, & Long, 2007). Maintaining credibility is a challenge, as controversial issues such as eligibility for health care and financial compensation are involved (Hyams et al., 2002). In a study on terrorism related to industrial chemical production, it was concluded that terrorism crises need open yet cautious discourse, as it is also important that information should not fall into the wrong hands and add to the crisis (Palenchar et al., 2005).

3.1.1.5. Discourse on terrorism

Labelling an act as terrorism in crisis management often leads to upscaling to a higher level of responsibility, while it may also affect the perceptions of public groups. Unfortunately, fear is seen by some as political capital, and a politicization of terrorism occurs, in which risk rumours may easily attach to a rolling narrative that gains cultural momentum (Mythen & Walklate, 2006). Political cause construction has also been noted, as in a study on the strategic communications of the Bush administration (Lockett, Domke, Coe & Graham, 2007).

The literature offers a variety of definitions of terrorism. For example, school violence may be mentioned as an act of terrorism by some (Veil & Mitchell, 2010), while for others terrorism is defined in terms of political group violence expressed by terrorist actions

(Gofin, 2005). Initial evidence from a study on school shootings indicated that in communication about school violence, it may be wise to avoid widening the gap between conflicting world views (Veil & Mitchell, 2010). Hence, campus safety campaigns need the right balance of warning and tolerance messages, while mitigating attacks on alternative world views and preventing aggression towards differing others (Veil & Mitchell, 2010). The same point is made in an Australian study (Stevens et al., 2009): communication campaigns about terrorism have to be framed with caution in order to avoid negative reactions towards minorities.

3.1.2. CBRN-related aspects

In the literature, the CBRN-related challenges emphasized are the diversity of crises, uncertainty and the quickly evolving nature of information, lack of clear boundaries of time and geographical space, lack of knowledge and the diverse needs of different public groups.

3.1.2.1. Diversity of crises

The topics placed under this heading include the kinds of hazardous materials involved, lethality, area size and the duration of contamination (e.g., Sheppard, 2011). It is clearly challenging to arrange preparedness for such a great diversity of situations.

3.1.2.2. Uncertainty and quickly evolving information

A terrorism crisis involving CBRN materials is often not observable and has delayed effects (Sheppard, 2011). The detection of the substances in question may also take time (Clements-Nolle, Ballard-Reisch, Todd, & Jenkins, 2005). Consequently, scientific uncertainty results in delays in information release, as was shown in an interview study of the anthrax crisis in 2001 (Robinson & Newstetter, 2003), and causes ambiguity in the advice provided initially (Sheppard, 2011). During such a crisis, as in the London polonium crisis in 2006, insights evolve and call for constant updates in the information provided to stakeholders (Rubin, Amlôt, & Page, 2011). These uncertainties add to the fear of the unknown experienced by public groups (Sheppard et al., 2006). A study is discussed in which expert-interviewees explained that a bioterrorist threat was likely a hoax, while at the same time responding as if the danger was genuine (Sellnow, Littlefield, Vidoloff, & Webb, 2009).

3.1.2.3. No clear boundaries of time and geographical space

Terrorism crises caused by hazardous CBRN materials often do not have very clear boundaries in time and space. As mentioned in the previous paragraph, the beginning often resembles a creeping crisis. Next, there may not be a specific end to the situation (Goldstein, 2005), as the consequences may be felt for a long time. Furthermore, there is no clear zone of danger, making it difficult to see who is safe and who is not, so that, for example, rescuers do not know for sure that their own families are safe (DiGiovanni, 2003).

3.1.2.4. Lack of knowledge among public groups

An American study showed that people's understanding of CBRN threats is limited (Wray, Becker, Henderson, Glik, Jupka, Middleton, Henderson, Drury, & Mitchell, 2008). This makes it challenging to communicate technical information to citizens in a short period of time (Rubin et al., 2008). A study on public health preparedness in Nevada showed that the lack of health literacy calls for simplification of technically difficult content (Clements-Nolle et al., 2005).

3.1.2.5. Diverse needs of public groups

The needs of public groups vary greatly, as groups are at different levels of risks (Wray et al., 2008). Detailed information on the risks of having been exposed to hazardous substances is needed, as, for example, in the London polonium incident in 2006 (Rubin et al., 2011). Along with exposure-specific messages, context-specific messages are also required (Casman & Fischhoff, 2008). Persons who are directly affected by the crisis need detailed instructions, for example, to be able to conduct self-triage to establish if they have been exposed (Sheppard, 2011) or to evacuate more rapidly, as in the case of the attack on the World Trade Center (WTC) buildings in 2001 (Zimmerman & Sherman, 2011). Another study on this crisis showed that barriers to evacuation need to be explicitly addressed (Gershon, Qureshi, Rubin, & Raveis, 2007). Fear may also spread to non-exposed populations (Rogers et al., 2007), and hence their concerns also need to be answered. It is important to reassure those who are not exposed of their safety and, while preventing further harm, for example, by transmission of an infectious disease, also to mitigate the social effects of the crisis (Wray, Kreuter, Jacobson, Clements, & Evans, 2004).

3.2. Themes discussed in the literature on communication in terrorism crises (RQ2)

Several themes related to communication in terrorism crises receive attention in the literature. Insights on both risk perception and communication are reported below. First, we report themes (discussed) on *risk perception*, as an understanding of risk perception by public

groups is a precondition for initiating effective communication. Second, we report themes discussed on communication.

3.2.1. Risk perception

Many aspects of risk perception are discussed in the literature. Here, we report the following: mapping risk perceptions, factors influencing risk perception and misperceptions.

3.2.1.1. Mapping risk perceptions

Risk perceptions can be mapped according to the degree of dread they create and the degree to which they are known or unknown (Sheppard, 2011). Perception of risk is also influenced by threat type, as perceptions of risk between a natural disaster, a violent crime and an act of terrorism have been found to differ (Heilbrun et al., 2010). As a low-chance phenomenon, terrorism is acknowledged for its potential to create anxiety among publics (Lee et al., 2010). The type of terrorist scenario also plays a role (Lee, Dallaire, & Lemyre, 2009). For example, one study tested a threat appraisal model for terror alerts (Pang, Jin, & Cameron, 2006). CBRN hazards are perceived both as dreadful and unknown (Sheppard, 2011). Assessing risk perceptions after an attack may be methodologically challenging due to rapid changes in perceptions (Rubin et al., 2008).

3.2.1.2. Factors influencing risk perception

Risk perception is influenced by many factors. Threat, uncertainty and control are seen as cognitive dimensions which influence an individual's response to terrorism (Lee et al., 2009). While uncertainty and uncontrollability score high in terrorism, perceptions also further influence psychological reactions, such as fear and worry about family health (e.g., Lee et al., 2010).

In addition, socio-demographic, socio-economic and psychosocial factors are important aspects that shape risk perception. For example, education level, migrant background or ethnicity, gender, age, negative previous life events, post-traumatic stress disorder and fear of death have been found to influence risk perception (Boscarino et al., 2006; Kearon, Mythen, & Walklate, 2007; Stevens et al., 2009).

Moreover, cultural knowledge influences risk perception. Cultural factors are also often intertwined with the context in which the risk is perceived. For example, the timing of the event, regulation by authorities and other social and political processes may play a role, as has been shown by studies of terrorism risk perceptions and individuals' response to terrorism (Lee et al., 2009). In the case of the London polonium incident in 2006, popular culture and the fact that the James Bond movie *Casino Royale* had opened in the cinemas just before the event may have affected risk perceptions (Rubin et al., 2011). A preference for one source over another may also differ across cultures. In the case of the London polonium incident in 2006, communication conducted by health care professionals, a trusted source in the United Kingdom, may have mitigated people's perceptions and reactions (Rubin et al., 2011). A study conducted among Canadians suggests that control over terrorism is considered the responsibility of institutions (Lee et al., 2010), as individuals feel helpless to do anything themselves.

3.2.1.3. Misperceptions

A challenge presented by CBRN terrorism concerns misperceptions, which may further add to public fear levels (Rubin et al., 2008) and spur circulation of rumours (Mythen & Walklate, 2006). As people normally do not have first-hand experience of terrorism, they may rely on others, including the news media, for interpretation of the risks involved (Aldoory, Kim, & Tindall, 2010). Prevailing misperceptions among the public groups should be addressed in communication activities. Understanding the risk perceptions of public groups in CBRN terrorism crises is important in order to craft communications that meet the needs of target audiences (Wray et al., 2004).

3.2.2. Communication in terrorism crises

We now turn to a discussion of themes related to communication found in the literature: the role of communication, communication approaches, leadership communication and rhetoric, communication as a support function, communication planning, information needs and trust, targeting communication, messages and communication means, and ethics.

3.2.2.1. The role of communication

In a study on nuclear/radiological terrorism situations, the role of communication was described as helping people take appropriate self-protection measures, limit adverse social and psychological effects, maintain trust and confidence, and reduce morbidity and mortality (Becker, 2004). Although we have already mentioned that the notion of the public as panic-prone public is to be considered a myth (Sheppard et al., 2006), it is suggested that communication can help to keep people's fears in perspective (Gray & Ropeik, 2002).

According to Fischhoff (2011), while the direct effects of terrorism depend on operational crisis management, the indirect effects, for example, whether terrorists manage to spread fear, anxiety, uncertainty and

distrust, depend on the success of communication. Insights on how this may be done are presented below.

3.2.2.2. Communication approaches

According to the literature, communication can adopt two rhetorical stances: a persuasive approach aiming at inducing certain behaviours, such as evacuating, or a non-persuasive approach aiming at facilitating informed decision-making, for example, explaining how to best prepare for a radiological/nuclear attack (Fischhoff, 2011). Moreover, in reference to the 9/11 tragedy in 2001, it is suggested that discourse that emphasizes renewal and growth based upon stakeholder commitment or a re-establishment of core values may be an appropriate strategy (Ulmer & Sellnow, 2002).

A contingent approach to communication strategies is proposed for cases of terrorism by a model linking the appraisal of threats with communication where threat level, duration and type play a central role (Pang et al., 2006). By reducing dread and unknown risks, risk communication strategies may aim at augmenting resilience (Sheppard, 2011).

Speaking with multiple voices in comparison to 'speaking with one voice' may be the most appropriate strategy for risk communication, where heterogeneity of the target groups is combined with high technical uncertainty about the issue being communicated, as suggested by a case study following the anthrax attacks in 2001 and an analysis of the literature (Clarke, Chess, Holmes, & O'Neill, 2006). Finally, due to the indirect and long-term effects of CBRN events, a comprehensive strategy covering not only emergency response, but also long-term health care, risk communication, research and economic assistance, is proposed (Hyams et al., 2002).

3.2.2.3. Leadership communication and rhetoric

A study of leadership communication after the 9/11 attacks in 2001 suggests, confirming the restorative rhetoric approach, that a leader can serve as a facilitator in guiding the process of healing towards restoration, as this helps to restore faith in a core set of values and beliefs, facilitate the healing of direct victims and wider audiences, recreate a sense of security, and establish a vision for the future (Griffin-Padgett & Allison, 2010). Several authors analyzed President Bush's public communication and crisis rhetoric related to the terrorist attacks of 9/11, covering topics such as successes and difficulties in the war on terror (Smith, 2005), themes and sequences of discourse and communication strategy (Lockett et al., 2007), presidential communication and charismatic leadership (Bligh, Kohles, & Meindl, 2004), and public discourse and national identity (Drew, 2004).

3.2.2.4. Communication as a support function

In addition to its more strategic role, the literature describes how communication also serves as a support function. In the case of evacuation, for example, the WTC buildings in 2001, communicating the risk communication plan to employees before the event can ease evacuation (Gershon et al., 2007), while immediate communication is needed to start the evacuation and enable other services, such as the transportation system, to function smoothly (Zimmerman & Sherman, 2011). Moreover, in crises caused by biological weapons, communication is considered an important component of hospital preparedness (Ippolito, Puro, & Heptonstall, 2006) and, when improved, could also enhance the efficiency and safety of the emergency medical service response (Beaton, Stergachis, Oberle, Bridges, Nemuth, & Thomas, 2005). In fact, communication can serve as both a facilitator and barrier to the smooth operating of other functions in emergencies (Gershon et al., 2007).

3.2.2.5. Communication planning

CBRN terrorism preparedness planning should include anticipating and preparing for a range of psychological factors associated with various incidents (DiGiovanni, 2003). Moreover, the human factor, the kind of substances involved, the socio-cultural environment and the physical environment should be taken into account throughout the pre-event, event and post-event phases (Gofin, 2005). The community should also be involved in the planning activities (Blanchard et al., 2005). CBRN incidents may have long-lasting effects, thus, recovery poses special challenges for communication, as people need to know, for example, if it is safe to return to contaminated areas (Sheppard, 2011).

According to the literature, among the communication staff needed for terrorism risk communication are subject matter specialists, risk and decision analysts, and communication specialists and managers (Fischhoff, 2011). Pre-event education and training is suggested for both citizens and professionals. A study in Nevada showed that while citizen groups need personally relevant information regarding, for example, signs and symptoms of infection, professional groups need training in potential non-traditional roles that they may need to assume in the event of a bioterrorism crisis (Clements-Nolle et al., 2005). Uddin, Barnett, Parker, Links, and Alexander (2008) describe an emergency preparedness curriculum that also covers the topic of risk communication and risk perception in relation to CBRN.

3.2.2.6. Lack of coordination

Terrorism and, in particular, CBRN terrorism crises involve many different response organizations, making

collaboration even more crucial. Several authors suggest improving coordination in the response network, as this is often hampered by, for example, organizational, legal and professional constraints, such as lack of resources, differences in role perceptions (Lowrey, Evans, Gower, Robinson, Ginter, McCormick, & Abdolrasulnia, 2007), interpretations of scientific or medical information (Chess & Clarke, 2007), different priorities (Hyams et al., 2002), hierarchical structures (Alavosius, Houmanfar, & Rodriquez, 2005), power differentials and cultural clashes (Beaton et al., 2005), ineffective communication between journalists and public information officers (Lowrey et al., 2007), and interorganizational conflicts (Chess & Clarke, 2007). Problems can also arise where the organizations involved in the response network are not accustomed to working together (Hyams et al., 2002). Solutions offered by the literature include different organizing models (Alavosius et al., 2005), organizational, professional and informal networks to facilitate communication by response organizations. For example, a bioterrorism taskforce was utilised in the anthrax crisis in 2001 (Chess & Clarke, 2007), and cooperation was arranged to improve journalistic practices, as mentioned in case studies such as the Madrid train bombings in 2004 (Sorribes Pont & Rovira Cortiñas, 2011).

3.2.2.7. Information needs and trust

The information needs of the public in the case of a bioterrorism crisis include – as in other crises generally – honest, accurate and timely communication (Clements-Nolle et al., 2005). In addition, focus group studies on radiological/nuclear situations showed that the primary concerns tend to centre on health issues, self-protection and the protection of family members (Becker, 2004). Similar results emphasizing personal health issues are mentioned in other studies (e.g., Wray et al., 2008). Moreover, people would like to have specific information about the dangerous substances involved (Becker, 2004). Detailed information is appreciated on one's risk to exposure, test results and the differences between acute and chronic effects of exposure (Rubin et al., 2011), as is evacuation information for those at continued risk (Wray et al., 2004).

Consistency of information across different sources is also appreciated (Clements-Nolle et al., 2005). Attempts to provide non-specific reassurance may provoke suspicion (Rubin et al., 2011). Furthermore, the uncertain nature of information related to CBRN terrorism crises may lead people to suspect miscommunication. For example, in the case of the anthrax crisis in 2001, health messages might have been interpreted as inconsistent and unreliable had the rationale for changing information not been explained (Blanchard et al., 2005). Consequently, communicators should ensure that changing information and advice is not interpreted as mishandling of the situation by authorities (Sheppard, 2011).

The provision of accurate and consistent information has also been identified as a component of trust (Blanchard et al., 2005; Palenchar et al., 2005; Meredith et al., 2007). Other aspects of communication to be considered in relation to trust include the use of credible and trusted sources and spokespersons, having local officials demonstrate sincerity in helping people, providing people with all the relevant information available, and involving people in the communication process (Blanchard et al., 2005; Meredith et al., 2007). This is relevant in all kinds of crisis, but it is especially crucial in CBRN terrorism incidents as these create even more uncertainties. One aim of communication before, during and after terrorist attacks, as proposed in the literature, is to maintain and build trust (Rogers et al., 2007), as it is this that terrorism seeks to shatter.

3.2.2.8. Targeting communication

In terrorism crises, emphasis is laid on the importance of identifying risk groups (Stevens et al., 2009) at different risk levels (Wray et al., 2008) to be able to develop group-specific risk communication strategies (Stevens et al., 2009) and segment, for example, consumer groups in the case of food terrorism (Degeneffe, Kinsey, Stinson, & Ghosh, 2009). Risk groups include professionals exposed to the event, vulnerable populations (e.g., homeless and poorly housed people, children, immigrant communities, people with physical limitations, such as a hearing defect) and transient populations (e.g., individuals away from their normal surroundings; Blanchard et al., 2005; Casman & Fischhoff, 2008).

A questionnaire-based study into public perceptions of emergency advice, including CBRN terrorism crises, confirmed that communication should – as in other types of crisis – be tailored to meet the needs of particular stakeholder groups and different communities (Kearon et al., 2007). Educational materials on, for example, bioterrorism should suit the needs of different public groups (Clements-Nolle et al., 2005). Furthermore, stakeholder groups differ, for example, in preferences for or use of media, as shown in an American study (Wray et al., 2008). There are also a number of communication issues that particularly concern minority groups, including potentially higher levels of distrust and fatalism (Blanchard et al., 2005; Wray et al., 2008), and which thus call for relationship building with different groups before crises occur (Blanchard et al., 2005). This is considered even more important in the case of a terrorism threat that may evoke strong emotions. Public groups may also be formed around issues presented in the media during a terrorism crisis. A study showed that news coverage of bioterrorist activity may,

for example, generate hot issue publics and active publics, by increasing problem recognition, perceptions of severity and emotional responses, such as fear and anxiety (Aldoory & van Dyke, 2006).

3.2.2.9. Messages and communication means
In the case of CBRN terrorism-related instructions, the messages designed for diverse publics should emphasize simple, practical steps and basic information (Wray et al., 2008), be straightforward, use easy language, employ pictures, and be available in multiple languages (Becker, 2004). Studies have shown that some terms, such as 'shelter-in-place', used in current radiological/nuclear terrorism emergency information materials may be confusing or unclear for some people (Becker, 2004). This stresses the importance of health literacy and the simplification of complex materials (Clements-Nolle et al., 2005). Furthermore, there is discussion on how the distinctive features of various hazardous CBRN materials could be taken into account in message strategies (Wray et al., 2004). A method for assisting in the construction of exposure-specific messages and answering context-specific questions in the case of a plague bio-attack has been developed (Casman & Fischhoff, 2008).

With regard to communication means, the use of multiple channels is advocated (Clements-Nolle et al., 2005). In a multi-platform strategy, for example, tweets can link to websites with more information. The suitability of various media in crisis situations is discussed by many authors (e.g., Becker, 2004; Kearon et al., 2007; Jefferson, 2006; Lee & Rao, 2007).

3.2.2.10. Ethics
CBRN risks and, for example, the ethically complex dimensions of disease containment, call for accurate information and in cases where information is shared between different organizations, questions about confidentiality and anonymity also arise (King, 2005).

Questions and concerns about ethics are relevant also to governmental communications on terrorism where the discourse about terrorism, according to the literature, is brought into political debates and sometimes used for political ends (Mythen & Walklate, 2006). Moreover, when a nation is threatened, nationalist sentiments come into play, as was shown in a content analysis of communication following the 9/11 crisis in 2001 (Hutcheson, Domke, Billeaudeaux, & Garland, 2004). Terrorism may also be seen to undermine trust in the government and pose a threat to core values (Gibbs van Brunschot & Sherley, 2005). Terrorism is a criminal offence with risk of repetition, and thus linked with security issues. Underlying security concerns often dictate what information can be communicated to the public, and consequently there is a risk of security issues being leaked (Mythen & Walklate, 2006).

It is also pointed out that as the success of terrorism may be measured in terms of publicity and fear created among the public as much as in numbers of casualties, overstating the risk in public communication may turn against itself (King, 2005). Moreover, it is suggested that issues of ethics and responsibility should be addressed in crisis management planning and preparedness communication by organizations (Ulmer & Sellnow, 2002; Wray et al., 2004). All of this adds to the complexity of communication concerning CBRN terrorism threats.

3.3. Trends and gaps in the field (RQ3)

Next, trends in the literature on communication in terrorism crises are discussed.

3.3.1. Years of publication
The final sample consisted of 63 articles covering 10 years, 2002–2011. The highest number of articles was found in 2007 (12), followed by 2005 (11) and 2006 and 2011 (8 each). Hence, a peak in publication shows in the years 2005–2007. This could be explained by the high number of articles on bioterrorism (9), either focused on or inspired by the anthrax attacks of 2001. Moreover, a relatively large number of the articles published during those years address the terrorist attacks of 9/11 (8).

Division of the study period into two 5-year-periods, 2002–2006 and 2007–2011, shows a slight rise in the number of articles in the latter period: 34 in 2007–2011 vs. 29 in 2002–2006.

3.3.2. Crisis types
Throughout the 10-year review period, various types of crises, risks and threats were studied and addressed that relate to communication. The attention devoted to CBRN terrorism in the literature was high over this period, and in the second half of the time span covered, the number of CBRN-focused articles was somewhat higher (20) than in the first half (14). The number of terrorism-focused articles, on the contrary, was almost the same in the two periods (14 vs. 15).

Within the general terrorism category, almost half of the articles (14) dealt with the attacks of 9/11. Moreover, many of the remaining general terrorism-focused articles used these attacks as a point of reference. The attacks of 9/11, not surprisingly, were also the single terrorism event that received most attention in the literature. In fact, many authors noted that scientific interest in terrorism and, more specifically, terrorism risk communication increased after the attacks of 9/11 (e.g., Heilbrun et al., 2010).

Within the CBRN terrorism category, the crisis type that received most attention in the literature was biological terrorism ($n = 17$). Following the anthrax crisis in

2001, anthrax attacks were the most studied event ($n = 4$), also serving as starting point for a number of other bioterrorism-focused articles. In fact, the number of articles on bioterrorism began to increase from 2005 onwards. In addition to the anthrax attacks after 9/11, other cases analyzed were a hypothetical attack on food supplies and a bioterrorist hoax. Least attention in the category of CBRN terrorism-related articles was paid to terrorism crises related to chemical substances ($n = 2$). One such article reflected on the sarin gas attacks in the Tokyo subways in 1995 (Beaton et al., 2005). Interest in radiological/nuclear terrorism crises, on the other hand, seems to have grown recently, as half of the radiological/nuclear articles (6) were published in 2011, the same year as the disaster in Fukushima.

3.3.3. Methodological approach

The majority of the articles (38) were based on empirical data while the rest (25) were classified as non-empirical. A higher number of empirical articles were found among the general terrorism-focused articles (21 of 29) compared to CBRN-focused articles (17 of 34). Empirical data appeared least in articles dealing with the whole range of CBRN terrorism crises as a group (2 out of 9). More empirical articles appeared in 2007–2011 (24) than in 2001–2006 (14).

The methodological approach of the empirical articles was qualitative (21), although a substantial number of articles (14) followed a quantitative approach, while only a few ($n = 3$) adopted a mixed-method approach using both qualitative and quantitative methods. The most common qualitative methods used were interviews and focus groups, and the most frequently used quantitative methods were surveys and content analysis. The non-empirical articles consisted of a diversity of article types. No previous systematic literature reviews were found.

3.3.4. Journals and authors

The 63 articles in the final sample were published in 52 different journals representing many different disciplines, indicating the multidisciplinary nature of the topic. The most recurrent groups of journals were health and medicine, communication and psychology. Nine journals appeared on more than one occasion in the final sample, and the highest number of articles from the same journal was three. There were two journals in this category: *Health Physics* and the *American Journal of Public Health*.

Moreover, the list of authors was wide. Sixteen of them were involved in more than one article. The most frequently appearing authors were G. James Rubin (5), Simon Wessely (5), Steven M. Becker (4), Richard Amlôt (3) and Lisa Page (3). All in all, the topic seems to have a broad scholarly foundation with an as yet not fully developed core of journals and authors.

4. Conclusions

Although this literature review did not capture all the insights present in the literature in full detail, it offers a broad overview of the scientific publications on the topic during the last 10 years. It reveals the many challenges presented by terrorism crises, in particular those concerning risk perception and communication, and some of the current research trends in the field. Below, we summarize the findings.

4.1. Characteristics of communication in terrorism crises

According to the literature, terrorism crises are complex and challenging. They are low probability but high-risk incidents. Terrorism is an intentional act, possibly leading to mass casualties with risk of repetition. CBRN terrorism crises are even more complex, as they may involve a wide array of hazardous materials, causing contamination and in some cases infectious diseases. They often have no clear boundaries in time and no clear zones of danger and safety.

For crisis management, the wide and evolving array of hazardous materials makes it difficult to create preparedness, while mitigation calls for cooperation between multiple response organizations and different kinds of specialists. CBRN crises may be difficult to identify at an early stage and can have long consequences. They may call for large-scale response and high capacity on the part of the various organizations involved, including hospitals.

4.2. Themes related to communication in terrorism crises addressed in the literature

According to the literature, risk perception in the case of terrorism can be mapped according to the level of dread and knowledge in society. Risk perceptions may be influenced by many factors, such as uncertainty and uncontrollability, and differences in cultural knowledge and levels of trust in institutions. The perceptions and misperceptions of public groups should be taken into account when drafting communication activities.

The literature shows that the role of communication is clearly broader than just issuing instructions to public groups. Various approaches can be used to enhance resilience. It is important that leaders show empathy and facilitate sense-making. Communication can support crisis response processes, for example, by addressing evacuation guidelines. The literature mentions the importance of the thorough planning of com-

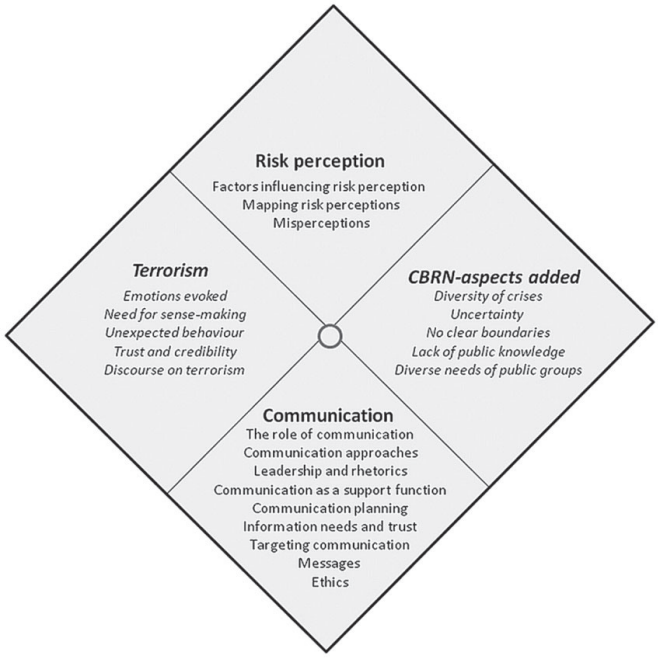

Figure 1. Overview of the main themes found in the literature.

munication, including the various competences needed, and coordination of the response network. Diverse information needs have to be addressed and ways found to target communication to the right audiences. For example, exposure- and context-specific messages can be disseminated using a multi-channel approach. Ethical aspects are also mentioned. Figure 1 summarizes the main characteristics and themes found in the literature.

4.3. Trends in the literature on communication concerning terrorism crises

The literature shows that the topic belongs to a multi-disciplinary field addressed by a variety of authors in a variety of journals, although relatively little attention has been paid to the topic in communication journals. The current variety and breadth of scope also indicate a field of study with a not yet fully developed scientific core. The attacks on 9/11 have spurred the publication of a number of articles on terrorism in general, while the anthrax attacks in 2001 led to articles on bioterrorism. In fact, the literature shows an increasing interest in communication in CBRN terrorism crises, in particular over the past 5 years. The literature on communication in cases of terrorism involving the use of chemical substances, on the contrary, is still in its infancy while interest in radiological/nuclear terrorism-related crises seems to have grown recently. In sum, the results show an increasing number of articles based on empirical research. However, empirical evidence supporting the examination of the whole range of CBRN terrorism crisis events combined is lacking.

4.4. Implications for practice and research

The study shows that in terrorism crises many general insights on crisis communication are applicable, but in addition terrorism- and possibly also CBRN-related aspects need attention.

4.4.1. Challenges for communication

The challenges for communication in the case of terrorism crises are many. Terrorism intends to arouse fear and insecurity, and by its malicious intent creates strong emotions while there may also be the threat of repetition. Although the idea of a panic-prone public is considered a myth, terrorism nevertheless creates high levels of anxiety. People's view on the world may change, creating a need for sense-making and socially supportive communication. Fear and misperceptions may lead to unexpected behaviour, and maintaining credibility and trust in institutions becomes difficult.

Media discourse about terrorism may further add to conflicts in society. The evolving large-scale social media discourse is difficult to monitor. Since terrorism crises are considered low probability with potential for much damage, people feel that the authorities should take responsibility.

CBRN terrorism crises involve an array of hazardous materials of which public groups have little knowledge. For response organizations, there is difficult content that must be explained. Such crises are characterized by uncertainty and rapidly evolving information. Public groups need continuously updated information and often over a long period of time. The needs of public groups differ widely according to their level of exposure to the CBRN material in question.

4.4.2. Implications for communication practice

Based on these communication challenges, implications for practice can be outlined. Preparedness for such diverse low-probability crises can best be included in a wider educative approach. The mitigation of large-scale crises needs a task force of high capacity, possibly through pooling expertise and cooperative training, and supported by joint facilities such as high-capacity crisis websites and call centres for various types of crises. Communication must be integrated into crisis management, and therefore, the challenges of communication need to be understood by crisis managers, while communication experts need to familiarize themselves with the existing procedures and also, especially in the case of CBRN terrorism, the relevant jargon. Cooperation between the health and rescue sectors needs attention, including where this concerns the development of joint communication strategies.

With respect to the communication activities themselves, close monitoring of the risk perceptions and information needs of public groups, including possible misperceptions, is important. This requires competences in social media, in particular the use of monitoring tools, and methods of data interpretation that can lead to decision-making on communication strategies. Terrorism crises call for fast information updates that, using a multi-channel approach, can be tailored to fit different needs and media habits. This is similar to communication activity in other types of crisis, but in large-scale terrorism incidents, it becomes even more urgent.

In the case of CBRN terrorism crises, affected publics need detailed health-related information, while a wider group of people is also involved. Human behaviour and ethical aspects should be taken into account, for example, in communication on evacuations and medical treatment. Moreover, communication needs to be socially supportive, showing empathy and facilitating sense-making to strengthen community resilience. CBRN crises can have long-term consequences, so that mitigation and aftercare may overlap and need communicative attention over a prolonged time span.

4.4.3. Limitations and implications for research

The focus of this paper is on communication in the case of terrorism, with CBRN terrorism as a growing area of interest within this topic. As this was not a comparative study, the present findings cannot outline to what extent communication in terrorism crises is different from communication in other kinds of crises. Nor do the findings permit one to say which pose the bigger challenge, the aspects of terrorism *per se* or the CBRN aspects of terrorism, as this will depend on the case in question. Future research could take a broader overview of the crisis categories under consideration. For now, however, this paper brings together insights gathered from the literature on communication supporting crisis management in the case of terrorism.

In the literature, the challenges presented by terrorism crises of very different types were not clearly linked to particular options for communication strategy decision-making. This may point to a need for a comprehensive communication strategy model that would address the different kinds of terrorism crises in a holistic way, taking into account the variety of response organizations, diversity of target groups and all the phases of a crisis – topics that were also addressed in the literature. In this way, knowledge about strategy-making for communication aimed at promoting a resilient society could be further developed. Nowadays, this should include social media, as such crises evoke emotions and give rise to a large volume of social media interaction that calls for the development of tools and methods both for monitoring perceptions and for communication strategy-making.

Such an approach would not be complete if it did not entail partnering with the public, a best practice in risk and crisis communication (e.g., Veil, Buehner, & Palenchar, 2011), and also suggested as a remedy for improving communication about the highly uncertain, diverse, unpredictable, infrequent, unfamiliar, uncontrollable and unknowable nature of terrorism risks and crises (Kearon et al., 2007; Meredith et al., 2007; Rogers et al., 2007; Becker, 2011; Sheppard, 2011).

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II

COMMUNICATION CHALLENGES IN CBRN TERRORISM CRISES: EXPERT PERCEPTIONS

by

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Communication Challenges in CBRN Terrorism Crises: Expert Perceptions

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The aim of this paper was to investigate experts' perceptions on communication in chemical, biological, radiological and nuclear (CBRN) terrorism crises, including challenges and good practices. This is pursued by means of a qualitative online questionnaire aimed at international crisis communication and crisis management experts. The challenges of communication concerning CBRN terrorism arise from the complexity of such incidents, having to do with the nature of the threat, leading to problematic public perceptions and response. Critical areas that need to be taken into consideration include resources, competences, and cooperation in preparedness communication and when providing information during a crisis. The findings and conclusions of this study will serve the development of an audit instrument for communication preparedness towards CBRN terrorism.

1. Introduction

Several authors have described factors that make chemical, biological, radiological and nuclear (CBRN) terrorist events unique and demanding. These factors relate to terrorism and the hazardous – CBRN – materials involved (Ruggiero & Vos, 2013), including, for example, the element of surprise, unseen agents, lethal devices, risk of repetition, and new kinds of risks (Covello, Peters, Wojtecki, & Hyde, 2001; Sheppard, 2011; Slovic, 2002). These factors may create intense reactions among the public (Rubin, Amlôt, & Page, 2011) that have to do with risk perception factors such as involuntariness, uncontrollability, unfamiliarity, unfairness, lack of understanding, uncertainty and ethical/moral violations (e.g., Covello et al., 2001; Gray & Ropeik, 2002). Combined with urgency and a need for quick action should such an event take place, the importance of effective crisis communication, including identification of challenges and possible pitfalls before crises occur, goes without saying.

The aim of this study is to investigate experts' perceptions on communication in CBRN terrorist crises, including challenges and constraints as well as some good practices. This is pursued with the help of a qualitative online questionnaire aimed at international crisis communication and crisis management experts. The purpose was to identify areas that need attention when planning, implementing and evaluating communication in the case of CBRN terrorism incidents. The findings and conclusions will serve the development of an audit instrument to facilitate and improve communication preparedness towards CBRN terrorism along the lines of previous research on crisis communication measurement and scorecard construction (Palttala & Vos, 2011,

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2012; Palttala, Boano, Lund, & Vos, 2012). In view of the assertion that crisis communication in terrorism situations is an under-researched topic (Falkheimer, 2014; Schmid, 2011), insights on problematic areas from a practical point of view may also generate topics for the development of future research and theory in the field. From a societal perspective, this study contributes to the call of the European Union in the CBRN Action Plan (Council of the European Union, 2009) to improve communication with the public via paving the way for the development of good practices and communication strategies.

1.1. Communication concerning incidents of CBRN terrorism

In this paper, crisis communication is studied as communication with public groups that supports crisis management. The process approach of Reynolds and Seeger (2005) further explains the interrelated and overlapping roles of risk and crisis communication, as well as the developmental nature of crises as comprising different phases; in this approach, risk communication primarily enhances the understanding of (often health-related) risks, whereas crisis communication is seen as event specific. Following a functional approach, the role of communication is to accomplish certain outcomes, for example, problem solving, decision making, coordination of actions and facilitating cooperation (Sellnow & Seeger, 2013). In the case of terrorism, in the pre-crisis phase, communication can be used to prepare the public by a broader educative approach (Ruggiero et al., 2013), and increase understanding of the risks of terrorism, thereby increasing their resilience (Sheppard, 2011). During a terrorist event, the role of public communication is to share up-to-date information about the event, including instructions on the precautionary measures people can take to prevent further harm and mitigate its effects (Wray, Kreuter, Jacobson, Clements, & Evans, 2004). In the recovery phase, communication can help restore trust, which may have been shaken (Fischhoff, 2011), and facilitate the process of understanding, learning and healing (Griffin-Padgett & Allison, 2010).

Crisis communication is, therefore, not limited to the simple issuing of messages and instructions, but it encompasses a process of sense-making where meanings are created in the interaction of various actors in the network constituted by e.g., response organizations, citizens and the media, both in crisis situations and before crises occur (Palttala et al., 2012). In the interaction initiated by response organizations, a stakeholder approach can be used, taking the perspective of the various stakeholders into account, for example, by monitoring the needs of citizens. In the case of a terrorist event, although the number of directly affected people may not always be high, fear may also spread to non-exposed populations (Rogers, Amlôt, Rubin, Wessely, & Krieger, 2007). Moreover, terrorism may also affect the way people view the world or themselves (Rubin, Brewin, Greenberg, Hughes, Simpson, & Wessely, 2007), touching core values in the society (Griffin-Padgett et al., 2010; Ulmer & Sellnow, 2002), and indicating a heightened need for emotional support and affective communication (MacGeorge, Samter, Feng, Gillihan, & Graves, 2007).

In fact, the challenges related to the indirect consequences of terrorist attacks – anxiety, health concerns and various psychological reactions – may pose a greater threat than the acts themselves (Hyams, Murphy, & Wessely, 2002). When combined with a lack of knowledge and understanding, people could, in the case of an event, engage in unsafe behaviour, including acts of omission, e.g., becoming passive and ignoring instructions, and acts of commission, i.e., going against the advice of authorities (Rubin, Amlot, Page, & Wessely, 2008; Sheppard, 2011; Sheppard, Rubin, Wardman, & Wessely, 2006). Hence, although ensuring the safety of those who are directly affected is of primary importance, taking into account and addressing the information needs, concerns and feelings of indirectly affected wider audiences is important, too. As Fischhoff (2011) has pointed out, while the direct effects of terrorist attacks depend on operational factors, the indirect effects depend primarily on communication, thereby also determining whether terrorists succeed in achieving their primary objectives, i.e., getting public attention for their cause by spreading anxiety (Rubin et al., 2008).

By interacting with various psychological, social, institutional and cultural processes, risk communicators help mitigate how events unfold (Wray et al., 2004), as explained also in the Social Amplification of Risk Model (Kasperson, Renn, Slovic, Brown, Emel, Goble, Kasperson, & Ratick, 1988). Moreover, the environment is dynamic, consisting of numerous, sometimes competing issue arenas (Luoma-aho, Tirkkonen, & Vos, 2013), which in the case of terrorism comprise diffuse and complex processes (Falkheimer, 2014). Monitoring and analysing public response and perceptions before, during and after CBRN terrorist events is of central importance, including traditional media monitoring, opinion polling (Wray et al., 2004) and social media monitoring (Ruggiero & Vos, 2014). Through risk communication, actions can be taken to moderate risk perceptions, including the establishment of trust, increasing familiarity of terrorism risks and facilitating a sense of control by giving citizens a voice already in the preparedness phase (Covello et al., 2001). Addressing preparedness and facilitating informed-decision making is also part of an ethical approach to terrorism crisis communication (Wray et al., 2004).

This paper consists of four parts. The introduction is followed by an explanation of the method including data collection and analysis. The next section presents the findings of the questionnaire study, and chapter four concludes the paper with a discussion of the main results in the light of the existing theory and empirical literature.

2. Method

This study on communication in CBRN terrorism crises was conducted as part of a larger questionnaire study aimed at emergency management and communication specialists. The purpose of the part on CBRN terrorism was to investigate experts' perceptions on communication with the aim of answering the following research questions.

RQ1: What communication challenges do CBRN terrorism crises according to expert views present?

RQ2: What are considered good practices when communicating with citizens in CBRN terrorism crises?

2.1. Data collection

The questionnaire comprised mainly open-ended questions accompanied by some multiple-choice questions. With regard to the latter, the respondents were asked to give some general background information on their organization, expertise and the state of preparedness in their organization for communication in terrorism-related CBRN crises. The open questions related to descriptions of organizations' preparedness for communication in terrorism-related CBRN crises, what the respondents saw as especially challenging for communication in CBRN terrorism crises, what kind of communication would be most effective when interacting with citizens, and ethical issues regarding communication in CBRN terrorism crises. Following strict ethical guidelines, an informed consent form was used and participants were told they could withdraw from the study at any point or leave any of the questions unanswered. In order to enable participants to respond to the long questionnaire in stages, respondents were asked to log in to the questionnaire using their email address as authentication information.

A pilot study was conducted in May 2012. The data were collected between June and September 2012. The sample consisted of emergency management and communication specialists working in Europe and was drawn from the database of the yearly International Disaster and Risk Conference in Davos of the Global Risk Forum. Four hundred ninety-three experts received an email invitation to participate in the questionnaire, of whom 82 responded. The section on CBRN terrorism crises, the focus of the present paper, was answered by 28 respondents. Respondents could choose which questions to answer. It seems that only experts who felt confident that they could contribute to this topic chose to fill in this part. Although the number of respondents was not very high, their expert perceptions provide useful qualitative insights into the challenges facing communication in CBRN terrorism crises that can complement existing knowledge.

2.2. Data analysis

The analysis of the questionnaire data was conducted using version 7, by ATLAS.ti Scientific Software Development GmbH, a qualitative data analysis software. The analysis was implemented using data-driven thematic coding (Riessman & Quinney, 2005). Thematic analysis is commonly used with qualitative data (e.g., Schwandt, 2007). The aim was to reduce the data by segmenting, grouping and categorizing, and then to summarize and reconstruct them so as to capture important patterns and concepts (Ayres, 2008; Elo & Kyngäs, 2008).

In this manner, the data from the questionnaire sheets were read through and sections of text were coded based on whether they contributed to emerging themes (following e.g., Schwandt, 2007). The main themes included preparedness of organizations for communication in CBRN terrorist crises, challenges encountered in communication with citizens, what were considered possible solutions, and views on ethical issues. These themes were further divided into subthemes. Finally, the themes and subthemes were brought together in table overviews and described in a report, illustrated by quotes of the respondents. The main findings follow in the next section.

3. Results

In this section, we report the main findings of this study, including the state of preparedness of respondents' organizations for communication in terrorism-related CBRN crises, the main communication challenges, good practices for effective communication with citizens, and solutions provided to overcome ethical issues. First, the background information on the respondents is described.

3.1. Background information

Most of the 28 respondents were experts in crisis or emergency management (15), followed by crisis communication specialists (10) and experts in other related fields (9) such as risk analysis, disaster risk reduction or

Table 1. Respondents' Background Information

Type of organization		Level of organization	
Governmental organization or authority	14	International organization	14
Police or rescue services	1	National organization	15
Health care	1	Regional or district organization	4
Expertise centre, or research organization	7	Local or municipal organization	7
Non-governmental organizations	4		
Enterprise	7		
Other: telecommunications, county fire brigade, private consultant, research and development centre	4	Other	–
Total	38*	Total	30*

$n = 28$.
*Multiple answers permitted.

risk management. The majority of the respondents (12) had more than 10 years of experience in their respective fields, while 11 respondents had between 6 and 10 years of work experience, and five had less than 6 years of experience.

The types of organizations represented mostly comprised governmental organizations (e.g., municipality or ministry) or authorities, expertise centres or research organizations, and enterprises, while some worked for non-governmental organizations (NGOs), police or rescue services, and health care (see Table 1). Most of the respondents worked for organizations that operated nationally and/or internationally, while some were also active locally and/or regionally (see Table 1). Many had work experience in more than one country, by working for an international organization or providing assistance elsewhere. Many respondents (20) worked primarily in Europe (France, Greece, Romania, Belgium, Germany, Wales, Finland, Spain, Italy, Austria, Netherlands, Switzerland), while some (5) worked primarily outside Europe (Turkey, Sri Lanka, Georgia, Myanmar, Haiti, the Philippines, Myanmar, Indonesia, Cambodia, Zimbabwe, worldwide), or had (3) combined work experience in and outside Europe (Italy, Turkey, Germany, USA, Chile, New Zealand, Japan, global, worldwide). The majority of the respondents worked both in urban and rural areas (17), while some worked only in an urban area (8) and others only in rural areas (2).

Five of the respondents further specified their experience and mentioned concrete work experience in terrorism-related CBRN crises, participation in, or organization of specific training and exercises, communication planning for such scenarios, and work for the North Atlantic Treaty Organization and nuclear power plants.

3.2. Preparedness for CBRN terrorism crises

Many (10) of the respondents considered their organizations moderately prepared for communication in the event of terrorism-related CBRN crises. Moderate preparedness was described with reference to both positive matters and issues that could be further improved. Positive comments all indicated that some plans and preparedness were in place, as in the following.

> Crisis communication channels in general are good. (R26)

However, positive matters were often accompanied by points for further improvement, centring on a lack of experience of real situations, and a lack of training or exercises:

> There are plans. But there hasn't been an exercise (yet). (R42)

Besides moderate preparedness, many other respondents (8) considered their organizations poorly or very poorly prepared. Poor or very poor preparation was associated with a lack of plans, training, expertise, equipment and public education. One respondent working in an NGO/expert centre in the field of public education for disaster prevention described it thus:

> Almost no public education in what to expect. Do people really have radio and batteries for communications? Do they know when to evacuate and when to lock-down? Do they have supplies to shelter in place? Can schools shelter students for prolonged periods with parents trusting them to do so? (R11)

Moreover, very poor preparedness was attributed to low perceptions of terrorism risk in the country. Some respondents, on the contrary, reported their organizations as well ($n = 5$) or very well ($n = 1$) prepared for communication in the event of a CBRN terrorism crisis. Good preparedness was linked to planning and exercises:

> Exercises covering CBRN scenarios are conducted regularly on the national level. (R8)

One respondent described close cooperation and training in the response network:

> The governmental partners train and engage very close together. (R35)

Another respondent, who perceived his or her organization as very well prepared, also reported experience of real events:

> Well documented, tested and faced real incidents as well as threats numerous times. (R2)

3.3. The nature of the threat poses a challenge

According to the respondents, the specific nature of the threat in question sets certain challenges for communication in a CBRN terrorism crisis. For example, a threat may not always be easy to perceive, as one respondent puts it.

> You can't see or smell the danger. (R42)

Moreover, it was pointed out that 'C, B, R, N issues are each very specific', comprising different threat types and involving different scenarios for crisis situations, which are also characterized by a lack of time. These risks were considered anxiety-inducing, for example, because they may be invisible and thus create uncertainty. Quick changes in the situation may be caused by, for example, changing weather conditions, which can further complicate, for example, evacuation.

> [. . .] it might be challenging to react quickly to changing weather conditions that determine the spread of contamination. While potential evacuation area should be kept as small as possible, the weather uncertainty might require evacuation of very large areas. (R18)

A further challenge related to the terrorism side of CBRN crises is the global nature and unpredictability of such crises, as described by one respondent.

> It is a global threat, and it cannot be predicted. (R25)

3.4. Lack of resources, competences and cooperation in the response network

The respondents cited lack of resources as a factor challenging communication in a CBRN terrorism crisis. According to one respondent, there is 'a lack of everything'. This respondent mentioned that personnel and equipment for the analysis of CBRN materials are inadequate, and that an area-wide database for measurement results is also lacking. Moreover, it is hard to involve citizens in information gathering, unlike in other types of crises, such as floods. Another respondent pointed out that in such scenarios, 'excellent crisis communicators are required'. However, the lack of experts and competences in this field constitutes a big challenge, such that in the view of one respondent 'sometimes preparedness is jeopardized'. This problem also relates to a lack of experience and technical knowledge with regard to the terrorism aspect of such crises.

Arising out of the lack of resources and competences, the respondents stated that training in risk and crisis communication is needed. In the view of one respondent '[. . .] the most important issue [is] to improve our competence in this field, training people [. . .]' (R29).

According to this respondent, few communication experts and competences are available, and the authorities are not 'focused on enhancing preparedness and knowledge in this field'. The respondent further calls for 'a common national programme' to train and prepare all those involved in such emergencies – from physicians and security services to citizens. Research activities in this field also need to be increased. Another respondent stressed that CBRN terrorism crises are not priorities at national and local levels, and hence, it was 'a matter to put CBRN crises as a priority'.

Moreover, another respondent reflected on the need for realistic expectations.

> Explain that you can usually not have safety and full privacy at the same time. You have to compromise and set priorities. (R13)

Other challenges for communication, mentioned by the respondent, dealt with cooperation in the response network. In the words of one expert:

> Local partners like the fire brigade, [national government disaster relief organization], red cross and . . . need clear command structures. (R4)

Moreover, another expert noted that, when the cooperation for crisis communication is not smooth, it may happen that too many organizations and 'so-called experts' will communicate and create confusion. Having too many players communicate without coordination may also evoke more fear in the population. Furthermore, one respondent mentioned that schools also need to be involved when planning crisis communication, 'so that they can act in loco parentis' in the event of a CBRN terrorism crisis, with parents trusting them to do so.

3.5. Public perception and response in CBRN terrorism crises

The public response to CBRN terrorism crises may set challenges for communication related to the psychological and behavioural reactions of people. According to the respondents, people's psychological reactions have to do with, for example, anxiety because of a lack of understanding and control regarding the handling of such a crisis. The respondents also mentioned problematic behavioural reactions of the public in CBRN terrorism crises caused by not following instructions or possible ignorance as such crises hardly occur.

A further challenge, specific to terrorist situations, would be a fear of future attacks among the public and high levels of anxiety caused by exaggeration of the danger inherent in such situations. Several respondents mentioned challenges regarding the need to calm people.

> [. . .] often the situation might be exaggerated and lead to panic – most CBRN attacks will only affect people in the direct vicinity (e.g., some km around the place of attack) [. . .] Therefore it is important to calm the population and to prevent a panic. (R8)

One respondent mentioned 'panic from misinformation' as a potential challenge, indicating that anxiety may be caused by e.g., problems hampering information dissemination by response organizations. Moreover, according to the respondents, a limited understanding of the risks may cause problems for people.

> People are highly emotional, mainly because they do not understand the risks, and have no clue what e.g., a 0.1% probability of an event means. Furthermore, acceptable limits are usually set at an extremely cautious level, and most people are not used to think in categories of risk to understand such limits. (R13)

3.6. Preparedness communication and providing information during a crisis

Because of the rareness of such crises, people are more concerned about more recurrent crisis scenarios. According to one expert:

> Usually people do not consider these risks within their living conditions. For them, their livelihoods systems are more disrupted by recurrent crises due to natural hazards, climate change or conflicts, provoking food insecurity [. . .] (R27)

According to some respondents, concerning CBRN terrorism crises, preparedness communication and education are lacking. The public tends to delegate preparedness for unlikely threats to response organizations. Some respondents consider preparedness needed. It is a long-term challenge, according to one respondent, of how 'to avoid that the population enters the "it won't happen to me" mode, thus reducing their attention and preparedness'. In the words of another respondent:

> IF we continue to NOT TRAIN the public in what to expect, there will simply be too much to do, too much disinformation and noise, and it's too late to teach people after the crisis begins. (R11)

One respondent suggested that discussion of the results of studies and lessons learnt from accidents and exercises could be used to help prepare the public and thus decrease anxiety in the event of a crisis. Another respondent stressed that terrorism preparedness should not be singled out, but embedded in preparedness for various threats. Terrorism adds a dimension of deliberation to e.g., industrial CBRN accidents, but that needs no emphasis as it calls for the same kind of preparedness for the consequences.

> Don't communicate about terrorism/violence separately from all man-made hazards to settlements and environments. [It is] easier to communicate about industrial accidents, and fold deliberate acts into this (e.g., Bhopal explosion or Deepwater Oil Spill in the Gulf of Mexico or Exxon Valdez). (R11)

Another approach, according to the respondents, is to focus on prior education. One respondent mentioned prior education with parents as a key challenge.

Most of the respondents' insights on the challenges for communication were related to communication and providing information. Deciding how much information could be provided to the public and providing accurate information to the people closest to the critical area were thus considered of paramount importance. Although the public may expect the government to act fast in terrorism-related CBRN crises, providing information fast enough was seen as challenging. One respondent mentioned public distrust of news media and official sources as a problem. Not following instructions may be the result, also caused by lack of understanding of such threats. Because of the high specificity of CBRN issues, distinct approaches need to be developed.

An overview of the respondents' insights on challenges of communication is provided in Table 2.

3.7. Good practices in communicating with citizens

The respondents presented their views on what kinds of communication would be most effective in the event

Table 2. Overview of Respondent Views on Communication Challenges in Chemical, Biological, Radiological and Nuclear (CBRN) Terrorism Crises

Challenges for communication in CBRN terrorism crises
Nature of threat
Cannot always be sensed
Uncertainty and an evolving situation
Differing threat types that involve emotions
Lack of time in crisis situations
Unpredictable, global threat
Resources and competences
Lack of experts and competences
Lack of training
Lack of experience (does not happen)
Cooperation
Clear responsibilities in the network structure needed, assuring liaison
Many players; clarification of roles and responsibilities (including e.g., schools)
Public perception and response
Psychological reactions: fear, panic stemming from misinformation
Differing behavioural reactions: ignorance, not following instructions
Lack of understanding of risks, lack of control
Not considered likely to happen
Preparedness communication
Preparedness for low-probability risks integrated
Education on lessons learnt
Communication and providing information during a crisis
Deciding how much information can be provided
Providing accurate information to those closest to the area to ensure their safety
Assuring rapid information and maintenance of trust
Distinct approaches to CBRN needed

of terrorism-related CBRN crises when interacting with citizens.

The responses included references to certain principles of communication that, in their eyes, CBRN terrorism crises call for. Transparency and openness about uncertainties were described in the following ways: 'dare to communicate about uncertainties'; 'communicate in a transparent way'; 'authorities have to accept uncertainties and risks'. Moreover, timely rather than comprehensive actions were emphasized: 'a fast sticker-like spreading of information from officials' and 'fast update cycles'. The principle of consistency was described by one respondent as 'no contradictions', and reflected in the words of another respondent according to whom 'national authorities need to bring their agency experts together fast so they can talk with one voice'. Accuracy was also called for.

The tasks that the respondents assigned to communication with citizens included, for example, prevent, care and help combat. Moreover, 'trust should be won ahead of time, by straight talking'. Populations should be prepared for such crises, and creating fear and anxiety should be avoided. In the view of one respondent, effective communication with citizens requires 'analysing social media and responding asap'.

Communication means mentioned by the respondents to communicate with citizens included social media, such as Facebook or Twitter, but also traditional media channels, such as radio and TV. One respondent referred to 'using all the media'. Mobile phones and text messages were also emphasized. Related matters mentioned included e.g., websites, dedicated spokespeople, social influencers, and early alert systems.

The types of communication that the respondents perceived as most effective when communicating with citizens include, for example, personal communication, although 'this is rarely feasible' as one respondent added. Similar views were expressed by other respondents, who nominated interpersonal communication and group-related communication as the most effective types of communication with citizens. In the direct vicinity of an incident, information needs to be provided 'directly to affected people'. Moreover, open discussion and face-to-face communication were mentioned.

According to the respondents, information targeted at citizens should be illustrated with concrete examples, for example, comparing the level of radioactivity or concentration of chemical agents in the atmosphere to normal levels. In the view of one respondent:

> Most people are not able to think in theoretical terms, they only understand practical examples. (R13)

Moreover, both best case and worst case scenarios should be described jointly. In the event of a crisis, citizens need to know what happened, where and what to do. One respondent referred to the need to provide additional information with 'links to secondary literature' so that citizens could find relevant background information.

In the view of one respondent, involving neutral actors, such as the UN or NGOs, is needed. Moreover, when VIPs (very important persons) visit an affected area without protective clothing, this is likely to suggest to the lay observer that the threat level is lower than expected. Similarly, the behaviour and outward appearance of the first responders may also be interpreted by the public. One respondent calls for 'a single trusted authority' to provide accurate information. The current players may not be adequately prepared for a CBRN terrorism situation, including the appropriate communication. In the view of one respondent:

> [. . .] our local fire departments have done the best at this, but they are not necessarily equipped or authorized for a terrorism-related CBRN role. (R11)

Table 3. Overview of Good Practices in Communicating with Citizens Mentioned by the Respondents

Communicating with citizens in terrorism-related chemical, biological, radiological and nuclear crises	
Tasks	Principles
Prevention	Transparency and openness about uncertainties
Preparedness	Fast information
Build trust	Consistency
Avoid fear and anxiety	Accuracy
Analyse social media	
Means	Type of communication
Social media and Internet	Personal communication
Radio and TV	Group communication
Mobile phone	Interpersonal communication
Spokespeople (to victims)	Direct communication to those affected
Social influencers	Face-to-face communication
Early alert system	Open discussion
Content	Communicators
Explain with concrete examples	Neutral actors
Provide additional information	VIPs (very important persons)
	A single trusted authority
Role of citizens	
Allow citizens to track activities and create their own operational picture	

The role of citizens was stressed by one respondent, who stated that 'citizens must be able to track activities as close as possible (measurements taken, risks, etc.)' to be able to create 'their own operational picture'. The latter may also be seen as an ethical point of view. Ethics, however, were addressed in a separate question.

An overview of the respondents' insights on good practices in communicating with citizens is presented in Table 3.

3.8. Ethical issues

The respondents were introduced to the topic of ethical constraints by explaining that communication about terrorism may, on the one hand, help citizens to be prepared for such situations, while on the other it may create fear and polarization in society, thereby posing an ethical problem. They were then asked how communication specialists can take such ethical dimensions into account when communicating about terrorism.

According to one respondent, 'ethical dilemmas are one of the crucial points of communication in this field'. Moreover, ethical dilemmas should be explained whenever the topic is discussed in public. In the view of another respondent, ethical issues need special consideration 'where terrorism isn't very present'.

In the respondents' points of view, ethical issues should be communicated avoiding generalizations, stereotypes and stigma based on e.g., religious, political, ethnic or national connotations. In the words of one respondent:

> We believe that the most important aspect is to isolate the terrorists from any religion, ethnic or political group they claim to represent. E.g., Islamic terrorists never represent in any way the Islamic people. This must be clearly repeated and communicated over and over by the crisis communication officers. (R3)

Moreover, communication should take place keeping in mind human rights and with respect towards people's civil and religious feelings. One respondent pointed out that terrorism should be cast as a singular act and terrorists as insane people, no matter what the ideology claimed to be underlying their behaviour.

According to the respondents, people need an explanation of what can happen, including the potential threats and risks in the particular instance of terrorism. In the view of one respondent:

> [. . .] there should always be awareness on the general threat to keep people's eyes and mind open to potential risks. (R18)

Moreover, information about terrorism should be communicated 'referring as much as possible to the facts', combined with practical advice.

> We have to explain what can happen in case of such events. And we have to give practical advices, what everybody can do in such a situation. (R4)

In the view of some respondents, terrorism itself should not be emphasized, but explained in conjunction with man-made hazards and accidents.

> The effects of terrorist attacks can also be created by accidents; therefore, the population can be

> trained for industrial accidents, but will have the necessary background to behave correctly in terrorist cases. (R8)

Some respondents add that the public should be informed if there are concrete threats.

> In my opinion it is the right of the public to be informed about terrorism threats. This holds particularly true in case of concrete threats (concrete attack plan for specific city or even location). (R18)

However, in other cases, when the threat is not concrete and may not materialize, people could also be protected from information.

> However, in case [of] only vague threats (such as general findings that attacks are planned in a country, without evidence where exactly) it might be better to protect the civilians from such information as it would reduce their well-being. (R18)

The insights of the respondents on ethical issues were related to the following sub-themes: general importance of ethical issues, content regarding how ethical issues should be taken into account in communication concerning terrorism and what should be the content of communication.

4. Discussion

While it is sometimes questioned whether the challenges facing communication in CBRN terrorism crises are not more or less similar to those in other severe crises, the combination of terrorism with largely unfamiliar hazardous substances clearly presents a high level of complexity. As the present respondents stated, this *complexity* emerges from the nature of the threat, including diverse scenarios and risks that evoke emotions, cause uncertainty and rapid changes, and are unpredictable with possibly global consequences, complicating communication with the public. With respect to the reasons explaining why CBRN terrorism risks are special and demanding, the present findings support those of previous research (e.g., Covello et al., 2001; Sheppard, 2011). Insights from subject matter specialists and risk analysts may be needed to support communication planning and preparedness (Fischhoff, 2011) in this risk context. Moreover, the challenges facing communication about CBRN terrorism include the sheer diversity of actors, and hence making sense of CBRN terrorist events necessitates cooperation, utilizing a stakeholder approach.

The challenging aspects of communication that are related to public groups arise from risk perceptions and public response. The respondents phrased this as 'people can be highly emotional' when they do not understand risks. The fact that the most challenging aspect about communicating with citizens reported by the present respondents is 'to calm the population and prevent panic' shows that the *panic myth* (Sheppard et al., 2006) still lives on in the minds of crisis managers and communication specialists. This observation should be addressed in crisis communication training, as previous studies show that although there may be gaps between actual and advised behaviours (Gray et al., 2002; Rogers et al., 2007; Rubin et al., 2008), panic is nevertheless rare among citizens. On the contrary, as the London polonium incident showed, underestimating people's ability to handle a situation and providing non-specific assurances can undermine successful communication (Rubin et al., 2011). The distinction between panic, and say, anxiety is more than an academic issue, as it relates to what decisions and consequences result from applying it. The assumption of panic is often used as a reason to reduce information to citizens, which hinders public empowerment and underestimates the fact that lack of information in itself creates anxiety.

A *preparedness paradox* exists. On the one hand, to prepare the public to be able to act in a real situation in a timely manner and to harness public initiative to compensate for the scarcity of resources by, e.g., using self-diagnosis kits to lessen the burden on hospitals, will require a high level of public empowerment (e.g., Becker, 2011). On the other hand, lack of trust in and underestimation of the abilities of the public to act in and handle stressful situations by authorities can hamper public involvement. In addition, complicated expert knowledge and the low probability of such crises may hinder motivation for preparedness activities among the public, resulting in e.g., a lack of understanding of the risks involved. A respondent suggested that the public tend to delegate preparedness for unlikely threats to response organizations. This may not be a problem, if there would at least be basic knowledge of hazardous substances and infectious diseases.

One way to tackle the challenges of communicating about high-impact, low-risk issues, including CBRN terrorism, is to embed preparedness activities in an *all-hazards approach*. As pointed out by the respondents of this study, terrorist threats can be explained in conjunction with other man-made hazards and accidents. This integral approach is also in line with good ethical practices for communication about CBRN terrorism; terrorism threat is not emphasized and negative side effects of polarization are avoided. When people have a basic understanding of hazardous materials such as radiation or viruses, they are better prepared for possible accidents and other risks with similar negative consequences. By addressing preparedness and explaining background information, awareness with respect to

potential risks is created, thus facilitating informed and voluntary decision making among citizens (Wray et al., 2004). Other ethical guidelines suggested by the respondents were the provision of facts and practical advice, caution to minimize false alarms in the case of threats, and avoiding generalizations and language that could be interpreted as stigmatizing others. This supports the views in the literature according to which negative reactions towards differing 'others' or minorities need to be prevented by, e.g., cautious framing of related messages (Stevens, Agho, Taylor, Barr, Raphael, & Jorm, 2009; Veil & Mitchell, 2010).

5. Conclusions

The aim of this qualitative study was to investigate experts' perceptions on communication in CBRN terrorism crises, including challenges and good practices. This was pursued with the help of an online questionnaire, containing mostly open questions, aimed at international crisis communication and crisis management experts. The good practices mentioned by the respondents related to transparency and openness about uncertainties, using multiple communication media and personal communication involving trusted sources. Next to this, many challenges were discussed. The *challenges* and *critical areas* for communication are explained together with some implications for both research and practice.

The challenges of communication concerning CBRN terrorism, according to the results of this study, arise from the complexity of such incidents, which has to do with the *nature of the threat*, including diverse scenarios and risks, which cannot always be detected by the human senses, lack of time in crisis situations, high levels of uncertainty, rapid changes and unpredictable global consequences. This complexity in the case of CBRN terrorism threats is manifested in problematic *public perceptions* and *response*, including inadequate understanding of the risks and substances that may be involved, delegation of preparedness activities by public groups, and action or non-action that may go against health instructions.

Areas that are critical and need attention when planning, implementing and evaluating communication concerning CBRN terrorism, based on the findings of this study, include *resources*, *competences* and *cooperation*, which can be improved through training and other network-wide preparedness activities. Moreover, *preparedness communication* is needed, embedded in an all-hazards approach that addresses various kinds of risks (Reynolds & Seeger, 2012) and takes ethical views into account (Wray et al., 2004).

Communication and providing information during a crisis, when the situation is at its peak, include instructing those in direct danger, calming people and dealing with possibly high levels of anxiety. As the findings of this study point out, although ensuring the safety of the directly affected is of paramount importance, responding to the needs of the wider audiences in CBRN terrorism cases is also critical. Different teams can respond to the inquiries of the worried well and the directly affected. Moreover, training should be provided to ensure that personnel are adequately prepared to deal with psychological turmoil and anxiety, including a contact person for very distressed people (Rubin et al., 2011).

In responding to the needs of the indirectly affected, social media monitoring may become critical. In a situation where people would be advised to shelter in a place for long periods of time, given that electricity would be available, social media fora may become meeting places and arenas for interaction, asking for help and information. In communication preparedness, attention needs to be paid to ensure that means for social media monitoring and online communication including enough competent personnel as well as tools and solutions are in place (Ruggiero et al., 2014). As CBRN terrorism comprises various types of risks and scenarios, including C, B, R and N materials with different kinds of consequences, preparations also need to be made for different communication approaches.

A topic for future research could be to delve more profoundly into how all these challenges affect the choice of particular communication actions and strategies. Moreover, as this study did not account for possible differences among C, B, R and N risks, a future study could focus on what implications and specific challenges these distinct scenarios would bring into the communicational picture by interviewing experts with specific expertise and knowledge on each of the risk categories. The fact that the question regarding ethical constraints was the least answered indicates that the familiarity with ethical issues of crisis management and communication specialists may be low. In the light of the multiple ethical issues that terrorist risks trigger, this may also be a gap that warrants further investigation.

These insights on communication challenges and good practices complement results from previous studies and will be used in the development of an audit instrument for communication concerning CBRN terrorism. Although the number of respondents to this study was not high, their profile shows experience in crisis management and crisis communication over a number of years, with a reasonable spread over, e.g., countries and types of organizations involved. However, while the responses generated important qualitative insights and provide a fruitful starting point for future studies, the lower response rate for the part on CBRN terrorism crises is a cause for concern. Namely, it may indicate that the community of experts who are knowledgeable in this area is rather a small one, which also

accords with the remarks of some respondents. In light of the severity and complexity of CBRN terrorism crises, the question of preparedness is paramount. As one respondent concluded, on the topic of public preparedness, the same goes for organizations as well '[. . .] there will simply be too much to do, too much disinformation and noise, and it's too late to teach people after the crisis begins'.

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III

THE CBRN COMMUNICATION SCORECARD

by

Aino Ruggiero, Marita Vos & Pauliina Palttala, 2015

In S. Schmidt & M. Vos (Eds) Behavior and communication in CBRN crises - Findings and recommendations in case of chemical, biological, radiological, and nuclear attacks on society, 106–139

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The CBRN Communication Scorecard

Aino Ruggiero, Marita Vos and Pauliina Palttala

The CBRN Communication Scorecard is a tool to facilitate preparedness for crisis communication in the cases of CBRN terrorism incidents. In the introduction, the development of the scorecard is explained. Next, the scorecard itself is presented. Finally, the scientific basis is clarified in the annex.

The development of the CBRN Communication Scorecard

The CBRN Crisis Communication Scorecard is based on the general Crisis Communication Scorecard[1]. In the CATO project[2], the scorecard has been tailored to CBRN terrorism incidents, using input derived from various studies.

A structured literature review helped understand the characteristics of terrorism crises and, in particular, CBRN terrorism crises[3]. In addition, an international expert-questionnaire clarified the challenges of crisis communication as experienced in practice[4]. Furthermore, to modernise the indicators of the scorecard, social media interaction and monitoring public needs in crisis situations gained attention[5].

In this way, the scorecard was tailored to CBRN terrorism incidents and modernised, systematically adding elements that needed to be included. The Annex shows how the sources were summarised in a data-extraction table to customise the content of the general Crisis Communication Scorecard for CBRN terrorism incidents.

The CBRN Crisis Communication Scorecard is an audit consisting of performance indicators, arranged according to the four phases of a CBRN terrorism crisis: preparedness, detection, response and recovery. Within each crisis phase it specifies communication tasks towards various stakeholder groups, including coordination of the communication within the organisation and the response network, relations with news media, and communication with citizens who may be more or less directly involved in the crisis. Each task is measured by performance indicators. For each indicator, an explanation is

[1] This scorecard was developed in 2011 by the University of Jyväskylä, Finland in CrisComScore, an earlier EU-funded project (FP7/2007-2013, n° 217889). http://www.crisiscommunication.fi/criscomscore/

[2] The CATO project, the research leading to these results, has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 261693. http://www.cato-project.eu/page/homepage.php?lang=EN

[3] Ruggiero, A. and Vos, M. (2013), Terrorism communication: Characteristics and emerging perspectives in the scientific literature 2002–2011. *Journal of Contingencies and Crisis Management, 21*(3), 153–166. DOI: 10.1111/1468-5973.12022.

[4] Ruggiero, A. and Vos, M. (Early View, print forthcoming 2015), Communication challenges in CBRN terrorism crises: Expert perceptions. *Journal of Contingencies and Crisis Management, 23*(1). DOI: 10.1111/1468-5973.12065.

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provided and the assessment is done using scale measurement. The scorecard facilitates reflection on how crisis communication processes are initiated in the response network.

The aim of the scorecard is to offer a framework for evaluating and improving crisis communication, and assisting in communication planning. The CBRN Communication Scorecard describes critical factors in the communication of public authorities with such stakeholders as citizens, news media, and other response organisations before, during and after CBRN emergencies.

The scorecard also pays attention to the kind of cooperation in the crisis response network that is crucial in the successful management of complex crisis situations. The response organisation network includes many organisations, such as rescue services, the police, health care, and various municipal and state officials. Alongside governmental organisations there are, for example, non-governmental organisations, such as the Red Cross, that have important tasks in crisis management.

The audit can be used in different ways to[6]

(1) assess preparedness for crisis communication,
(2) evaluate the communication in an exercise that focuses on one or two crisis phases, and
(3) evaluate a recent real-life case to extract the lessons learned.

The *first* use of the scorecard is for measuring crisis communication preparedness and testing the crisis communication plan in the home organisation. Specifically, a quick check can be run on overall preparedness, or preparedness can be assessed for each phase by using all of the indicators.

A number of people within the same organisation can fill in this part of the questionnaire individually. Differences of opinions can then be discussed in a subsequent meeting. This will result in the clarification of strong and weak points on the basis of which plans can be made for strengthening preparedness. Moreover, when several organisations participating in the same network use the audit, the results can be compared and jointly reflected on in a meeting where coordination is discussed. The assessment can also lead to additions to the existing crisis communication plans. The indicators on the scorecard can be used as a checklist to scrutinize the crisis plans of response organisations.

The *second* use of the tool is to score performance during an exercise. Such an exercise can be done by one organisation or, preferably, include more actors in the response network. This audit usually concerns the detection and warning phase, and response phase. However, it is also possible (for example, in a separate exercise) to simulate the recovery phase.

The exercise, for example a simulation, can involve citizens and journalists, or possibly actors in these roles. The indicators can then be used to evaluate the exercise. The exercise can focus on how communication is integrated in a broader crisis management exercise, or how communication is coordinated within the response network.

The *third* use of the tool is to evaluate how an organisation has responded in a recent real-life crisis event. This means looking back on all the phases of the crisis to facilitate learning within the organisation or the broader response network.

In the evaluation of the crisis events, external experts and researchers can be brought in to critically review the crisis communication activities and their effects. In this case, all the phases of the document

[6] Vos, M., Lund, R., Harro-Loit, H. and Reich, Z. (Eds) (2011), *Developing a crisis communication scorecard.* Jyväskylän yliopisto. Jyväskylä Studies in Humanities 152. (Ref.) https://jyx.jyu.fi/dspace/handle/123456789/27124

can be used to carefully reconstruct the events, identify where improvements could be made and what can be learned for communication in future cases.

For the CBRN Crisis Communication Scorecard, an educative approach has been chosen, the aim being to help crisis management and communication experts to clarify their tasks and the quality criteria related to communication during CBRN terrorism crises. This is why each indicator is accompanied by a thorough explanation. The content of the indicators has been derived from many scientific sources.

The CBRN Communication Scorecard is a very detailed tool for communication management, comprising 52 performance indicators. The results are analysed by comparing average scores with those of other organisations, in order to benchmark, or with outcomes of an earlier year, in order to see the progress achieved. High scores indicate strong points and low scores indicate areas in need of improvement.

To analyse the outcomes, the results of the indicators are compiled in 25 groups of tasks. These, in turn, are fitted to the four phases of a crisis. The results can also be analysed by target group, for which three categories are assigned: communication with (more or less directly involved) citizens, communication with the news media, and coordination within the response organisation and network.

Crisis phase	Number of tasks	Number of Indicators
1. Preparedness	7	19
2. Detection and warning	4	8
3. Response	6	13
4. Recovery and evaluation	8	12
	25	52

Table 1. Overview of the number of tasks and indicators per crisis phase.

Each of the performance indicators is measured on a 5-point scale, as follows:

1 = This indicator is not taken cognizance of
2 = The importance has been recognized, but hardly any action is being taken
3 = We act on this to some extent but not systematically
4 = This is to a large extent a systematic part of the action
5 = This is fully a systematic part of the action
0 = Don't know, or this indicator is not relevant for our organisation (not included when counting the average score of an indicator).

The scorecard can be used as a survey and filled in by the organisation's communication experts and by general managers familiar with communication (self-assessment). If the scorecard is used as a survey, it is recommended to arrange a reflection meeting to discuss in more depth the average scores of the indicators. Self-assessment can be complemented with auditor assessment. The auditing can, for example, be conducted by an internal and an external expert, who may use interviews and gather facts and figures to back up their assessment. For example, if available, the results of real-life case evaluations of communication actions during earlier crises can be utilised.

An assessment of the key success factors reveals the strong and weak points in the organisation's crisis communication and thus enables the allocation of resources to be prioritized. High-scoring indicators can be used to maintain the same quality level with less manpower through the use of practices developed for this purpose, allowing more time to be invested in new task areas with lower scores.

The CBRN Crisis Communication Scorecard has been inspired by the 'Balanced Scorecard' of Kaplan and Norton[7] , which uses performance indicators, and by the self-assessment procedures introduced by the European Association of Quality Management. It is based on the general Crisis Communication Scorecard developed by JYU in CrisComScore, an earlier EU-funded project (FP7/2007-2013, n° 217889)[8], and has now been tailored to CBRN terrorism crises. The results of the CATO research project, in particular the work package on communication, were utilized to tailor the indicators to CBRN terrorism incidents.

It has been emphasized that performance measurement needs to focus on the improvement of processes rather than act as a control mechanism[9]. For crisis management, a scorecard has been developed[10], but for crisis communication purposes the CrisComScore audit was the first available tool[11]. The process approach of the Crisis and Emergency Risk Communication Model (CERC) provided the starting point for the development of the tool, as it linked risk and crisis communication tasks to the crisis management phases[12]. Another source of inspiration was the stakeholder approach to crisis management[13].

Performance indicators for crisis communication need to fit the goals of crisis communication, and ultimately crisis management, as presented in the following strategy map (see the figure below).

[7] Kaplan, R. and Norton, D. (2001), *The strategy-focused organization*. Boston, Harvard Business School Press.
[8] See www.crisiscommunication.fi/criscomscore/
[9] Wouters, M. (2009), A developmental approach to performance measures: Results from a longitudinal study, *European Management Journal, 27*, 64–78.
[10] Moe, T., Gehbauer, F., Senitz, S. and Mueller, M. (2007), Balanced scorecard for natural disaster management projects, *Disaster Prevention and Management, 16* (5), 785–806.
[11] Palttala, P. and Vos, M. (2011), Testing a methodology to improve organizational learning about crisis communication. *Journal of Communication Management, 15*(4), 414–331.
[12] Reynolds, B. and Seeger, M. (2005), Crisis and emergency risk communication as an integrative model. *Journal of Health Communication, 10*, 43–55.
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[13] Alpaslan, Z., Green, A. and Mitroff, I. (2009), Corporate governance in the context of crises: Towards a stakeholder theory of crisis management. *Journal of Contingencies and Crisis Management, 17*(1), 38–49.

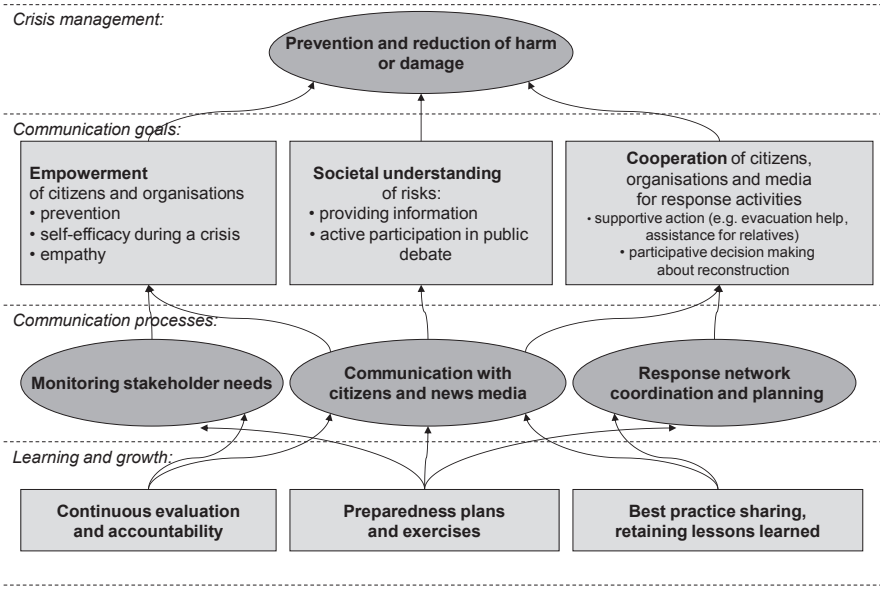

Figure 1. Strategy map for crisis communication supporting crisis management by public organisations

(Taken from Palttala, P. and Vos, M. (2012), Quality Indicators for Crisis Communication to Support Emergency Management by Public Authorities. *Journal of Contingencies and Crisis Management,* Vol.20, Issue 1, pp. 39-51.)

Communication goals of empowerment, societal understanding and cooperation contribute to crisis management. They are realised through communication processes, including monitoring, interaction with stakeholders and coordination in the response network. This, in turn, can be facilitated by evaluation, planning and sharing best practices[14].

When customising the tool for CBRN terrorism communication, the specific challenges if these types of crises needed to be taken into account. For this purpose, several studies were undertaken. Terrorism crises evoke complex emotions that call for sense-making, may bring unexpected public behaviour, test trust and credibility, and require attention for ethics in the discourse, whereas CBRN aspects add further challenges owing to the high diversity of these crises, the uncertainties involved, the lack of clear boundaries, the lack of public knowledge, and the very diverse needs of public groups that need to be met[15].

[14] Palttala, P. and Vos, M. (2012), Quality indicators for crisis communication to support emergency management by public authorities. *Journal of Contingencies and Crisis Management, 20*(1), 39–51.

[15] Ruggiero, A. and Vos, M. (2013), Terrorism communication: Characteristics and emerging perspectives in the scientific literature 2002–2011. *Journal of Contingencies and Crisis Management*, *21*(3), 153–166.

The CBRN Communication Scorecard

The tool consists of several parts, all of which mention communication tasks and specify indicators for each. The first part facilitates assessment of the Preparedness of the organisation for crisis communication in CBRN incidents. The second part concerns preparations for the Warning Phase, the third relates to Crisis Response when the situation is at its peak, and the last part, Reconstruction and Evaluation, focuses on actions when the situation has calmed down.

Phase 1. Preparedness

STAKEHOLDER	COMMUNICATION TASK	PERFORMANCE INDICATOR	SCALE 1 = This indicator is not taken cognizance of 2 = The importance has been recognized, but hardly any action is being taken 3 = We act on this to some extent but not systematically 4 = This is to a large extent a systematic part of the action 5 = This is fully a systematic part of the action 0 = Don't know, or this indicator is not relevant for our organisation	
RESPONSE ORGANISATION AND NETWORK	**1.1 Improving preparedness in the organisation and in the network of response organisations**	**1.1.1** Communication plans and strategies for C, B, R and N scenarios are developed within individual organisations as well as with other participants in the response network. *Explanation: Communication plans need to be developed for the organisation in question. However, it is not enough that individual organisations have crisis communication plans; such plans should be synchronized to match the plans of the other key participants in the network. Communication plans and strategies should cover scenarios, such as food poisoning, pandemics, or an attack onto a nuclear power plant or a chemical factory. They can take into account the possibility of a hoax, the lethality of the material involved, the area and duration of contamination, infectiousness, criminal investigation and risk for repetition.*		1 2 3 4 5 0 Open space for comments:

		1.1.2 The responsibilities and tasks of communication experts in relation to response management in the organisation and within the response network are clearly laid down. *Explanation: The roles and competencies of communication experts are clarified together with response managers. This requires a communication expert in the crisis command centre who takes part in strategic crisis management, a competent team with expertise in CBRN issues to operate and conduct crisis communication, and the possibility to build up a backup team for communication tasks when needed, e.g. for monitoring and web updating during crises. Competence profiles can be established for communication experts working with journalists, the social media, web editors, call centre coordinators, etc.*	1 2 3 4 5 0 Open space for comments:
		1.1.3 Agreements are made regarding coordination in the network of public response organisations, including responsibilities for communication. *Explanation: In order to cooperate efficiently, the communication responsibilities, depending on the kind of scenario (C, B, R or N), of the organisations involved should be transparent to others in the network. As CBRN incidents may have wide implications, 'up scaling' to a national level is likely and procedures should be clear, as also should procedures for international cooperation. It should be established who are involved during the different crisis phases in coordinating communication, as this may change from the early to later phases. CBRN crises call for broad network activities, including specialised agencies next to rescue services, police, defence and health care. Agreements among public organisations may also concern when specific crisis facilities are to be used, such as a national crisis website or call centre.*	1 2 3 4 5 0 Open space for comments:

		1.1.4 Local organisations, national special interest groups, institutions and companies, are stimulated to draw up their own crisis communication plans and exercises and include more severe hazards like CBRN risks within an all hazard approach. *Explanation: An all-hazard approach is recommended rather than a focus on CBRN in particular, unless the region has specific risks in this area (e.g. a nuclear power plant). This also helps prevent information overload. It should be clear which other groups outside the response network should be included in the preparedness activities or encouraged to formulate their own crisis communication plans and exercises, e.g. schools which may need to act in loco parentis during an evacuation or sheltering-in-place, homes for the elderly, and (e.g., infrastructure) companies. Agreements on cooperation in a crisis situation should be discussed. National interest groups, such as associations of disabled people, can clarify needs of specific groups.*	1 2 3 4 5 0 Open space for comments:
	1.2 Improving facilities and the availability of trained manpower	**1.2.1** Communication facilities for alerts and information exchange with public groups and within the response network are arranged in a timely and effective manner. *Explanation: For communication with different publics, facilities are arranged that include alert systems (e.g. sirens and cell broadcasts), media relations and social media interventions. Crisis websites and call centres for citizens need enough capacity. Co-located work spaces facilitate cooperation between scientists and communication experts. Communication between the crisis command centre and the crisis site, as well as among the response network partners has been arranged to be independent from public telephone systems. Moreover, there should be preparedness for a potential power outage.* *Multi-channel approaches, including social media and linked web pages, have been developed. Facilities have been created to simultaneously post messages on different social media platforms. Joint media strategies, such as the use of joint hashtags and re-tweeting, have been discussed within the organisation and across the response network. Preparations for social media monitoring have been made, including, e.g. a monitoring tool and analysts to interpret the results.*	1 2 3 4 5 0 Open space for comments:

		1.2.2 The pooling of communication expertise is arranged and there is enough manpower for each communication task. *Explanation: The pooling of communication expertise is needed in major crises, including communication experts of similar organisations. In addition, a specialised support group can be set up to be brought in with specific areas of expertise, e.g. on C, B, R or N, terrorism, health, or mental health in the case of incidents that are expected to evoke high levels of anxiety among public groups. It should be ensured that there is sufficient manpower for a three-shift 24-hour operation in the event of a major and long-lasting emergency.*	1 2 3 4 5 0 Open space for comments:
		1.2.3 Training for communication expertise and skills is offered for all personnel involved. *Explanation: Continuous education for communication should be provided so that different competence profiles are developed both for communication experts and managers. Different competences are needed for, e.g. spokespersons, website editors, call centre officers, and those who monitor the online and traditional media. Moreover, training is needed for potential non-traditional roles, and creative problem solving is encouraged. Communication training is also provided for the leadership, whose role in CBRN crises is often important, and key staff members. Subject expertise needs attention as well.*	1 2 3 4 5 0 Open space for comments:
	1.3 Improving information exchange and exercises on crisis communication activities in the organisation and within the response network	**1.3.1** Knowledge of the responsibilities of other parties, persons to be contacted, procedures and means for the exchange of information in the organisation and within the response network is established in advance. *Explanation: Exchange of information should be arranged to gain familiarity with the organisation's partners so that it is not only after a crisis has occurred that they meet each other. For example, formal and informal professional, inter-organisational and cross-sector networks can improve cooperation and coordination prior to crises. As CBRN incidents may have cross-border implications, international cooperation also needs to be developed. Information exchange procedures are established so that everybody knows whom to contact and how in the case of a crisis, and how information will be shared about the decisions made and the reasons for them. This includes a communication system for internal reporting and exchange between (overlapping) shifts.*	1 2 3 4 5 0 Open space for comments:

		1.3.2 Crisis exercises emphasizing communication are conducted regularly and across internal and external organisational boundaries covering CBRN scenarios. *Explanation: Exercises in advance enable the practising of roles and tasks as well as coordination of the communication within an individual organisation and between the response organisations, covering cooperation between multiple parties, e.g. from science-making to policy-making and emergency response. These exercises can be undertaken for the different crisis phases, together with other (specialised) national or international authorities, depending on the crisis type, and input by citizens and media should also be simulated. A thorough evaluation should be conducted, for which later phases of this scorecard can be used. Attention also needs to be paid to flexibility as situations evolve.*	1 2 3 4 5 0 Open space for comments:
CITIZENS	**1.4 Knowing the public groups and their use of media**	**1.4.1** The various public groups are identified according to how they seek and receive information about risks. *Explanation: Organisations should be prepared to do an actor analysis to clarify which public groups are involved and how they seek, share and receive risk information. Different public groups may be involved depending on the incident, e.g. whether it concerns a C, B, R or an N scenario. People use different communication channels and react differently to information according to their experience of risks and crises and their cultural background while media use also changes over time. Risk groups should be known, including vulnerable people (e.g. children, elderly, pregnant, disabled), and those needing special attention regarding communication, such as transient populations and immigrants.*	1 2 3 4 5 0 Open space for comments:

		1.4.2 It is known which sources and intermediaries the various public groups consider reliable in the case of C, B, R and N events. *Explanation: People will trust some sources more than others and this will influence the 'communication climate'. A message that is received from a trustworthy channel is accorded greater credibility. Trust in sources differs among public groups, and across crisis types, and can be affected by rumours, e.g. spread on the Internet. Trust in the source affects people's willingness to follow instructions given. For example, immigrant groups or associations of disabled people need to be involved as credible intermediaries to reach specific groups. In the case of a bio-threat, health professionals may be considered the most trustworthy source.*	1 2 3 4 5 0 Open space for comments:
	1.5 Monitoring of risk perception and general public understanding of risks	**1.5.1** Regularly, different monitoring tasks are arranged to analyse risk perception and the related information needs of public groups. *Explanation: Perceptions play a big role in CBRN events, as they are considered feared and are generally not previously experienced by publics, and thus unknown to them. Monitoring provides information on how groups of citizens see risks. Perceptions may differ according to the scenario and material in question (C, B, R or N). Moreover, perceptions may be shaped by several cultural and contextual as well as socio-demographic and socio-economic and psychosocial factors. Surveys can be conducted (bi)annually to chart developments, along with continuous monitoring of news and social media content to learn what kinds of questions, concerns and possible misperceptions people may have. The results need to be interpreted and explained to others in the response organisation(s). Even where gathering these data is the task of another organisation, the responsibility nevertheless remains for internally disseminating the information and making sure that it is sufficient.*	1 2 3 4 5 0 Open space for comments:

	1.6 Contribution to general public preparedness and prevention	**1.6.1** Different means of communication are used to educate and instruct people on how to be prepared for diverse risks and to support prevention. *Explanation: Information on CBRN materials needs to be integrated in general preparedness campaigns. Educational approaches concerning CBRN substances are recommended, for example through incorporation into school programmes, to help people better understand what, e.g. infections and radiation are. Care should be taken to avoid propagating fear, generalizations, stereotypes and stigma when communicating to publics about terrorism. Counter-narratives and prevention of radicalisation may gain attention, for example, by involving intermediaries and citizen initiatives.*	1 2 3 4 5 0 Open space for comments:
		1.6.2 Preparedness includes online communication and active social media accounts. *Explanation: A multi-platform approach includes social media posts that arouse attention and link to a dedicated website with more complete background information. By providing interesting preparedness information, people are invited to follow the organisation's social media account, creating opportunities for fast information exchange in the case of crises. Similarly, one can subscribe to service apps, e.g. for localised crisis warnings. Crisis websites are easy to find, for example, a national crisis website that when there is no ongoing crisis offers content related to general preparedness, using an integral all-hazard approach. Websites of different response organisations can link to the national website and to each other. Tweets can be embedded in crisis websites and public input included by, e.g. retweeting.*	1 2 3 4 5 0 Open space for comments:
		1.6.3 Educational background information is available but actively promoted only in the case of a CBRN threat. *Explanation: Clear background information leads to a better understanding and motivates people to act as advised, and thus needs to be available, e.g. online. This includes, for example, educative materials about hazardous substances and how they are transmitted, signs and symptoms of infection or exposure, and preventive measures. Complex terms, such as shelter-in-place, need to be simplified. The aim is to increase awareness and understanding of CBRN materials among public groups.*	1 2 3 4 5 0 Open space for comments:

NEWS MEDIA	**1.7 Establishing cooperation with news media and journalists for deployment in crisis situations**	**1.7.1** The various news media and key journalists are known. *Explanation: It is known what the main news media are, on both the national and regional level. Names and specialist areas of journalists working in public and commercial channels are listed, including those specialised in CBRN issues, so that they are available also at the location of the incident, and e.g. in print in the event of power outages. Relations with journalists are regular. An up-to-date media database is maintained along with email lists to enable the various categories of the media to be reached without delay. Preparedness for dealing with international media may be needed for CBRN incidents.*	1 2 3 4 5 0 Open space for comments:
		1.7.2 Preparedness information concerning CBRN risks and measures is provided to the media in an all-hazard approach. *Explanation: As CBRN incidents are low-probability high-impact risks, an all-hazard approach is suitable. Educational information about CBRN materials, integrated into the context of broader preparedness can be offered to the media. Knowledge of CBRN materials is generally low, e.g. understanding of how different infections are transmitted, or that iodine in the case of radiation incidents should only be taken if so indicated by the authorities.*	1 2 3 4 5 0 Open space for comments:
		1.7.3 Media coverage on CBRN risks is followed and analysed. *Explanation: Monitoring is done to discover and actively correct possible misperceptions in the media via the organisation's own channels, but also to determine the needs of public groups as portrayed in the news. The technical details of CBRN risks may be misunderstood and need clarification. Preparations are made to facilitate 24/7 intensive monitoring when needed.*	1 2 3 4 5 0 Open space for comments:

		1.7.4 Cooperation with the news media, focusing on the interests of citizens and protecting victim privacy, is initiated. *Explanation: Guidelines for public notification and ethical reporting are provided. The organisation develops procedures to protect victims and families, in the event of a crisis, from overwhelming media attention. A dialogue with journalists is established in pursuit of the organisation's objective of finding a balance between the need to report an incident and the requirements of official investigations. Protocols regarding communication on sensitive topics are discussed. Matters for discussion include, for instance, avoiding creating generalizations when explaining the possible causes of terrorism or drawing attention to a criminal act that may lead to the copying by others of the same violent behaviour, and avoiding sensationalist reporting, including publishing pictures that could induce panic or harm victims' privacy.*	1 2 3 4 5 0 Open space for comments:

Phase 2. Detection and warning

STAKEHOLDER	COMMUNICATION TASK	PERFORMANCE INDICATOR	SCALE 1 = This indicator is not taken cognizance of 2 = The importance has been recognized, but hardly any action is being taken 3 = We act on this to some extent but not systematically 4 = This is to a large extent a systematic part of the action 5 = This is fully a systematic part of the action 0 = Don't know, or this indicator is not relevant for our organisation
RESPONSE ORGANISATION AND NETWORK	**2.1 Information exchange and coordination in the organisation and within the response network**	**2.1.1** Crisis mode is activated within the organisation and response network. *Explanation: To be able to act fast, procedures need to be clear regarding who sets matters in motion and how. Crisis communication personnel need to be informed by internal alerts and on-duty arrangements, including communication experts with CBRN expertise. In the case of incidents with possible cross-border implications, relevant bodies in neighbouring countries or international organisations need to be involved. A warning message may also come from abroad, and a period of uncertainty may exist when the nature of the threat, e.g. an infectious disease and how it is transmitted, is unclear.*	1 2 3 4 5 0 Open space for comments:
		2.1.2 Within the organisation, the warning and all information about the initial organisational measures are actively shared. This includes consulting and informing other participants in the response network when formulating key warning messages. *Explanation: In the warning phase, it is important to operationalise network cooperation so that there is an exchange of current activities beyond the organisational and, in the case of a large incident, national boundaries. This ensures that the key warning messages issued by the different response organisations are consistent. Contradictory messages create confusion among publics, hinder rescue operations and lessen trust towards response organisations.*	1 2 3 4 5 0 Open space for comments:

CITIZENS	**2.2 Targeting and distribution of warning messages**	**2.2.1** Multiple channels for public warnings are used, including both news media (press and broadcasting) and direct channels of communication. *Explanation: Procedures for public notification are followed, and warnings are sent to publics via multiple communication channels, the aim being to reach as many as possible of the targeted public groups through channels they use and sources they trust. Crisis type (C, B, R or N) may also affect the distribution of warning messages; in the case of a radiological incident, for example, to avoid people unnecessarily opening their windows, the use of loudspeakers is not recommended. In choosing media, attention should also be paid to reaching risk groups and vulnerable populations (e.g. the handicapped and elderly). Special groups (e.g. tourists and speakers of minority languages) can be addressed in other languages or via intermediaries. Ways to reach people abroad may also be needed.*	1 2 3 4 5 0 Open space for comments:
		2.2.2 The core content of the warning is the same for everyone, while more information can be found online or by phone; for some specific public groups, additional information will be given directly. *Explanation: Public information must be coherent. Consistency can also be ensured by issuing information from a single, trusted authority throughout the crisis, while it is just as important that other organizations actively link to this source. Depending on the crisis type (C, B, R or N), people need information on, e.g. health issues, including self-protection and protection of their family members, and risk to and symptoms of exposure. The diversity of the public groups can be addressed, for example, by including additional information on the topic in the case of transient groups, such as event visitors and tourists who do not know the area they are in very well. It is taken into account that people may receive the warning in various locations, e.g. not necessarily when at home with their family but also when travelling or at work. Priority is given to those who are directly affected, also taking into account risk groups and the needs of the wider audiences. A website should be provided with a well-known address and linked through other related web pages. A phone number, such as a crisis call centre number where people can obtain more information should also be available. When the lines are busy, a tape-recorded message should at least give the currently available information. Inquiries in social media should also be answered.*	1 2 3 4 5 0 Open space for comments:

	2.3 Issuing instructions to public groups and monitoring reactions	**2.3.1** Warning messages should: − stand out to attract attention − give clear, simple and practical instructions for action to reduce the likelihood of harm − include advice on how to find more information − encourage people to contact persons who might not know of the warning (especially vulnerable groups, such as elderly, or disabled people) − be available in the languages needed *Explanation: Warnings should be noticeable and clearly phrased as alerts. Availability of translators needs to be arranged also outside office hours. People should be able to take action in a timely manner according to the instructions given. Messages should be short and important instructions repeated, e.g. references to time and place. It should also be stated what to do rather than what not to do, unless taking the wrong action could harm people. In the case of C or RN scenarios, people need information on health care and evacuation, and in the case of a B scenario, information on, e.g. symptoms, incubation time and how to prevent transmission of the disease. Animals, pets and livestock may need attention too. It is also important to mention where more information can be found, e.g. on a web page. As social networks are effective sources of information, people can be encouraged to communicate with neighbours and relatives. For some groups, e.g. foreigners, such social networks might be the dominant source of information.*	1 2 3 4 5 0 Open space for comments:
		2.3.2 The effect of warning messages is checked. *Explanation: It is important to monitor that all public groups have been reached, citizens' need for information is met, instructions are understood, and people act accordingly, e.g. they are able to evacuate, conduct self-triage and seek medical treatment when needed. Gaps between advised and real behaviour need to be identified, e.g. to avoid people needlessly rushing to hospitals. In situations in which the warning phase is relatively long, e.g. a slowly developing pandemic, this can be done throughout this phase by observation in the field and monitoring of traditional and social media (identify hashtags and influentials to follow). When the warning phase is short, how people react to the warning should at least be checked. Insight into reactions is needed to direct later communication.*	1 2 3 4 5 0 Open space for comments:

NEWS MEDIA	**2.4 Informing the news media**	**2.4.1** Warning messages to the news media: − are provided to all news media, as timely as to citizens − provide clear information and instructions − give background information about the warning in a clear and open way. *Explanation: Message content should be consistent with the information given directly to public groups and any instructions issued should be clear, simple and practical, and in language easy to understand. Difficult terms, such as 'shelter-in-place' or 'prophylaxis', and other technical jargon should be avoided. Essential facts to be given are place and time, and where to find more information. The purpose is to empower citizens so as to prevent further damage. Transparency in giving background information is important, as this demonstrates that the response organisation is reliable in its motives and actions, and clear about its own responsibilities.*	1 2 3 4 5 0 Open space for comments:
		2.4.2 Media coverage related to the warning is monitored and analysed. *Explanation: Monitoring should be arranged to discover possible misperceptions about the warning in the media and correct these using the response organisation's own channels, and also to see what needs of public groups are mentioned in the news.*	1 2 3 4 5 0 Open space for comments:

Phase 3. Crisis response (Emergency)

STAKEHOLDER	COMMUNICATION TASK	PERFORMANCE INDICATOR	SCALE 1 = This indicator is not taken cognizance of 2 = The importance has been recognized, but hardly any action is being taken 3 = We act on this to some extent but not systematically 4 = This is to a large extent a systematic part of the action 5 = This is fully a systematic part of the action 0 = Don't know, or this indicator is not relevant for our organisation
RESPONSE ORGANISATION AND NETWORK	**3.1 Assist cooperation in the organisation and within the response network**	**3.1.1** Information is actively exchanged in the organisation, including between work shifts. *Explanation: Information needs to be exchanged among all the groups involved in the response activities. Where work is done in shifts, not just the decisions taken but the reasons why and how they were communicated should also be shared. An updated log of press relations and other communication activities should be kept, e.g. through a shared information system.*	1 2 3 4 5 0 Open space for comments:
		3.1.2 Information is exchanged actively within the response network, including coordination of how the communication tasks are handled throughout the crisis. *Explanation: It is very important that information be exchanged about actions taken, so that the organisations in the response network can make informed decisions and know how their counterparts are proceeding in communicating with the media and citizens. In major crises, exchange of information with the network's international partners must also be ensured. The allocation of communication-related tasks in the organisation and between other participants in the response network must be clear. Coordination serves consistency in communication and is of high importance in complex CBRN crises with a broad response network. When the organisations in the network communicate with the media and citizens along similar lines, coordinating their statements, this prevents misunderstandings and balances resources. If problems of cooperation with other response organisations occur, action should be taken to solve them.*	1 2 3 4 5 0 Open space for comments:

CITIZENS	**3.2 Instructions on how to prevent further damage**	**3.2.1** Information issued to citizens is continuously updated. *Explanation: Instructive information provided via call centres, web pages and social media must be constantly updated and drafted as clearly as possible, in order to prevent further damage, e.g. the transmission of an infectious disease. Instructions should be short, with repetition of important guidelines, and issued separately from background information and emotional messages. The most recent information should be the easiest to find.*	1 2 3 4 5 0 Open space for comments:
		3.2.2 All public groups, including vulnerable groups, have access to information, and citizens are encouraged to use their social networks. *Explanation: The diversity of public groups should be taken into account by using various channels of communication. In CBRN crises, the need for continuous adaptation of the targeting of information is pressing, as boundaries of time and safe zones may not be clear and can change according to, e.g. weather conditions. Circles of those more or less involved can be identified. In CBRN crises, both the directly and indirectly affected need attention. Whereas people in an affected area, e.g. where there is chemical pollution, are likely to have contacts, possibly through social media with those further away, it is important to ensure that indirectly involved publics are not left without information. Personal networks function as an effective information source through which the messages of response organisations can also be distributed. Persons who might not be reached by the official information channels can then receive information via their social networks, families and friends.*	1 2 3 4 5 0 Open space for comments:

	3.3 Clarifying the situation to help public groups to cope with the situation	**3.3.1** The communication activities aim at increasing understanding of the crisis and its circumstances and demonstrating empathy on the part of official spokespeople with the public groups affected by the crisis. *Explanation: The situation should be clarified on the basis of the available information in order to increase general understanding about the situation, its duration, severity and likely consequences, including uncertainties. It should be explained that as CBRN materials can have delayed effects and their detection may take time, changes are possible in the information initially provided. A balance is needed between an open yet cautious discourse, as there should be enough and not too much information given actively, while more details can be made available online, such as symptoms of particular diseases. In cases where information is withheld due to forensic or security concerns, the rationale for this should be explained to people. Empathy and emotionally supportive communication can help to overcome the uncertainty and stress provoked by terrorism, and assist psychological recovery. The feeling of safety of people needs to be addressed. Possible stress or anger on the part of certain involved groups should also be taken into consideration, and a channel or a forum where people can express their feelings and ask questions should be provided.*	1 2 3 4 5 0 Open space for comments:
		3.3.2 Special attention is given to provide information and support for those directly affected by the emergency. *Explanation: Contact persons should be appointed to serve victims and families. Professional support and post-trauma care should be offered where needed. This also applies to the crisis management employees, who should be protected from media attention and, e.g. assisted in visiting the emergency location. Online systems such as Google Person Finder or Red Cross victim finder can be utilized.*	1 2 3 4 5 0 Open space for comments:

	3.4 Continuous monitoring of needs and perceptions of public groups	**3.4.1** The needs and perceptions of public groups are monitored and analysed, which also entails following the debate on the crisis and related issues in social media. *Explanation: In CBRN crises, there is a heightened need for monitoring, as fears and misperceptions may lead people to place themselves in greater danger than that posed by the initial incident. Monitoring should be done by analysing questions asked at the crisis communication call centre, content of social media, and, e.g. results of fast surveys and so forth. Attention is also paid to foreign language speakers and risk groups, such as pregnant or elderly people. The results of such monitoring help clarify what requires attention regarding information needs, behaviour and sense making. The results of monitoring are not used for communication purposes alone, but also for crisis management.*	1 2 3 4 5 0 Open space for comments:
		3.4.2 Questions and misinterpretations are identified and addressed. *Explanation: When performing monitoring, existing questions and misunderstandings should be listed so that they can be addressed via direct communication means and media relations. Incorrect rumours should also be addressed, and reactions mediated, e.g. by participation in social media.*	1 2 3 4 5 0 Open space for comments:
	3.5 Direct means of communication	**3.5.1** Means for direct communication with diverse public groups are used by the organisation, including a crisis website, social media and a call centre with sufficient and competent manpower to provide public information. *Explanation: Information centres need to be built up immediately after a crisis erupts. Communication should not be a mere one-way distribution of messages but also facilitate individual information seeking. This includes well-known, updated and easy-to-find websites, social media accounts, and call centres for questions by the public. In addition, targeted communication with, e.g. risk groups in face-to-face meetings and communication via intermediaries may also be needed. Sufficient and well-trained staff should be arranged for direct communication tasks, while pooling of expertise, within the organisation and with similar organisations in the region, can be used to ensure the availability of enough communication expertise now that the need for this is at its peak.*	1 2 3 4 5 0 Open space for comments:

NEWS MEDIA	**3.6 Designated crisis agency spokespeople and services for journalists**	**3.6.1** A 24-hour media service and sufficient trained manpower deal with questions from the press also at the crisis site. *Explanation: In a time of crisis, a round-the-clock service is needed to answer questions from the press and inform journalists about the development of the situation. People dealing with the media should be trained specifically for this purpose. A large number of (international) journalists may be interested. In the case of localised threats, e.g. in C or R incidents, communication experts also need to be available in the vicinity of the crisis site (when possible). The requirements of official investigations should be met and, if needed, explained. Providing enough information about rescue activities may help distract attention away from terrorism and violent acts that can lead to copy-cat behaviour by others. People's health and safety should be the priority.*	1 2 3 4 5 0 Open space for comments:
		3.6.2 When providing media services near to the crisis site, it is current practice that the organisation protects the victims and their families from intrusions on their privacy and overwhelming media attention. *Explanation: Media officers at the crisis site should provide information and point out suitable sites for filming and photographing. They should give instructions (e.g. through the police) about where the media are allowed to go and where not, the aim being to ensure that, while reporters are able to do their job, the privacy of (the family of) victims is not unnecessarily invaded, investigations and rescue work are not hindered, and the safety of the reporters is ensured.*	1 2 3 4 5 0 Open space for comments:

		3.6.3 Official spokespeople explain emergency management activities and show empathy with those affected by the crisis. *Explanation: The response organisation should clarify the crisis situation and describe the crisis management operations (how the situation is being dealt with), including those in charge. In taking care of its media relations in this phase, the organisation should aim at prioritizing saving lives and reducing harm. It is important to relate to what is known and not yet known. To prevent further damage, the content should be consistent with the instructions given directly to citizens. If press conferences are broadcast live, the spokespeople, next to journalists, address many citizens at the same time; a long row of formal representatives behind a table may not be what is called for. Spokespeople explain the measures taken, but also give meaning to what has happened by stating how they interpret the situation. Leadership is important in CBRN incidents. The prime minister or a mayor, for example, shows empathy with those affected and facilitates sense-making by giving voice to the core values of the society. Providing non-specific reassurance and overstating the risk should be avoided. Regarding ethics, generalisations and stigma when referring to the causes of terrorism should be avoided. Experts will be available to provide detailed, trustworthy technical information in language that is easy to understand.*	1 2 3 4 5 0 Open space for comments:
		3.6.4 The media coverage of the crisis is continuously monitored and analysed, so that further explanations can be provided. *Explanation: Media reports should be scanned in order to spot and correct possible misperceptions and to see what needs of public groups are described in the media. CBRN incidents comprise many technical details, and possible misrepresentations or unclear presentations may increase anxiety. Response organisations may need to further clarify the picture of the situation through media contacts and direct means of communication.*	1 2 3 4 5 0 Open space for comments:

Phase 4. Recovery and evaluation

STAKEHOLDER	COMMUNICATION TASK	PERFORMANCE INDICATOR	SCALE 1 = This indicator is not taken cognizance of 2 = The importance has been recognized, but hardly any action is being taken 3 = We act on this to some extent but not systematically 4 = This is to a large extent a systematic part of the action 5 = This is fully a systematic part of the action 0 = Don't know, or this indicator is not relevant for our organisation
RESPONSE ORGANISATION AND NETWORK	**4.1 Stimulating cooperation and coordination in the organisation and within the response network**	**4.1.1** Information exchange and coordination of current tasks in the organisation and within the response network support the recovery effort. *Explanation: Different organisations may become involved at this stage, including, e.g. builders and insurance companies. As the health effects could be long-lasting, the role of health organisations remains important. Although the composition of the response network, leadership and responsibilities changes during a crisis, exchange of information must be ensured so that people remain committed to the recovery process. The response organisations need a shared understanding of the factors that could hamper recovery. Moreover, all key institutions should have participatory mechanisms through which to involve the general public, along with affected groups and organisations, in the recovery effort.*	1 2 3 4 5 0 Open space for comments:
		4.1.2 Contacts in the organisation and cooperation with other participants in the response network are evaluated throughout the process to improve these where needed. *Explanation: In the case of CBRN incidents, coordination relates to many different organisations. If problems relating to cooperation within the organisation (between units) or with the other response organisations arise, remedial action should be taken. Step by step the crisis communication activities are transferred to the day-to-day organisation.*	1 2 3 4 5 0 Open space for comments:

	4.2 Supporting evaluation and learning about communication in the organisation and within the response network	**4.2.1** Communication in the individual organisation and with other participants in the response network, including any international institutions involved, is evaluated, and improved coordination of future crisis communication is initiated. *Explanation: An evaluation of the existing communication is needed both at the organisational and network level, so that performance can be assessed and learning facilitated. Lessons learned should be seen as windows of opportunity for improvement. Documentation enables learning from others as well. Plans should be initiated that address concrete actions at certain phases of the crisis situation, e.g. by setting up an improvement team with members of selected organisations.*	1 2 3 4 5 0 Open space for comments:
CITIZENS	**4.3 Instructions for recovery efforts**	**4.3.1** Clear instructions that enable citizens to recover their lives, homes and property, and stimulate people to contribute to the coordinated recovery efforts in the community, are provided. *Explanation: After the response phase, one of the most important things in tasks of crisis communication is to help people regain control over their lives, by explaining how they can act to help themselves and their family in the post-emergency recovery, e.g. with insurance claims and facilities offered. CBRN events can have long-lasting effects, and people need to know, e.g. when it is safe to return to contaminated areas. Collective efforts are needed for recovery, and many people are willing to assist as a volunteer if they know how. This can be on the level of the individual household, neighbourhood, or region. In the aftermath of CBRN incidents, clear instructions and guidance are needed to ensure that volunteers are instructed and protected, e.g. know how to handle pollutants safely to avoid contamination or further harm. When a community has been disrupted by an emergency, it needs to get functioning again. This includes not only social activities but also, e.g. cleaning or re-building. When it takes a long time to recuperate from a crisis, it is important that the citizens and organisations involved stay motivated to support the reconstruction of, e.g. their neighbourhood; this is a task that can be done by, for instance, the municipality. Social media activities, sharing reconstruction experiences and needs, can enhance engagement.*	1 2 3 4 5 0 Open space for comments:

	4.4 Stimulating a more accurate public understanding of the recovery process and ongoing risks	**4.4.1** Communication about the crisis and its consequences is open, facilitates sense-making and encourages participation in decision-making about the plans for recovery. *Explanation: Citizens, local communities and organisations should have a broad understanding of the recovery options and ongoing risks. They also need to be involved in decisions that have important consequences for them, e.g. plans about how a neighbourhood is to be rebuilt. Channels and means for people to express their feelings and concerns and participate in the recovery effort should be provided. Leaders can facilitate sense-making and the process of restoration.*	1 2 3 4 5 0 Open space for comments:
		4.4.2 Information and care for those directly affected by the emergency is continued for as long as they need it. *Explanation: Care, including professional help for victims and families should continue, depending on how serious matters are; for example, organizing memorial events in cooperation with the families involved. As CBRN crises may have far-reaching effects, wider audiences also need to be taken into account.*	1 2 3 4 5 0 Open space for comments:
	4.5 Ongoing monitoring of needs and perceptions of public groups	**4.5.1** Information needs and perceptions of publics concerning recovery are monitored and analysed. *Explanation: Also in this phase, expectations should be met and questions addressed. Monitoring at this stage focuses on public support for the recovery activities of the response organisation and the active involvement of the public in the collective recovery effort. It also includes noting reactions in the traditional and social media and, e.g. the use of surveys.*	1 2 3 4 5 0 Open space for comments:

	4.6 Supporting reflection	**4.6.1** Public knowledge about what happened is increased, and public dialogue about the crisis situation and its causes and consequences is promoted to limit damage in similar cases in the future. *Explanation: After recovery, while affected public groups may be eager to forget their recent difficulties, it is nevertheless important from a future perspective to look back on what has happened. Society needs to cope with similar crises in the future and discussion helps in developing preparedness. This may involve measures to be taken to prevent or limit such risks in the future. Leaders can help restore trust and faith in values which the crisis may have shaken, and establish a vision for future.*	1 2 3 4 5 0 Open space for comments:
NEWS MEDIA	**4.7 Ongoing media relations**	**4.7.1** Media are encouraged to report about and to motivate the recovery effort, while empathy for those involved is present in information given to the news media. *Explanation: Although the news value of the activities in this phase is not as high as in the emergency phase, recovery initiatives and decisions are nevertheless newsworthy, since paying attention to the recovery process motivates individuals to contribute to it. Cases could be cited that inspire citizens and organisations to continue their recovery efforts. Spokespeople should continue to show empathy with those affected in order to support psychological recovery. This also demonstrates that those affected have not been forgotten.*	1 2 3 4 5 0 Open space for comments:
		4.7.2 The organisation explains its role and responsibility regarding the recovery process. *Explanation: The organisation must accept its responsibility and communicate about it. Organisations that caused or contributed to the crisis will be held accountable, but other response organisations may also encounter criticism regarding their performance in the response and recovery process. Organisational policies and actions of first responders are often supported in the first instance but later scrutinized more critically, with or without reason. This also needs attention in internal communication.*	1 2 3 4 5 0 Open space for comments:

		4.7.3 Media coverage on recovery is monitored and additional information provided when needed. *Explanation: Monitoring of the organisation's own communication channels should be undertaken to discover and correct possible misperceptions about recovery activities and to see what needs of what public groups in this phase are reported in the news.*	1 2 3 4 5 0 Open space for comments:
	4.8 Evaluation with the media	**4.8.1** Media relations are evaluated throughout the process to improve the cooperation where needed. *Explanation: Where problems arise in cooperation between the organisation and the media, remedial action should be taken. Feedback must be noted, as the tone in which the media report the situation may indicate the state of relations between the two parties. In the case of CBRN incidents, relatively many foreign journalists may be involved, especially in the response phase. This cooperation also needs to be evaluated and learned from.*	1 2 3 4 5 0 Open space for comments:

Ruggiero, A., Vos, M. & Palttala, P. (2015), **The CBRN communication scorecard**. In S. Schmidt & M. Vos (Eds) Behaviour and communication in CBRN crisis. Findings and recommendations in case of chemical, biological, radiological, and nuclear attacks on society. Pabst Science Publishers, Lengerich, pp. 106-110, 117-139. Annex by Ruggiero, A., published on project website http://www.crisiscommunication.fi/tec/guides

Annex. Sources utilised when customising the crisis communication scorecard to CBRN crises

In the below table, the sources used when customising the crisis communication scorecard are reported. Input derived from various sources was brought together in a data-extraction table. The table briefly refers to insights gained from scientific literature on CBRN terrorism communication (review 1) and social media monitoring (review 2), and results of an expert-questionnaire investigating communication tasks and challenges.

Crisis phase	**Communication tasks**	**Insights gained from studies implemented:** *R1 = review 1 academic literature*[16] *R2 = review 2 academic literature*[17] *E = expert-questionnaire*[18]
PHASE 1: Prepared-ness	Knowing the public groups and their media use - circles, vulnerability -media use, trusted sources	*Literature (R1) indicated:* - use of trusted sources may mitigate reactions (Rubin, Amlôt, & Page, 2011) - need to identify risk groups (Stevens, Agho, Taylor, Barr, Raphael, & Jorm, 2009) including e.g. professionals who may be exposed to the event, vulnerable populations (e.g. homeless and poorly housed people, children, immigrant communities, people with physical limitations, such as a hearing defect) and transient populations (e.g. individuals away from their normal surroundings) (Blanchard, Haywood, Stein, & Tanielian, 2005; Casman & Fischhoff, 2008) - need to take into account also the wider audience that may be susceptible to concerns (Griffin-Padgett & Allison, 2010) and fear (Rogers, Amlôt, Rubin, Wessely, & Krieger, 2007) - a number of communication issues may concern minority groups, including potentially higher levels of distrust and fatalism (Blanchard et al., 2005; Wray, Becker, Henderson, Glik, Jupka, Middleton, Henderson, Drury, & Mitchell, 2008) - low education can be a risk factor for high terrorism risk perception and fear (Boscarino, Adams, Figley, Galea, & Foa, 2006; Stevens et al., 2009) - people with underlying mental health problems may be difficult to reassure in high-anxiety-situations (Rubin et al., 2011) - differences between rural and urban populations (Clements-Nolle, Ballard-Reisch, Todd, & Jenkins, 2005) *Literature pointed out (R2):* - need to identify which stakeholders use social media as social media users do not equal whole populations (Chou, Hunt, Folkers, & Augustson, 2011)

[16] Review 1 was published in: Ruggiero, A. and Vos, M. (2013), Terrorism communication: Characteristics and emerging perspectives in the scientific literature 2002–2011. *Journal of Contingencies and Crisis Management, 21*(3), 153–166. DOI: 10.1111/1468-5973.12022.

[17] Review 2 was reported in: Ruggiero, A. and Vos, M. (2014), Social media monitoring for crisis communication: Process, methods and trends in the scientific literature. *Online Journal of Communication and Media Technologies*, *4*(1), 105–130.

[18] The expert-questionnaire was reported in: Ruggiero, A. and Vos, M. (Early View, print forthcoming 2015), Communication challenges in CBRN terrorism crises: Expert perceptions. *Journal of Contingencies and Crisis Management, 23*(1). DOI: 10.1111/1468-5973.12065.

	Monitoring risk perception and general public understanding of CBRN risks - regular monitoring and surveys - social media monitoring	*Literature noted (R1):* - public perceptions may differ according to different terrorist scenarios (Lee, Dallaire, & Lemyre, 2009) - CBRN terrorist threats considered dreadful and unknown (Sheppard, 2011) - perceived threat, uncertainty and control are cognitive factors which influence perceptions and understanding of risks of terrorism (Lee et al., 2009) - socio-demographic, socio-economic and psychosocial factors shape risk perception: including e.g. education level, migrant background or ethnicity, gender, age, negative previous life events, post-traumatic stress disorder, and fear of death (Boscarino et al., 2006; Kearon, Mythen, & Walklate, 2007; Stevens et al., 2009) - cultural knowledge and context influence risk perceptions (Lee et al., 2009; Rubin et al., 2011) - need to identify and address misperceptions among public groups *Literature pointed out (R2):* - monitoring process consists of four steps: preparation, data collection, analysis and reporting - preparation phase includes: definition of the issue(s) to be monitored including related terms and synonyms, choice of stakeholder groups whose views are monitored, selection of relevant social media to be monitored, type of messages, focus within the messages (e.g. topics, attitudes, emotions), timing and frequency of data collection (Bengston, Fan, Reed, & Goldhor-Wilcock, 2009; Bruns & Liang, 2012; Rappaport, 2010; Sutton, 2009) - methodological issues include e.g.: ethics and privacy (Boyd & Crawford, 2012; Eysenbach, 2009), accuracy and reliability of data being collected (Boyd & Crawford, 2012) difficulty to find out subtle meanings, attitudes and motivations (Branthwaite & Patterson, 2011), potential intentional provision of inaccurate or misleading information (Lindsay, 2010), representativeness of the sample and generalizability of the findings - social media monitoring results should be combined and compared with results from news media monitoring, opinion polls and surveys *Experts indicated (E):* - lack of understanding of risks: people do not understand probabilities - lack of understanding of risks due to complicated expert knowledge - people are more concerned about recurrent crises, CBRN risks are not connected to people's everyday lives - lack of interest: "it won't happen to me" - emotional reactions among people due to lack of understanding of probabilities - fears due to a lack of understanding and control
	Contribution to the general public preparedness - by different means - background info	*Literature described (R1):* - people have limited understanding of CBRN threats (Wray et al., 2008): need to increase awareness and knowledge of people - facilitating informed decision-making and increase preparedness among public groups (Chess & Clarke, 2007) - goal is to reduce dread created by terrorism (Sheppard, 2011), increase publics' resilience to cope with fear (Palenchar, Heath, & Orberton, 2005), and build relations of trust (Blanchard et al. 2005; Casman & Fischhoff, 2008) - open, yet cautious discourse on terrorism needed (Palenchar et al. 2005), community should be involved in planning activities (Blanchard et al., 2005) - need to explain that in the case of an event information may change due

		to scientific uncertainties involved (Sheppard, 2011) - importance of health literacy and the simplification of complex materials (Clements-Nolle et al., 2005): some terms, such as 'shelter-in-place', used in current radiological/ nuclear terrorism emergency information materials may be confusing or unclear for some people (Becker, 2004) - contents for pre-event education and training: (1) possible threats; (2) how different agents are transmitted; (3) signs and symptoms of infection; (4) preventive measures to be taken; (5) how an incident is managed and by whom; (6) how information is communicated and through which channels; (7) official spokespersons and their qualifications (8) platforms for further information (Clements-Nolle et al., 2005) *Experts suggested (E):* - involve citizens in training exercises - risk education needed: results from studies, lessons learnt from accidents and exercises - prior education of parents needed - create awareness and preparedness - prepare general public but avoid creating fear - use different channels: both new and traditional media - open discussion with citizens - explain with concrete examples *Regarding ethics:* - potential risks and scenarios need to be explained - terrorism could be communicated together with man-made hazards and accidents - provide practical advice what can be done in case of an event - avoid generalizations, stereotypes and stigma with regard to religion, political groups, ethnic groups, national connotations paying respect to human rights and civil and religious feelings - explain values: we do not live in the best of worlds
	Establish cooperation with news media - database - stimulate media coverage backgrounds - follow and analyse - internal guidelines, balance in reporting	*Literature pointed out (R1):* - as people normally do not have first-hand experience of terrorism, they may rely on others, including the news media, for interpretation of the risks involved (Aldoory, Kim, & Tindall, 2010) - sensationalist reporting should be avoided: repeated sensationalist reports may increase emotions, for example, in cases of bioterrorism (Aldoory & van Dyke, 2006) - need to develop protocols and guidelines for reporting in crisis situations regarding e.g. precise information provision: avoid the use of dramatic language and sensationalism; taking photographs and shooting: avoid taking close-up shots of people who are dying, injured or in pain; using sources: give voice to experts or other trusted sources rather than e.g. politicians (Sorribes & Rovira, 2011) - need to cooperate with journalists in communication about risks of terrorism (Sorribes & Rovira, 2011) - need to improve relations between journalists and scientists (Sorribes & Rovira, 2011)
	Improving preparedness in the organization and in the network of response organizations - clarify responsibilities in the network - agreements on coordination procedures	*Literature addressed (R1):* - CBRN crises consist of different scenarios – factors to be considered: e.g. material involved, lethality, the size of contaminated area, duration of contamination (Sheppard, 2011) a terrorist hoax (Sellnow, Littlefield, Vidoloff, & Webb, 2009), criminal investigation (Rubin et al., 2011), possibility of repetition - need to create a comprehensive strategy covering different functions: emergency response, long-term health care, risk communication, research, and economic assistance (Hyams et al., 2002)

	- plans and exercises own organization - stimulate planning by others and coop - identify barriers to cooperation and coordination	- communication planning should include anticipating and preparing for a range of psychological reactions (DiGiovanni, 2003), take into account socio-cultural and the physical environment (Gofin, 2005) - identify organizational, legal and professional constraints which may hamper cooperation and coordination: lack of resources, differences in role perceptions (Lowrey, Evans, Gower, Robinson, Ginter, McCormick, & Abdolrasulnia, 2007), interpretations of scientific or medical information (Chess & Clarke, 2007), different priorities (Hyams, Murphy, & Wessely, 2002), hierarchical structures (Alavosius, Houmanfar, & Rodriquez, 2005), power differentials and cultural clashes (Beaton, Stergachis, Oberle, Bridges, Nemuth, & Thomas, 2005), ineffective communication between journalists and public information officers (Lowrey et al., 2007), and inter-organizational conflicts (Chess & Clarke, 2007) - issues of ethics and responsibility should be addressed in planning and preparedness (Ulmer & Sellnow, 2002; Wray, Kreuter, Jacobson, Clements, & Evans, 2004) including confidentiality and anonymity regarding e.g. disease containment (King, 2005), political dimension of discourse on terrorism, restrictions on information provision due to security issues (Mythen & Walklate, 2006), eligibility for health care, financial compensation (Hyams et al, 2002), need to avoid widening the gap between alternative worldviews (Veil & Mitchell, 2010) or creating reactions towards minorities (Stevens et al., 2009) *Literature indicated (R2):* - need to agree on guidelines for social media interaction, including social media monitoring (Gallaugher & Ransbotham, 2010) - need to define resources for social media monitoring including identification of budget, personnel and responsibilities (Bengston et al., 2009; Rappaport, 2010; Sutton, 2009) - plan and establish social media interaction: create accounts, profiles and followers before a crisis occurs, i.e. a basis in preparedness, joint communication strategies and, a multi-channel approach using different (social) media linking to a dedicated crisis website *Experts stressed (E):* - need to prioritize CBRN preparedness - need to increase research activities - need to clarify roles and command structures - involve schools in cooperation when planning crisis communication (acting as logo parentis in crisis situations) - distinct plans / approaches needed for C, B, R and N scenarios

	Improving facilities and availability of manpower - alert systems, websites, call centres, social media accounts, monitoring services - pooling and expertise	*Literature suggested (R1):* - the communication staff needed for terrorism risk communication include subject matter specialists, risk and decision analysts, and communication specialists and managers (Fischhoff, 2011) - need for co-located workspaces to e.g. smoothen cooperation between scientific and communication teams (Robinson & Newstetter, 2003) - incidents provoking high levels of fear may require cooperation with mental health professionals (Rubin et al., 2011) *Literature cited (R2):* - need to select and decide on a social media monitoring tool (Rappaport, 2011) - the selected monitoring tool should have adequate technical features, e.g. storage space and computing power (Bruns & Liang, 2012), allow tracking emotions – a feature that many existing tools fail to adequately provide (Sobkowicz, Kaschesky, & Bouchard, 2012) – and recognizes the relevant vocabulary and terms related to CBRN incidents - potential power outage should be taken into account when planning the use of social media and other technologies (Lindsay, 2010) - real time social media monitoring needs specialist manpower around the clock and communication expertise to interpret the results *Experts stressed (E):* - need to prepare for alternative communication channels in case e.g. mobile phones do not work

	Improving information exchange and training of crisis communication activities in the organization and within the response network - sharing knowledge on responsibilities, procedures and means for exchanging information - communication training - regular crisis communication exercises	*Literature mentioned (R1):* - professional groups need training in potential non-traditional roles that they may need to assume in an event (Clements-Nolle et al., 2005) - networks (organizational, professional – formal and informal) can improve cooperation and coordination among response organizations (Chess & Clarke, 2007) - need to provide specialized training in communication protocol regarding communicating to media about sensitive topics (Robinson & Newstetter, 2003) - as crisis situations always include unforeseen elements, it is important to encourage creative problem solving and human ingenuity in trainings and exercises (Robinson & Newstetter, 2003) - there may be a compression of time from scientific discovery (science-making), to the making of recommendations to the public regarding those discoveries (policy-making), and to the news making (Robinson & Newstetter, 2003): need to train cooperation between all parties *Literature indicated (R2):* - need to ensure adequate competence and expertise for monitoring interaction in social media in cooperation with the ICT specialists through e.g. training and exercises - social media interaction: need to join forces to become more visible by joint strategies with other organizations (same hashtags, retweeting, etc.), and lead attention created in various social media towards crisis websites with more information *Experts noted (E):* - lack of competences, experts and resources - lack of experience and technical knowledge - need to improve competences and provide training - need for a common national program to train and prepare both experts and citizens - gaining and establishing trust - response organizations should cooperate in preparedness activities to train public groups
PHASE 2: Detection and warning	Targeting and distribution of warning messages - target plus use many channels - address diverse needs - easy to have access to/find info	*Literature mentioned (R1):* - the different features of C,B,R,N materials need to be considered in messages: for C,R – information needed, e.g., on nature and timing of care + evacuation information; for B – information needed, e.g., how to prevent further transmission of the disease (Wray et al., 2004) - risk groups to be included in warning messages – including professionals exposed to the event, vulnerable populations (e.g. homeless and poorly housed people, children, immigrant communities, people with physical limitations, such as a hearing defect) and transient populations (e.g. individuals away from their normal surroundings) (Blanchard et al., 2005; Casman & Fischhoff, 2008) - directly affected groups need detailed instructions (Shepard, 2011), non-exposed populations need to be reassured (Rogers et al., 2007; Wray et al. 2004) - need for targeting: due to a lack of clear boundaries of time and space, the zone of danger may not be clear, making it difficult to see who is safe and who is not, including rescuers' own families (DiGiovanni, 2003) - the use of multiple channels is advocated (Clements-Nolle et al., 2005) - credible sources providing information with sincerity (Meredith, Eisenman, Rhodes, Ryan, & Long, 2007) *Experts noted (E):* - targeting information according to closeness of the affected people to

		the event - difficult to have trust: need to enhance it - using all media - single trusted authority should provide accurate information - in the direct vicinity information should be provided directly to the affected people *Regarding ethics* - inform public groups only about serious threats
	Issuing instructions to public groups and monitoring reactions - provide clear instructions in a timely manner - check effect of initial messages	*Literature referred to (R1):* - people need information about: health issues, self-protection and the protection of family members (Becker, 2004; Wray et al., 2008), the dangerous substances involved (Becker, 2004), one's risk to exposure, test results and the differences between acute and chronic effects of exposure (Rubin et al., 2011), evacuation information for those at continued risk (Wray et al., 2004), detailed information to establish one's exposure to be able to conduct self-triage (Shepard, 2011) - message content/style: messages designed for diverse publics should emphasize simple, practical steps and basic information (Wray et al., 2008), be straightforward, use easy language, employ pictures, and be available in multiple languages (Becker, 2004), avoid using difficult terms which people may not be able to understand (Clements-Nolle et al., 2005), such as 'shelter-in-place' (Becker, 2004) - honesty, accuracy, consistency and timely communication needed (Clements-Nolle et al., 2005) - need to monitor reactions of people: identify gaps between advised and real behaviour (Rogers et al., 2007) including acts of omission (e.g., travelling, but perhaps at higher statistical risk) and of commission (e.g., taking medication, but possibly not at the right moment) (Sheppard, Rubin,Wardman, & Wessely, 2006) - need to monitor public perceptions: fear and misperceptions may lead people to place themselves in greater danger than that posed by the original incident itself (Rubin, Amlôt, Page, & Wessely, 2008, following Gray & Ropeik, 2002) *Literature indicated (R2):* - social media monitoring helps track reactions, which may be voluminous, of public groups (Sobkowicz et al., 2012) - the effect of messages may be monitored in social media (Zailskaite-Jakste & Kuvykaite, 2012) - identifying and responding quickly to misinformation online is critical (Sutton, 2009) *Experts stressed (E):* - provide accurate information in a timely manner - need to monitor problematic behaviour of people: ignorance or not following instructions - a fear of future attacks among people - people may be anxious due to exaggeration of danger - people may "panic" due to misinformation - emotional reactions among people - fears due to lack of understanding and control to handle the situation - social media interaction should be analysed and responded to - explain what happened, where and what can be done
	Informing the news media	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)

	Information exchange and coordination in the organization and within the response network	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
PHASE 3: Crisis response	Instructions on how to act and prevent further damage - providing further information - continuous updating of information - targeting of information taking into account vulnerable groups - encourage using social networks	*Literature mentioned (R1):* - uncertainty and quickly evolving information call for constant updates in the information provided to stakeholders (Rubin et al., 2011) - adjust information and explain changes: as a terrorism incident involving CBRN materials is often not observable and has delayed effects (Sheppard, 2011), and the detection of the substances in question may take time (Clements-Nolle et al., 2005), there may be delays in information release (Robinson & Newstetter, 2003), and ambiguity in the advice provided initially (Sheppard, 2011) - continuous need for targeting: due to a lack of clear boundaries of time and space, the zone of danger may not be clear, making it difficult to see who is safe and who is not, including rescuers' own families (DiGiovanni, 2003) - reassuring those who are not exposed of their safety and, while preventing further harm, for example, by transmission of an infectious disease, also to mitigate the social effects of the crisis (Wray et al., 2004) *Experts stressed (E):* - provide accurate information in a timely manner - fast updates of information - consistency of information provided - using all media - involve neutral actors, VIPs and social influencers
	Clarifying the situation to help public groups to cope with the situation - increasing understanding of the crisis and its circumstances - spokespeople show empathy - special attention to those directly affected	*Literature described (R1):* - explaining the rationale behind changing information needed to ensure that changing information and advice is not interpreted as mishandling of the situation by authorities (Blanchard et al., 2005; Sheppard, 2011) - providing non-specific reassurance may provoke suspicion (Rubin et al., 2011) - sense-making: people may experience changes in the way they view the world or themselves (Rubin et al., 2008); leaders in the public sector can facilitate sense-making and address a wider audience that may also be susceptible to traumatization by the events (Griffin-Padgett & Allison, 2010) - addressing core values in society (Ulmer & Sellnow, 2002) - overstating the risk is a risk in itself as publicity and fear created among the public groups may count as much, or even more, as the numbers of casualties in terms of harm created by terrorism (King, 2005) - the importance of relationships and social groups during stressful times, and the role of emotionally supportive communication as an antidote to the stress provoked by terrorism (MacGeorge, Samter, Feng, Gillihan & Graves, 2007) *Experts stressed (E):* - calm people and avoid panic - ensure safety of people - transparency and openness about uncertainties: explain them - explain both best and worst case scenarios - need to provide additional information - people should be able to follow the situation and to derive their own operational picture *Regarding ethics* - refer to facts, avoid generalizations, stereotypes and stigma, casting

		terrorism as a singular act and terrorists as insane irrespective of the ideology behind paying respect to human rights, civil and religious feelings
	Continuous monitoring of needs and perceptions of public groups - monitoring needs and perceptions of public groups - monitoring social media interaction - addressing misinformation and responding to questions	*Literature addressed (R1):* - monitoring public perceptions in the media throughout the event (Wray et al., 2004) - need to identify and address misperceptions, which may further add to public fear levels (Rubin et al., 2008) and spur circulation of rumours (Mythen & Walklate, 2006) *Literature mentioned (R2):* - social media monitoring can help e.g. to respond to rumours, mediate reactions and correct inaccuracies (Gallaugher & Ransbotham, 2010) *Experts stressed (E):* - social media interaction should be analysed and responded to
	Direct means of communication	*Experts mentioned (E):* - personal and face-to-face communication - interpersonal communication - group communication
	Designated crisis agency spokespeople and services for journalists	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
	Assist cooperation in the organization and within the response network	*Experts stressed (E):* - different agencies need to speak with one voice to ensure consistency
Phase 4: Recovery and evaluation	Instructions for recovery efforts - instructions facilitating recovery - stimulate community efforts	*Literature pointed out (R1):* - CBRN incidents may have long-lasting effects, and people need to know, for example, if it is safe to return to contaminated areas (Sheppard, 2011) - there may not be a specific end to the situation (Goldstein, 2005), and the consequences may be felt for a long time
	Stimulating a more accurate public understandings of the recovery and ongoing risks - accurate and transparent - encourage participation in recovery planning - continued care and information for those who are affected	*Literature described (R1):* - role of leaders: leader can serve as a facilitator in guiding the process of healing towards restoration, by restoring faith in a core set of values and beliefs, facilitating the healing of direct victims and wider audiences, recreating a sense of security, and establishing a vision for the future (Griffin-Padgett & Allison, 2010) - communication can help restore trust (Fischhoff, 2011)
	Ongoing monitoring of needs and perceptions of public groups	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
	Ongoing media relations	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
	Stimulating cooperation and coordination in the organization and within the response network	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)

	Supporting reflection	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
	Evaluation and conclusions for the future via media and public debate	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)
	Supporting evaluation and learning about communication in the organization and within the response network	(No new insights for CBRN terrorism crises, follow general crisis communication indicators)

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concerning the above table

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IV

SOCIAL MEDIA MONITORING FOR CRISIS COMMUNICATION: PROCESS, METHODS AND TRENDS IN THE SCIENTIFIC LITERATURE

by

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Social Media Monitoring for Crisis Communication: Process, Methods and Trends in the Scientific Literature

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Abstract

This literature review study aims at clarifying current knowledge on social media monitoring from the perspective of organizational communication and public relations. It also contributes to crisis communication by shedding light on how fast developing social media discourse can be followed and analysed in order to understand citizens' needs throughout all the phases of a crisis. The findings of this study reveal a number of insights in the scientific literature on the concept of monitoring, the monitoring process, methods, tools and solutions, methodological issues and trends covering the years 2009–2012. In the literature, social media monitoring is described as a process which comprises various steps: preparation, data collection, data analysis and reporting. The methodological issues discussed in the literature show the many challenges still to be addressed. Knowledge connecting the results of monitoring activities to communication strategy making is lacking, indicating a gap to be filled in future studies.

Keywords: social media, monitoring, crisis communication, public relations

Introduction

This paper aims at clarifying current knowledge on the monitoring of citizen interaction in social media. Specifically, the aim is to find out how the concept of monitoring, the process, monitoring methods, tools and solutions, and methodological issues are described and to identify trends in the recent scientific literature. This objective is pursued by undertaking a literature review. The underlying purpose is to contribute to crisis communication in the case of emergencies and disasters, including incidents of terrorism, by explaining how fast developing social media discourse can be followed and analysed. Monitoring of the online environment, listening to citizen interaction in the social media, is considered a first step in communication strategy-making and online participation by various organizations in the response network throughout a crisis (e.g. Reynolds & Seeger, 2005).

Social media form a group of diverse and fast developing communication media which enable the production and sharing of information through collaborative means (Sutton, 2009). The role of social media for crisis communication has been acknowledged in recent years with respect to e.g. the issuing of emergency warnings and alerts, receiving requests for assistance, supporting recovery efforts, and provision of situational awareness and real-time information through monitoring (Lindsay, 2010).

The importance of gaining fast insights into public perceptions and information needs that may be large in volume and also incorporate conflicting information becomes evident in crises which are unpredictable, unknown and fear-inducing(Sheppard, 2011). Due to the uncertainty and ambiguity involved, as in the anthrax crisis of 2001, there may be need to adjust information (Robinson &Newstetter, 2003), fine-tune communication and improve response (Rubin, Amlôt, & Page, 2011) as the crisis evolves. This calls for knowledge on how to monitor publics' perceptions and the debate and manage the communication process, all in real time.

This paper comprises four sections. Following the introduction, the method used, including the research questions, sample and data analysis, is described. The third section presents the findings of this study, and section four concludes.

Method

This study aims at clarifying monitoring of citizen interaction in social media. In particular, the focus is on describing the concept, process, methods, tools and solutions, and methodological issues, and on identifyingtrends in current scientific literature. The following research question was set:

> How are the methods for monitoring social media interaction of citizens described in the academic literature?

The study contributes to a project identifying factors that need to be taken into consideration when monitoring the social media interaction of citizens in crisis situations in order to understand citizens' needs throughout all the phases of a crisis. As social media are a new research field with a limited volume of published research, this study takes a broader approach and reveals insights on social media monitoring as a basis for communication with publics.

Sample

The present study was conducted following the protocol of a systematic literature review (e.g. Jesson, Lacey, & Matheson, 2011). The search was conducted in multiple electronic databases via EBSCOhost, ProQuest and Web of Science, accessible via Jyväskylä University Library, in October 2012. The search terms used included ["social media"] and [monitoring or scanning or tracking or analytics] and [communication or "public relations"]. The selection of optimal search terms was a result of several try-outs. For example, the terms mapping, metrics and measurement produced results that did not support the aim of the present study, and were consequently discarded.

The search covered abstracts, titles and keywords, and was limited to scientific articles in peer-reviewed journals. Hence, articles in consumer or trade magazines, for example, were excluded. In addition, the availability of the full article in the Jyväskylä University Library databases or on the internet was a prerequisite. Throughout the process, record was kept of excluded articles. Table 1 clarifies the process.

Table 1 Search results per database (*Number includes some duplicates)

Keywords	Database	First results	After initial scanning	Final sample coded
["social media"] and [monitoring or scanning or tracking or analytics] and [communication or "public relations"]	EBSCOhost	62 (15.10.2012)	38	17
	Web of Science	22 (16.10.2012)	9	6
	ProQuest	18 (17.10.2012)	2	1
	Total	102*	49	24

In the first step, the abstract, title and keywords of all the results from the different databases, 102 articles altogether (see table 1), were checked to assess their potential for the study. If needed, the introduction and/or conclusions were also read. Moreover, the scientific quality of the publication was checked and duplicates removed. After this initial scan, articles considered to be adequate in scope were exported to RefWorks, a system for managing references.

This resulted in a total of 49 articles that were read through more thoroughly and from which, on the basis of the inclusion/exclusion criteria, a further selection was made. The inclusion criteria were: focus on social media, perspective on communication (here limited to communication with members of external public groups), perspective on monitoring, English language, and scientific quality. In the context of the present study, monitoring is understood as following and analysing online discourse in the social media.Hence, articles focusing on monitoring for evaluation purposes, e.g. measuring the outcomes of campaigns, were excluded. As the field of study is multidisciplinary in nature, articles from advertising or marketing were included in the sample when pertinent to the research objective. Moreover, technical ICT-related articles were also included if they offered useful elements from a communication point of view. After applying the inclusion/exclusion criteria, the final sample for the literature review before coding numbered 24 articles.

Data Analysis

The 24 articles in the final sample were read through and initially coded by underlining relevant parts of the text. During this process, a preliminary list of codes was formulated. All the articles in the final sample were transported to ATLAS.ti (version 7), a qualitative data management programme, where the final analysis and coding were conducted. The unit of analysis was one article.

The analysis was conducted with the help of the preliminary code list, which was further refined during the process on the basis of data-driven thematic coding (Riessman&Quinney, 2005). Thematic analysis is a common approach used for analysing qualitative data (e.g. Schwandt, 2007). In this approach, the analyst codes sections of text based on whether they contribute to emerging themes (Schwandt, 2007). The aim is to reduce the data by segmenting, grouping and categorizing, and then to summarize and reconstruct them so as to capture important patterns and concepts(Ayres, 2008; Elo&Kyngäs, 2008). Following the coding process, the coded text segments were further grouped and categorized, yielding five main themes. In addition to identifying emerging themes in the literature, some simple quantitative analyses were conducted, covering, for example, the distribution of articles according to year of publication, the focus of the articles, and the types of social media studied. The findings, including the main themes answering the research question and the trends discovered in the literature, are reported next.

Results

This study yielded insights from the scientific literature on the concept of monitoring, the monitoring process, monitoring methods, tools and solutions, methodological issues and trends.

Monitoring

In this section the concept of monitoring is clarified, including how it is described, its purposes, and its objects and focuses.

Monitoring Described

In the literature, social media monitoring is described as a research approach covering both data collection and analysis. It is an observational, passive and quantitative approach which

shares commonalities with ethnography and quantitative surveys (Branthwaite & Patterson, 2011). Historically, social media monitoring originates from the tradition of media content analysis (Rappaport, 2010). The idea of analysing the social environment through news media monitoring can be traced back to the sociologist Alvan Tenney and his proposal to measure the "social weather" in 1912 (Bengston, Fan, Reed, & Goldhor-Wilcock, 2009). In the pre-computer era, these early content analytical approaches required considerable resources in terms of time, labour and money (Bengston et al., 2009; Branthwaite& Patterson, 2011).

The benefits that social media monitoring is much praised for, and that are expected from it, include access to authentic and honest data (Eysenbach, 2009) by providing an account of social life "as it happens" (Branthwaite & Patterson, 2011). Moreover, it enables the continuous, minute-by-minute (Branthwaite & Patterson, 2011), real-time data collection much needed by emergency managers, and tracking of fast changing perspectives over time (Kavanaugh et al., 2012; Sundaram, Xie, De Choudhury, Lin, & Natsev, 2012). It may also provide access to novel information (Deluca et al., 2012) and reveal hidden insights or even topics of controversy (Sobkowicz, Kaschesky, & Bouchard, 2012). This could also pave the way for two-way communication and partnering with citizens, e.g. in emergency situations (Lindsay, 2010). Monitoring is also said to be cost-effective, e.g. in comparison with traditional research methods (Bengston et al., 2009; Eysenbach, 2009; Kavanaugh et al., 2012). In contrast, other sourcescite the uncertainty related to possible costs of monitoring and responding to potentially voluminous incoming messages in the case of a crisis (Lindsay, 2010).

Social media monitoring methods can be described as "listening solutions" that provide technology; services and know-how to help researchers and organizations listen, interpret and respond to what people are saying online (Rappaport, 2010). When compared to the traditional research approaches, the similarities that social media monitoring shares with quantitative research include large samples, numeric data and difficulty in assessing meanings, while among those it shares with qualitative approaches are the gathering of spontaneous views and opinions, and a need for rigorous semantic analyses (Branthwaite & Patterson, 2011). Monitoring can also be seen as "a 24x7 focus group", which provides community insights and intelligence for e.g. communication planners (Hipperson, 2010). In

turn, the differences between monitoring and the traditional quantitative approaches include more imprecise sampling and lack of control and standardisation in conducting research, while the differences with the traditional qualitative approaches include larger samples, no direct contact with the targets of the research, and lack of non-verbal cues, feedback and contextual information (Branthwaite & Patterson, 2011).

In addition to the function of monitoring as environment analysis and listening – the focus of the present paper – monitoring may also serve the purpose of evaluation, e.g. tracking the success of a message or a campaign (Zailskaite-Jakste & Kuvykaite, 2012). Moreover, methods for social media monitoring can be divided into active methods that aim at engaging, e.g. citizens, in social media interaction and consequently gathering data from them, as in the case of health practitioners tracking the progress of their patients through an e-health website (Laakso, Armstrong, & Usher, 2012), and passive methods that include passive and automatized data gathering and analysis (Eysenbach, 2009). This paper focuses on the latter, i.e. methods for monitoring naturally occurring interaction online.

Purpose of Monitoring

According to the literature, the purposes for conducting social media monitoring are manifold. First and foremost, monitoring is conducted for analysing the environment (Zailskaite-Jakste & Kuvykaite, 2012). The goal is to make sense of a vast amount of information and to see the big pictureofthe phenomena monitored (Kavanaugh et al., 2012). Monitoring provides a window on societal debate and sheds light on stakeholder perceptions, needs and attitudes of various kinds (Bengston et al., 2009; Chou, Hunt, Folkers, &Augustson, 2011). The objective may be identification of issues of concern related to e.g. public safety (Kavanaugh et al., 2012), trends in e.g. drug use (Deluca et al., 2012), or political opinions or reactions to public policies (Sobkowicz et al., 2012). Moreover, social media monitoring may be conducted to identify radical opinions (Yang, Kiang, Ku, Chiu, & Li, 2011), misinformation e.g. on vaccinations (Eysenbach, 2009), profile criticism (Keelan, Pavri, Balakrishnan, & Wilson, 2010) or negative information (Campbell, Pitt, Parent, & Berthon, 2011).

The results of monitoring can be further used for specific action purposes. For example, monitoring may serve as a support in policy-making (Sobkowicz et al., 2012) e.g. to make

more informed decisions (Bengston et al., 2009) and for different planning purposes (Hipperson, 2010), e.g. organization's social media communication (Zailskaite-Jakste & Kuvykaite, 2012). The aim of monitoring may include e.g. responding to rumours, mediating reactions, correcting inaccuracies and responding to protests (Gallaugher & Ransbotham, 2010). In the context of disasters and emergencies, monitoring can serve to establish situational awareness and to enhance communication with citizens (Lindsay, 2010), and to provide an early warning system to identify potential problems (Gallaugher & Ransbotham, 2010) and paracrises (Coombs & Holladay, 2012).

Groups of users that may benefit from social media monitoring in the business sector include marketing specialists, advertisers (Campbell et al., 2011; Hipperson, 2010; Rappaport, 2010) and brand managers (Branthwaite& Patterson, 2011), and in the governmental sector decision and policy makers and officials (Kavanaugh et al., 2012; Sobkowicz et al., 2012; Yang et al., 2011) from various areas, such as health and the environment (Bengston et al., 2009; Eysenbach, 2009; Keelan et al., 2010).Monitoring is often specifically the task of public information officers (Sutton, 2009) and closely related to the work of crisis and emergency officials and managers (Coombs & Holladay, 2012; Lindsay, 2010). Moreover, other users of monitoring found in the literature include health professionals and organizations (Chou et al., 2011; Deluca et al., 2012; Laakso et al., 2012), higher education institutions (Zailskaite-Jakste & Kuvykaite, 2012) and researchers from different fields (Boyd & Crawford, 2012). Finally, monitoring tools may also be used by citizen groups (Kavanaughet al., 2012). In this study, however, the focus is confined tomonitoring by organizations and, professionals.

Object and Focus of Monitoring

Monitoring can be targeted according to e.g. stakeholder group (who interacts), type of information(what is talked about), type of message (what kind of interaction is going on), or type of social media(where the interaction takes place). Objects of monitoring in Twitter includeelectronic word-of-mouth communication between consumers and businesses (Zhang, Jansen, & Chowdhury, 2011) and community-related information (Kavanaugh et al., 2012). The object of monitoring may be to learn aboutconnections in social networks. With regard to health-related information, for example, it may be useful to know what relationships subsist between people in order to contain the spread of an infectious disease (Eysenbach, 2009). Other kinds of targets monitored have included Facebook posts and comments, community-

related videos in YouTube (Kavanaugh et al., 2012), crisis-related news content in blogs (Sutton, 2009) and radical opinions in extremist forums (Yang et al., 2011).

The focus of monitoring, on the other hand, defines the more specific emphasis of monitoring activities. For example, it could be information prevalence (the number of occurrences of certain keywords or concepts), information incidence (the volume of new information units created per time unit of interest), or concept co-occurrence (occurrence of certain concepts together) (Eysenbach, 2009). Other focuses may be topics, subtopics, associated sentiments, communication patterns (Sobkowicz et al., 2012), changes in discursive patterns over time (Bruns, Burgess, Highfield, Kirchhoff, & Nicolai, 2011), trajectory of retweets (Zhang et al., 2011) or biographical information about those interacting, including influential users (Kavanaugh et al., 2012). Other examples of this are given throughout this report.

Monitoring Process

In the literature, the process of monitoring is described as consisting of certain steps or phases; for example, Bengston et al. (2009) mention five steps for the fast monitoring of issues, while Bruns and Liang (2012) outline three phases for analysing tweets. Below, these and the other steps described in the literature are summarized and explained under four categories: preparation, data collection, data analysis and reporting. In this section they are explained as steps in the monitoring process although in practice the steps to be taken will also depend on the solutions, tools and methods chosen. Methods, tools and solutions for monitoring are explained in detail in the following subsections; here, we focus on the process.

Preparation

The engagement of an organization in social media interaction, including monitoring activities, should, as suggested in the literature, be guided by commonly agreed upon guidelines (Gallaugher&Ransbotham, 2010). Moreover, the choices made throughout the monitoring process depend on the organization's objectives (Rappaport, 2010) and can be explained by reference to specific social media monitoring strategies (Sutton, 2009).

The preparation phase includes the definition of the problem and identification of the issue to be monitored (Bengston et al., 2009). Other considerations are identification of the resources needed for monitoring, including the budget and the personnel to be responsible for

implementing the monitoring activities (Bengston et al., 2009; Rappaport, 2010; Sutton, 2009). This phase also includes identification of timing, including dates and timetable; geographic focus, i.e. where (e.g. country) and on what level (e.g. national or local); and key stakeholder groups who have a stake in the issue and whose perspectives on the issue of interest it may be relevant to know (Bengston et al., 2009).

The preparation phase also involves a choice among the available listening tools and solutions (Rappaport, 2010). Moreover, the message type, e.g. tweets, Facebook or blog posts, to be monitored and the focus of interest in the monitored messages, e.g. favourable / unfavourable attitudes, need to be defined (Bengston et al., 2009). The choice of data sources, i.e. the key media to be monitored, will depend on the problem or issue monitored, time and budget resources (Bengston et al., 2009; Sutton, 2009). The identification of relevant social media platforms may also help in limiting an otherwise overwhelming amount of information (Deluca et al., 2012).

Data Collection

Once the relevant choices in the preparation phase have been made, data in the relevant social media are collected. This can be done via programme interfaces or running search queries which vary from simple keyword searches to more sophisticated searches using e.g. Boolean operators (Rappaport, 2010). The collection of data is preceded by setting the search terms, taking into account possible synonyms (Bengston et al., 2009). Bruns and Liang (2012), in describing the criteria for an advanced, custom-made system for analysing tweets, propose parameters which the end-user needs to fill in the system to initiate the data collection: keywords, or search terms; language; results type, recent or mixed; and frequency of data collection.

In the case of a manual, researcher-driven monitoring process, the search is followed by downloading and/or saving the search results (Bengston et al., 2009). A central step in the data collection process is the archiving of the data collected. This allows not only historical archiving and more analyticalflexibility (Deluca et al., 2012), but also enhances methodological quality, which is especially important when monitoring is conducted for research purposes.

Data Analysis

Following the data collection is the analysis phase. While the use of open-source tools may provide a means to capture the data, the analysis often has to rely on other, either computer-assisted or manual, tools and methods. Specific areas of analysis include general statistical analysis and activity metrics, network analysis, and textual analysis (Bruns & Liang, 2012). The process will, of course, depend on the data and method chosen. An analysis of textual data may focus, for example, on the flow, volume, overall tone and temporal evolution of the discussion (Bengston et al., 2009). The analysis of tweet datasets could focus on frequency over time of tweets, users, keywords, replies and retweets, or changes over time of keywords and phrases (Bruns & Liang, 2012).

Reporting

Last, the findings are reported. The form of the report again depends on the methods and tools chosen as well as the purpose of the monitoring. In a crisis context, for example, publication of the findings should be rapid (Bruns& Liang, 2012). When monitoring is conducted to support decision-making, short and compact outputs may be preferable (Bengston et al., 2009). The presentation of findings should be supported by illustrative visualization, such as bar charts of recurrent topics of Facebook posts, tag clouds on YouTube videos, pie charts of followers and followers of followers (Kavanaugh et al., 2012) or a map illustrating hot zones of blogging activity, including the distribution of activity and overall tone of the blogs (Keelan et al., 2010).

The need for decision-making based on the results of themonitoring is mentioned in several articles (Gallaugher & Ransbotham, 2010; Kavanaugh et al., 2012) but addressed more thoroughly only in one article, where interpretation of the results and selection of appropriate communication strategies are discussed (Coombs & Holladay, 2012). According to Sutton (2009), current processes are too slow to meet the demands of rapidly evolving online arenas, and hence responding to misinformation online is likely to emerge as a critical issue in future disaster management.

Monitoring Methods

The monitoring methods described in the literature cover textual analysis and network analysis.

Textual Analysis

The majority of the articles in the final sample described textual analysis methods in which the researcher has a central role, while other articles gave examples of computerized content analysis techniques. The researcher-driven manual methods and applications are described first, followed by computerized content analysis techniques.

Researcher-Driven Analysis

A common approach to research-driven content analysis of social media interaction,according to the literature, is first to conduct a search in the selected social media and then to analyse the data following different forms of textual analysis. For example, in a study analysing vaccine-related blog discourse in MySpace, data were collected using key words in the blog search engine and subsequently analysed with a focus on the frequency of vaccine-related arguments and overall tone – positive, negative or ambivalent – of the blogs (Keelan et al., 2010). In another study, comments posted on a county government's Facebook page were content-analysed by topic, tweets from local civic organizations were analysed by popular topics and a tag analysis was conducted to YouTube videos pertaining to the county in question (Kavanaugh et al., 2012).

A textual analysis was also conducted in a study focusing on business engagement in Twitter, where tweets were classified into six groups: humorous, anecdotal, philanthropic, news, philosophical, and promotional (Zhang et al., 2011). Moreover, Bengston et al. (2009), in explicating their rapid issue tracking approach, give examples of cases where data from diverse online news media sources were collected via search and then analysed for e.g. main beliefs and favourable/unfavourable attitudes towards the issue of interest. Bruns and Liang (2012) describe content analysis of tweets, where the focus is on the keywords, terms and phrases used in order to map e.g. the overall distribution of keywords, and the occurrence over time and co-occurrence of keywords.

A different approach was taken in a study on cancer survivor stories on YouTube, where a narrative analysis covering both thematic (content-level) and discursive (linguistic-level) elements was conducted on transcribed video clips (Chou et al., 2011). The authors propose their method as a complementary technique to traditional content analysis, which could also

be conducted through a semi-automated coding scheme using natural language processing and computational techniques.

Computer-Assisted Analysis

Next to researcher-driven, manual analytical techniques are techniques involving software tools and programmes. For example, in a study on comments about consumer-generated ads on YouTube, first, a correspondence analysis was conducted with WordStat, a content analysis software program, to map brand personality dimensions, and second, a Bayesian machine learning-based content analysis was conducted with Leximancer, a software tool enabling both a thematic and relational analysis of the data, including main concepts and their interrelations (Campbell et al., 2011). In another study, machine learning and semantic-oriented approaches were combined to identify radical opinions in extremist web forums using four types of text features – syntactic, stylistic, content-specific, and lexicon – as text classification predictors, and three classification techniques – SVM, Naïve Bayes, and Adaboost (Yang et al., 2011).

Moreover, a paper presenting an opinion formation framework in which content analysis of social media is one building block proposes a combination of natural language processing (NLP) and semantic web approaches (SW) to detect political opinions, including topics and sentiments, automated in real time (Sobkowicz et al., 2012). However, the use of computer software and tools and the development of these techniques also involve researcher-driven efforts, as for example machine learning based methods may require a large amount of manually labelled training data to ensure accurate learning (Yang et al., 2011).

Statistics and metrics can add to the analysis, for example, in the case of Twitter, time-based metrics can be used to calculate e.g. the volume of tweets and keywords over time (Bruns& Liang, 2012).

Network Analysis

Besides methods that are used for analysing textual data online, the literature describes network analysis as another approach for analysing how information spreads in the social media. For example, a paper reporting research results on the networked public sphere in Australia, describes methodologies for mapping the blogosphere and tracking information

dissemination (Bruns et al., 2011). The described approach includes: (1) web crawling to identify networks of links combined with manual coding to refine the link lists, (2) automated content harvesting through Really Simple Syndication (RSS) feed alerts to capture new blog posts, (3) distinguishing blog content from other content, e.g. comments and the blogroll, using custom-made tools, (4) conducting textual analysis via e.g. automated concept mapping tools, and (5) combining textual analysis with link network mapping to produce both long-term maps and snapshots of current activity, including interlinkages and themes.

A related article describing French political blogging focuses on two types of networks: blogroll link networks describing the more permanent set of connections between blogs, and in-post link networks representing topical discussion networks in the blogosphere (Highfield, Kirchhoff, & Nicolai, 2011). Bruns and Liang (2012) describe different approaches to the network analysis of tweets: user-to-user messaging networks and keyword co-occurrence networks for homogenous networks; and user-and-URL networks, user-and-keyword networks, and user-and-hashtag networks for hybrid networks.

Tools and Solutions

Tools and solutions for social media monitoring include publicly available, open-source tools, and custom-made tools. Most of the ready-made tools focus on the content and frequency of the information shared while some also measure emotions in sentiment analysis. An issue which currently limits research in this area is the fact that many studies employ custom-made or commercial tools; these are discussed only to a limited extent and thus cannot be scrutinized, replicated nor learnt from by other researchers (Bruns & Liang, 2012). Therefore, a more systematic and open discussion on the research tools available is called for. The division of tools into free, open-source vs. often expensive custom-made tools also sets the border between more limited solutions vs. more advanced systems (Bruns & Liang, 2012).

Currently available tools and solutions mentioned in the literature include dashboards services that provide an overview of online activities, such as HootSuite, Netvibes and Trackur. A study on social media use by government officials showed that at that time geo-mapping features, in particular, were lacking and cited the open-access place-based application Locast as an example of emerging new solutions (Kavanaugh et al., 2012). Other

open access options for social media monitoring mentioned in the literature includevarious search solutions offered by Google, the Social Mention platform for tracking news, blog posts, videos and images, Addict-o-matic (Zailskaite-Jakste & Kuvykaite, 2012), Technorati.com for searching blogs (Bengston et al. 2009), and BotBox, a commercial tool for online news content, including blogs (Sutton, 2009).

Analytical tools for Twitter mentioned in the literature includeTweet Archivist, 140kit (Kavanaugh et al., 2012) and TweetDeck, an aggregation tool (Gallaugher & Ransbotham, 2010). Bruns and Liang (2012) discuss your Twapperkeeper (now in HootSuite), for tracking Twitter activities through its Application Programming Interface (API), the search API and the streaming API, and point out that the data analysis relies on additional tools and the analytical skills of the researcher. Other tools mentioned include Gawk, an open-source command-line tool which can be used to further process data into e.g. tweet statistics and metrics (Bruns& Liang, 2012), and the open source visualization tools Wordle, used also for YouTube video tags (Kavanaugh et al., 2012), and Gephi for visualizing networks, used for e.g. Twitter datasets (Bruns & Liang, 2012) and blogs (Highfield et al., 2011). The development of tools concerning social media monitoringis rapidand consequently new software mergers and names may arise.

Methodological Issues

Methodological issues may apply to more aspects of the social media monitoring process, but here they are explained in relation to research subjects, data, tools, type of social media, and sample.

Issues Related to Research Subjects

According to Bruns et al. (2011), the debate on ethics when crawling, tracking, and capturing social media content is only just starting. In fact, ethical questions are important throughout the process, from data collection to publication (Boyd & Crawford, 2012).

Ethical issues which have to do with research subjects, i.e. people whose interaction online is being monitored, centre on issues of privacy and informed consent (Eysenbach, 2009). According to some authors, the fact that social media content is publicly available does not mean that the producers of such content intended it to be utilized by anyone, and probably

rarely think of researchers as a target audience (Boyd & Crawford, 2012). This may also depend on the type of social media used, as Twitter is more clearly recognizable as a public place than Facebook, for example. Privacy issues may be especially sensitive in the case of disasters and emergencies (Lindsay, 2010), as some people stop tweeting when a crisis occurs, for example, to prevent theft in the case of an evacuation. Although it would not be reasonable to require consent from each person engaging in online discourse, these are questions that needto be tackled in research ethics and methodology (Bruns et al., 2011).

Issues Related to Data

Other methodological issues, related to accuracy and objectivity, have to do with the data being collected. The accuracy of large data sets drawn from the internet may be threatened by the fact that they are prone to outages and losses, and thus unreliable (Boyd & Crawford, 2012). The limitations of data collected in the social media have also to do with the limited archiving capacity of certain social media (Bruns & Liang, 2012). Due to the difficulty of studying historical events via e.g. Facebook and Twitter, researchers may more likely end up studying issues located more in the present or immediate past (Boyd & Crawford, 2012).Moreover, subtle meanings, attitudes and motivations are hard to interpret and understand (Branthwaite & Patterson, 2011). Among other things, this has to do witha lack of contextual information. When taken out of context, data, such as large data sets of networks, may lose or change their meaning (Boyd & Crawford, 2012). An accurate interpretation of plots and maps produced by complicated software may also be challenging (Campbell et al., 2011),leading to apophenia – the identification of patterns where they do not exist (Boyd & Crawford, 2012). The potential malicious use of social media, e.g. intentional provision of inaccurate information by terrorist groups or mischievous individuals may also threaten data accuracy (Lindsay, 2010).

Aconcern related to the data being collected is limited access. The right to social media data is often owned by (internet) companies which restrict access to the data in keeping with their own interests (Boyd & Crawford, 2012). Limited and paid access to research data creates a divide between the industry and the academy and hinders evaluation of the methodological claims of such studies (Boyd & Crawford, 2012.). The same goes for many of the tools and solutions used for gathering and analysing data in social media studies: limited access to

custom-made tools undermines the replicability and translatability of such studies to other contexts (Bruns & Liang, 2012).

Issues Related to Tools and the Type of Social Media

Data scalability issues in the case of tools arise from the enormous diversity, speed and volume of social media data, which challenge their storage and analysis (Sundaram et al., 2012). In particular, two areas are affected, storage space and computing power (Bruns & Liang, 2012): tools should be designed in such a way that they are able to continuously up-scale both of these. A critical factor for emergency situations, on the other hand, is a potential power outage, which could hinder the effective use of social media and other technologies (Lindsay, 2010).

The limitations of the existing tools and social media functions mentioned in the literature include the failure of available solutions to recognize subtle emotions, such as humour, sarcasm, irony or provocation (Sobkowicz et al., 2012), and the limited search functions of e.g. Facebook (Boyd & Crawford, 2012). In the case of Twitter, the limited archiving capacity necessitates immediate and on-going monitoring when an issue of interest, or a sudden event, like a crisis, takes place (Bruns & Liang, 2012).

Issues Related to the Sample

Sample-relatedmethodological issues include the representativeness of the sample and generalizability of the findings. For example, the amount of information that can be retrieved per minute is much smaller than the amount that is being produced (Sundaram et al., 2012). As a result of these technical limitations, the quality of the sample may be hard to evaluate. In Twitter, for example, no dataset of tweets can be guaranteed to be comprehensive (Bruns & Liang, 2012).

Moreover, social media users do not equal whole populations of people. For example, in a study on cancer survivors' narratives on YouTube it was found that the video posters were mainly upper-middle-class Americans of European descent (Chou et al., 2011). Furthermore, in the case of e.g. blogs, the culture prevalentin thesocial media influences people's self-presentation enabling them to create multiple persona, exaggerating and transforming their everyday personalities (Branthwaite & Patterson, 2011). These challenges related to sampling

increase when multiple datasets are combined: when the source is unknown, understanding the sample is hard, and a larger sample is not necessarily a better sample (Boyd & Crawford, 2012).

Trends in the Literature

Although the literature search was broad, the number of relevant articles found was somewhat limited, confirming that this is a young area of research. The final sample comprised 24 articles published during the years 2009–2012. The articles were distributed by year of publication as follows: three in 2009, five in 2010, seven in 2011 and nine in 2012, indicating a growing interest in the topic.

The majority (14) of the articles included empirical data, the rest being coded as non-empirical. Of the empirical articles, four were based on a case study methodology. The non-empirical articles consisted of a diversity of article types.

The reviewed topic, social media monitoring, was studied and discussed in various contexts and from several disciplinary perspectives. The articles in the final sample can be divided into four main groups according to the context of application: business sector, crisis communication and management, political communication and governmental sector, and health sector. The volume of coverage across the different contexts was rather equal: business-related issues were addressed in seven articles, while the other groups each contained five articles. Two articles did not fall into any of the four groups.

Next, the focus of the articles and the types of social media studied are treated in greater detail.

Focus of the Articles

The majority (13) of the articles focused on the development of methods and tools. The topics covered included infrastructure for tracking and analysing tweets (Bruns & Liang, 2012), frameworks for opinion mining in social media with respect to modelling, simulating, and forecasting political opinions (Sobkowicz et al., 2012), development of tools for collecting, monitoring, and analysing radical opinions in messages in extremist web forums (Yang et al., 2011), a review of solutions and methods available for social media monitoring (Rappaport,

2010), an approach designed for decision makers and communication professionals for rapid analysis of online issues (Bengston et al., 2009), and progress in the development of methodologies to map blog networks online (Bruns et al., 2011; Highfield et al., 2011).

The second biggest group of articles(6)focused on the use of social media monitoring in different contexts. One was an exploratory study on social media use and analysis by government and community organizations from the perspective of both routine and critical incidents, includingemergencies (Kavanaugh et al., 2012). Other articles addressed, for example, social media use, including monitoring by emergency managers (Lindsay, 2010), and business engagement in online word-of-mouth communication (Zhang et al., 2011).

The development of theories and models was addressed in three articles. In the most recent of these, Coombs and Holladay (2012) introduce a new concept, paracrisis, and explain how to evaluate and respond to paracrises. The other two articles in this group concerned models which explain communication in the social media context, including monitoring (Gallaugher&Ransbotham, 2010; Zailskaite-Jakste&Kuvykaite, 2012).

Methodological discussions were the focus of two articles. One of them discussed methodological issues related to big data in the social media context (Boyd & Crawford, 2012) and the other compared traditional qualitative and quantitative research approaches with respect to social media monitoring (Branthwaite & Patterson, 2011).

Types of Social Media Studied

The social media platform YouTube was addressed in seven articles, e.g. a paper on multimedia semantics (Sundaram et al., 2012), comments on consumer-generated advertisements (Campbell et al., 2011) and a narrative analysis of cancer survivors (Chou et al., 2011). In some articles, YouTube was studied alongside other platforms (e.g. Kavanaugh et al., 2012).

Twitter and blogs were addressed in five articles. These included a paper presenting two approaches for studying Twitter, one an open-source and the other a more advanced, custom-made system (Bruns & Liang, 2012), and a paper studying business engagement in Twitter (Zhang et al., 2011). Articles focusing on blogs addressed e.g. networks of political blogs

(Bruns et al., 2011; Highfield et al., 2011) and vaccine debates in MySpace (Keelan et al., 2010).

Forums and platforms were addressed in four articles (e.g. Yang et al., 2011). Flickr was studied in one article (Sundaram et al., 2012), and monitoring of Foursquare, along with other platforms, in another (Gallaugher & Ransbotham, 2010). Facebook was not the focus of any single article, but appeared in three articles in combination with Twitter and YouTube (Deluca et al., 2012; Gallaugher & Ransbotham, 2010; Kavanaugh et al., 2012).

Conclusions and Preliminary Factors for Monitoring

Monitoring activities are crucial in crisis communication in order to know citizens' needs and to obtain feedback on public perceptions and reactions. Monitoring includes both traditional and social media; however, it is the latter in particular that response organisations need more knowledge about. Information exchange via these new channels has greatly increased over the last few years, and as the numbers of citizens who are active online increase, so also do expectations that authorities will respond to what is going on in the online environment.

This literature review describes rather than attempts to resolve the current challenges involved in social media monitoring. Figure 1 summarizes the main themes found in the literature.

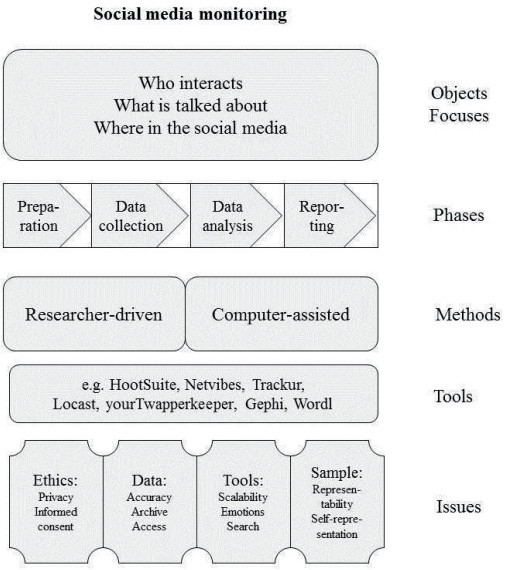

Figure 1 Overview of the main themes found in the literature

Social media monitoring methods can be seen as "listening solutions" that help organizations listen, interpret and respond to what people are saying online (Rappaport, 2010). Monitoring activities reveal who interact, what is talked about and in which media. The monitoring process consists of several steps: preparation, data collection, data analysis and reporting. The work needs adequate and qualified manpower. Textual and network analysis are the main data analytical procedures, and these may be either computer-assisted or researcher-driven. The process is facilitated by tools that currently include Hootsuite, Netvibe and Trackur, and also the open access tools Locast, Gephi and Wordl.

Methodological issues which have to do with research ethics concern lack of privacy and informed consent. Although social media content is publicly available, people may not be aware of this, and requiring the consent of each person involved is not feasible. Another problem is that the large datasets that are often used may not be comprehensive, or access to them may be restricted such as in cases where companies sell the data. Many of the current tools have limited scalability, including lack of storage and computing power, and may allow little inclusion of emotions, or offer limited search and archiving functions.

The publications found were from the period after 2009, and the sample demonstrates that increasing interest has been shown recently in this topic. The majority of the articles included empirical data. The topic has been studied from the perspective of different disciplines. The main foci concern the development of methods and tools, monitoring in different contexts, models and methodological issues. The social media that have been investigated include YouTube, Twitter, blogs, forums and platforms.

The work done so far leaves much to be desired. Tools were discussed only superficially, with the emphasis on methodological issues as well as the requirements, hopes and needs for the development of such tools. In the literature, ethical considerations pertaining to the studies conducted were mentioned in the introduction or discussion rather than reflected upon more deeply, e.g. in the methods section. The results of monitoring were linked to strategy options in only one article, and that on the topic of reputation crises. The relation with strategy is especially important for crisis situations, which require quick decision-making and action. When time is short and emotive reactions may spur people to behave in unpredictable ways, strategic thinking can help to mitigate harm.

Factors relevant for the monitoring of social media in crisis situations:

- Textual analysis is especially useful in seeking to understand citizen viewpoints
- Monitoring follows distinct stages; however, connecting reporting to decision making on communication strategies needs to be added to these
- Computer-assisted methods are needed to cover a large body of messages in real time, but researcher-driven work also continues to be needed
- Many of the tools available are not open enough to check precise procedures
- A combination of social media is aimed at, including e.g. Twitter
- It should be remembered that big samples are not always of good quality
- Monitoring in real time needs specialist manpower around the clock and communication expertise to interpret the results.

Participation in social media interaction begins with monitoring. To do this, authorities need to build accounts, profiles and – more importantly – gain followers before a crisis occurs. This means creating a basis, comprising preparedness, joint communication strategies with

other response organizations and, preferably, a multi-channel approach using different (social) media linked to a dedicated crisis website.

Here the emphasis was on monitoring as a start activity. How to utilise the results of monitoring for communication strategy-making remains a challenge for future studies.

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V

MAKING COMMUNICATION STRATEGY CHOICES IN A FAST-EVOLVING CRISIS SITUATION – RESULTS FROM A TABLE-TOP DISCUSSION ON AN ANTHRAX SCENARIO

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Making Communication Strategy Choices in a Fast Evolving Crisis Situation—Results from a Table-Top Discussion on an Anthrax Scenario

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Abstract: This paper aims at clarifying a timely topic of how communication strategy choices are made in evolving, complex crises, such as those caused by terrorism involving chemical, biological, radiological, or nuclear (CBRN) agents. This is done by examining data gathered from a table-top discussion among crisis communication experts, focusing on a scenario of an anthrax attack and analysed qualitatively. The communication experts followed the evolving crisis situation by gathering inputs from various actors in the crisis management network, thereby creating situational understanding, and interpreted these inputs for decision-making on communication strategies. The underlying process of coping with complexity in evolving CBRN terrorism crises can be described as a continuous, dynamic process that can best be explained with a combination of traditional and more modern crisis communication approaches. Strategy-making in crisis situations by communication experts is still largely a black box. In this study, a novel approach of decomposing strategy-making by observing a table-top discussion is chosen to clarify the process. By identifying the core elements involved, a more detailed picture of communication strategy-making is created, thus promoting preparedness and professional resilience in the field.

Keywords: communication strategies; crisis communication; terrorism

1. Introduction

Today's crises are described as complex and challenging, and are thus different from those of the previous century [1]. These new kinds of crises do not have clear boundaries of space and time: they emerge suddenly and spread in unforeseen ways and directions beyond local, functional, and geographical domains [2]. Global terror networks constitute one source of these new kinds of risks [3], as the November 2015 Paris and March 2016 Brussels terrorist attacks also show. The intensified awareness of terrorist risks in the period following the 9/11 attacks has also provoked increased concern over new forms and means of terrorism [4], including the use of biological agents or other CBRN (chemical, biological, radiological, or nuclear) materials for a terrorist purpose.

The aim of this study is to investigate communication strategy-making in evolving, complex crises, such as those caused by terrorism involving CBRN agents. In particular, the focus is on how communication experts cope with complexity and keep track of such situations and make strategy choices. This goal is approached by examining empirical data collected in a table-top discussion on a scenario of an anthrax attack conducted among crisis communication experts and analysed qualitatively. From a communication practice perspective, the findings create understanding on communication strategy-making during an evolving crisis and so help promote communication preparedness for coping with such emergencies. From a theory point of view, studying communication strategy-making in an ongoing crisis situation adds insight into an area which has been little studied, namely the process underlying decision-making on communication strategies during crises [5].

1.1. Communication and CBRN Terrorism

Communication supports crisis management by public organisations in various ways, including creating understanding of risks and the crisis events; promoting preparedness activities and self-efficacy during a crisis; and creating cooperation in the response network, which comprises citizens, response organisations, and the media [6]. Hence, from a functional perspective, the role of communication is to achieve certain goals or outcomes [7]. Different areas of activities targeted at achieving such goals include monitoring of stakeholder needs, communication with stakeholders, and cooperation in the response network on, for example, coordination and planning [6]. From an integrated process perspective [8], communication in risk and crisis situations concerns the different phases of crises, from preparedness to recovery. Moreover, crisis communication is an ongoing process of creating shared understanding and meanings among and between stakeholders [7]. Given the fact that crisis response in today's society is characterised by a network of multiple response actors [2], a network approach to crisis communication is essential (e.g., [9]).

According to some authors, complex crises, such as those involving terrorism, cannot be explained by the traditional crisis communication theories [10]. What makes terrorism special is intentionality instead of an accidental origin, the uncontrollability of the risks involved, the potential to create widespread harm and damage, including individual risks becoming systemic risks, and the potential to undermine trust and cultivate mistrust in society, leading to a self-multiplication of risks and simplified images of the enemy [3]. In the case of CBRN terrorism, the above is further complicated by CBRN aspects of such crises [11]. A particular feature of CBRN terrorism is the sheer diversity of crisis types to prepare for, scientific uncertainties involving quickly-evolving information, no clear boundaries of time and geographical space, involuntary exposure, and lack of knowledge among public groups [11,12]. As a consequence, strong reactions may be created among citizen groups due to the multiple factors pertaining to the risk perceptions that are triggered [13]. These include emotional reactions, such as fear or anxiety, and behavioural responses that may place people in greater danger than the original crisis event itself [14]. This is a challenge for communication.

Mapping risk perceptions [15] and monitoring them prior to and throughout terrorism events, including traditional news media analysis and opinion polling [16], but above all social media monitoring [17], are thus of primary importance. This is in line with the social amplification of risk model [18], according to which communication does not take place in isolation from the societal context, but should be based on an analysis of multiple psychological, social, institutional, and cultural processes [12,16], including multiple public groups with diverse needs [6]. Preparing for CBRN terrorism crises can be included in an all-hazard approach [19], to avoid increasing anxiety and strengthen resilience [15]. In the case of an ongoing event, the role of communication is, for example, to share up-to-date information about that event, instructing publics on precautionary measures and reassuring them [16], including not only directly involved groups but also the larger, indirectly affected, population. In the aftermath of the crisis, communication can help recovery efforts by, for example, empowering people, helping restore trust [20] in a shaken value system by establishing a vision for the future, and facilitating the healing process [21] and learning.

A full review of communication in the case of terrorist incidents is provided elsewhere [11]. In the present paper, the focus is on communication strategy-making by public authorities for communication with different stakeholders, citizen groups in particular, in the context of CBRN terrorism.

1.2. Communication Strategy Choices

Due to the urgency of crisis events, and of CBRN terrorism in particular, these situations call for quick and timely actions. Communication strategies can be understood as decision-making rules or recipes for reaching communication goals [22] and solving problems [23], or, in the case of crises, those of crisis management. In this study, the focus is on the process of making communication strategy choices, not the strategies as such.

The choice of a communication strategy requires a careful analysis of the situation it aims to resolve [22]. To act quickly, the crisis communication team must make a situation analysis and identify which facts in what otherwise may be an overflow of information are critical for public groups [20]. This calls for a variety of monitoring activities, including news media analysis, public inquiries, poll data, and analysis of social media (see [17]) to determine the public's information needs and, for example, where people are located [24]. The purpose of the analysis is to create situational awareness, which is a prerequisite for decision-making: once there is understanding of the crisis situation at hand, the crisis team can better estimate its effects and decide on the actions needed [5].

Decision-making that is based on an analysis of situational information in a rapidly changing environment is in line with more recent approaches to crisis management and communication, which emphasise, for example, complexity (e.g., [25]) and the art of improvisation and networking [26]. These perspectives also apply to terrorism crises, which are characterised by dynamic and diffuse processes and a need for fast adaptation to changing circumstances, and thus challenge the traditional ways of planning and information processing [10]. While most scientists would agree that the new world of risks and crises requires new ways of understanding and handling them (e.g., [1,2]) where linearity of communication has been replaced by the process approach of continuous action and interpretation [26], how the process of making strategy choices in this new context unfolds, is still largely a black box.

This paper consists of five parts. Following the introduction, the method is explained, including data collection, analysis, and background information on the participants. Section 3 presents the findings of this study, Section 4 consists of a discussion, and Section 5 concludes the paper.

2. Method

The aim of this paper is to clarify how communication experts cope with complexity in evolving and complex crisis situations, such as those involving CBRN terrorism. In particular, the aim is to find out how experts follow an evolving situation and how they arrive at decisions about the communication strategies to employ in complex crises. The research questions are as follows:

RQ1 How do communication experts follow a rapidly evolving and complex crisis situation?
RQ2 How do communication experts decide on the communication strategies to implement in such crises?

2.1. Data Collection

The data for this study were gathered from a table-top discussion that formed part of a workshop organised in Berlin in March 2014 in connection with the international project CATO (CBRN Crisis Management, Architecture, Technologies and Operational Procedures). The workshop comprised three parallel sessions where policy and decision-makers, health responders, and communication experts gathered to discuss CBRN crisis management issues from different perspectives. This article is based on data gathered from the workshop conducted among the communication experts.

The purpose of the workshop was two-fold. It aimed on the one hand at gathering input for communication guidelines and other materials produced for the purposes of the project, while on the other hand aiming at gaining insights for scientific purposes on communication strategy-making in complex crises, such as CBRN terrorism crises. This paper focuses on the data gathered in pursuit of the latter aim. As CBRN terrorism events are rare, a table-top discussion was considered an appropriate venue for data gathering. Moreover, in comparison to interviews, for example, observation of experts' actions was considered to produce more reliable results than simply asking them questions. Seven experts from five different European countries took part in the workshop. They were selected using a purposive strategy (e.g., [27]). The main selection criteria included (1) expertise in the field of crisis communication and (2) experience of CBRN issues and/or strategic communication.

The table-top discussion was organised in consecutive sessions, simulating an escalating crisis. Each session lasted approximately one hour and was preceded by an introduction in which the

scenario timeline and most important events pertaining to the session in question were explained. The task of the communication experts was to discuss any communication issues that they considered relevant. The discussion was led by three moderators, two whose task was to enable the experts to express themselves freely, while the third took notes. Only a few intermediary questions and comments were posed if, for example, the discussion got stuck on one point or further clarification was deemed necessary.

A fact sheet on anthrax was provided as support material. Moreover, a social media platform with a simulated stream of social and news media feeds was projected on the wall with the purpose of providing further input and to stimulate discussion. The discussion was both tape-recorded and videotaped with a panorama camera allowing a 360° overview of all the participants simultaneously. Moreover, two researchers observed the discussion and took notes. Following the principles of ethical research, an informed consent form was signed by all the participants before the workshop began.

The table-top discussion was based on a scenario of an evolving anthrax attack. The scenario was developed by a senior consultant on global health security and bioterrorism together with researchers and CBRN specialists working for the project. The scenario timeline was in three parts according to the phases of a crisis: (1) warning; (2) response; and (3) recovery. The first sequence focused on the warning phase and initial impacts, and included the first few hours of the crisis with a period of uncertainty. To begin with, the participants were shown two news items reporting a situation in Brussels where 14 employees of the European Parliament had been admitted to hospital. Two persons had died and a diagnosis of anthrax was being considered, including speculation on the possibility of a bio-terrorist attack. The second sequence, pertaining to the response phase, illustrated the situation on the next day, including the spread of the disease and an increase in the number of victims to over 1000 with 250 deaths. This phase was also marked by problems of access to health facilities and hospitals, fears among the population with many trying to leave the city, overwhelmed transport hubs and much confusion concerning the situation. The third sequence focused on the recovery phase, at day five, at which point many had died, while a large part of the population were still in the contaminated area. Moreover, questions were being asked by different publics concerning medical care, food, and water. Emergency responders were worried, and there were also significant international concerns, including offers of assistance from other countries.

2.2. Experts' Background Information

Seven communication experts took part in the table-top discussion. They came from five different European countries: Belgium (1), the Netherlands (2), Norway (2), Romania (1), and Sweden (1). The participants included two crisis communication experts, an EU project researcher with NATO experience, a senior project manager, a senior communication advisor, a press officer, and a communications director. Six of the seven participants were women. The experts were invited on the basis of their extensive experience, ranging between 6 and 18 years, in the field of crisis communication and management.

2.3. Data Analysis

First, the recorded video tapes were transcribed. In the next step, the transcripts were read through and colour-coded according to the research questions. The colour-coded rtf files were then exported to ATLAS.ti (version 7) qualitative data analysis software (by Scientific Software Development GmbH, Berlin, Germany) for further analysis.

The analysis was conducted drawing mainly on thematic analysis (e.g., [28]). This was done following both deductive and inductive approaches; the research questions and the structure of the workshop created a basis for analysis which was further complemented by open coding of the discussion. First, in ATLAS.ti, the colour-coded text segments which contributed to the two research questions were further coded. This was done per phase, as each workshop session, representing a different phase of the crisis, was covered in a separate document. After this, the coding was further

refined with the help of the colour-coded transcripts in Word, including a large table in which the running transcripts were accompanied by all the codes to see the overall evolution of the discussion across the three sessions.

Next, with the help of the network view of ATLAS.ti, all the codes were brought together in an overview. Codes were grouped according to the research questions and further segmented and categorized, following principles of inductive thematic coding and analysis, in order to capture key concepts and themes and underlying patterns [29]. During this process, the codes were also further streamlined, as new codes were created and overlapping ones discarded. Finally, the resulting main themes and topics were brought together and listed in a separate word file. These are described in the next section along with illustrative quotations from the participants' speech.

3. Results

In this section, the main findings of this study, based on the analysis of the empirical data gathered via the table-top discussion on the scenario of an anthrax attack, are reported. The discussion had an atmosphere of urgency and engagement, and was lively. Owing to the open structure of the discussion, the experts were able to take many different directions in addressing the communication issues they deemed relevant. Their high level of expertise provided fertile ground for the discussion. Perhaps due to their different backgrounds, both professional and cultural, disagreements also arose at times. Nevertheless, rather than remaining in contradiction, these conflicting views ultimately complemented each other, producing rich data.

Below, the results are summarized and some illustrative quotes are presented. Section 3.1 offers answers to the first research question by explaining how the communication experts followed the evolving situation. Section 3.2 focuses on the second research question and describes how the participants made communication strategy choices in the course of an evolving crisis situation.

3.1. Following the Situation

Throughout all the phases simulated in the table-top discussion, the communication experts tried to keep track of the situation and the evolving crisis event by gathering input and creating situational understanding with those inputs.

3.1.1. Gathering Input

Gathering input is an ongoing process. In order to monitor the evolving situation, the communication experts expressed a need for information, which is especially pressing at crisis onset. Moreover, the gathering of information and other input is described as a process where *giving and receiving* alternate:

> "[. . .] we gather information, two things, we are monitoring the outside world, and we are gathering all the information which come from us, from experts, and from other people, so we have an information manager, outside, inside, and we bring it together, from the information we go to a strategic level, we think what are we going to give back, strategic thing [. . .]" (P3)

Often the information that they need is something the other actors in the *response network* possess. The party that they most need liaison with is health experts. The *information needs from health responders* included, for example, the incubation time of the disease, possible spread and risk zone, the number of victims, decontamination procedures, available treatments (e.g., antibiotics *vs.* vaccination), including their availability and sufficiency, and health advice that could be provided to public groups.

> "I think one of the big challenges will be to get the advice from the health group, like how you should deal with all the clothes and everything, to be as simple, as clear, so that everyone learns it, like three basic advices about [. . .]" (P2)

Moreover, information is needed on the health responders' actions and decisions, such as evacuation from or quarantine in the city where the attack took place, and the overall health strategy.

Information is also needed on related *crisis management decisions* and views regarding, for example, closing off the subway stations, and the level of threat and the risk of repetition. Moreover, the *experts' own networks* also serve as a route for exchanging information:

> "There is such a thing as the health communicators' network from [a name of an institution], I'm a member of it, so in a crisis situation like this, we would activate that, and, and give each other information, so if something like this is going on, we immediately get information [. . .]" (P5)

However, one of the experts stressed that in addition to information from other experts, the communication experts also *gather their own information*:

> "[. . .] I think we have a double role, we are not only waiting for information from them, we are going to gather our own information, and that's what, how is it landing in the world, first in Brussels, in politics [. . .]" (P3)

3.1.2. Creating Situational Understanding

In their attempt to understand the evolving crisis, the participants went through and listed what they know about the situation. As by day two of the crisis case, the response phase, some of the uncertainties have been resolved and more facts can be listed, the creation of situational understanding is easier than in the warning phase.

> "[. . .] now we know a lot, we know where, we know how it worked, and if you, maybe, we also can say, we stopped it, I mean it has affected most people, and probably because of incubation time lots of people will get ill and even more will die, but we have the source right now [. . .]" (P5)

> One expert pointed out that there are *two levels of analysis*: "[. . .] one is the level we know now, and the other level is what can we expect." (P3)

Moreover, the participants sought to further *understand the crisis case* at hand looking at it from different angles. For example, they identified it as an international case which needs communication across borders. Regarding the risk type, it was concluded that since the bacterium itself is not contagious, infection is possible only through direct exposure to the source or the spores. There is a sense of urgency and uncertainty caused by the potential terrorism aspect of the crisis which can be seen in the social media stream of public discourse:

> "Symptoms and terrorists, these are the most common words, symptoms and terrorists, this is uncertainty case." (P7)

Stakeholder analysis is something that needs to be done both initially, and also as the crisis evolves, and includes the identification of relevant publics:

> "What we have to do at this stage is that we identify the publics, and one of the most important publics here is international community [. . .]" (P7)

Moreover, *public information needs* need to be analysed, which also guides communication. Regarding public groups, analysis of *public discussion* and *publics' perceptions*, *reactions* and *concerns* were also mentioned:

> "[. . .] what you see is that outside the organisation, you see a lot of public worries." (P3)

> "This is risk perception, and we know from all our studies that anthrax and bio is the [shows with her hands: the biggest thing]." (P1)

Analysing *social and news media* is a way for communication experts to gather their own information and to find out what people are thinking in order, for example, to formulate strategic advice and to correct inaccuracies.

From the information that the experts have gathered or received, they also *identify issues* that may need to be addressed in their communication. Some of these relate to practical matters, such as transportation or treatment, others to more intangible issues, such as emotional response in society:

> "And I also think we have to remember that two very different kind issues have to be communicated, one thing is the practical thing with the infrastructure and people getting out and in, and want hospital treatment and everything, but the other one is their feeling of safety, I mean this is a threat to the country, and how does that impact people, and what do they need to know to be sure that if it is gonna happen again or where can I be safe in my country, it's two very different type of issues to communicate, I think." (P2)

Other issues mentioned include the risk of repetition, having enough vaccination, prioritisation of treatment, problems of triage, mourning in the risk zone, the image of the attacked city, inadvisable self-evacuation, long-term risk of contamination, people who do not get the right information in time, problems related to insurances, disruption of families, large numbers of victims and the blame game about who is responsible.

Other ways of working with the information gathered cover *verifying the source* and the information that is provided in the news by, for example, *comparing different sources*. This relates mainly to the early phase of the crisis, when the experts do not yet have official information on the nature of the attack:

> "[. . .] the most important to start with is, is never a journalistic article about something, you know if you're responsible for communication, you get this, you take this information that you got as a rumour, and you have to check it, and then you get a real original source of the information, you get an access to the primary sources of information [. . .]" (P7)

By trying to understand the situation, *meanings* are further *clarified*, referred to by one expert as "sense-making". *Considering* different *scenarios* and *comparing* the situation at hand with *previous cases* is commonplace in the later phases of response and recovery. *Worst-case scenarios* are analysed, for example, with regard to the possible terrorist origin of the crisis:

> "[. . .] if the police have three suspects for this [. . .] you have to think about the worst case scenario, you have to think ahead [. . .]" (P2)

The list of cases referred to by the participants in their efforts to find points of comparison with *earlier crises* was wide, ranging from H1N1, the Marburg virus, tsunami, Q fever, 9/11, the Qoiânia accident and the poisoning of Alexander Litvinenko to the London bomb attacks in 2005. On the need to reassure the public, 9/11 was mentioned:

> "[. . .] like you know the, after the 9/11, the president says we are going to stand together, and all that kinds of messages to the, to the population of Brussels, to keep calm and carry on, you know, who will give that kind of message [. . .]" (P2)

3.2. Making Communication Strategy Choices

Communication experts make strategy choices by interpreting the diverse inputs that they have gained at various points during the evolving crisis event. They consider situational information from different sources, consider effects and scenarios, prioritise issues, weigh goals and principles, and balance their choices with the help of preparedness plans, roles, and responsibilities.

3.2.1. Interpreting Diverse Inputs

Choices based on an analysis of the situation include those based on information gathered by analysing the outside world, such as information on the *needs and perceptions of* different affected *publics*:

> "[. . .] do you think that people want to have a memorial, I am not saying that I don't agree, but I say that you have to read the outside world, and then come with you communication, communication actions [. . .]" (P3)

Moreover, the decisions made by communication experts are guided by the *actions and decisions of other actors* in the crisis situation and the information they have provided regarding, for example, the type of risk in question. When discussing the formulation of messages concerning long-term risks, one expert stated:

> "This message must be based on what we hear from our colleagues from health but also from policy and decision makers because maybe, health department, or maybe some kind of ministry says okay, everybody who is a victim will get a thousand euros, we don't know that." (P5)

What weighs more heavily in the balance—the situational analysis obtained from other actors or an *analysis* of, for example, social media *by the communication experts* themselves—is not always clear and varies from one expert to another. One expert put it thus:

> "[. . .] what for me is a problem because we are all experts, but we are not acting now based on what is the sentiment in the community of this moment, and that information I am missing now. [. . .]" (P3)

3.2.2. Timing and Stakeholder Needs

What seems to matter a great deal in the process of making strategy choices is *timing*, which was mentioned by many of the experts:

> "Also timing is really important, when do you release these fact sheets [. . .]. If you release them too early, then you may make panic, you know, you have to be really careful for the timing." (P7)

As a prerequisite for timely communication, roles and responsibilities should be clear, including a mandate for independent action by the communication experts:

> "[. . .] we should have to say that communication officers always should be ready to communicate without any special statements from the decision makers because maybe it will take another day before they confirm it's anthrax, maybe it takes another day before they confirm that it's two dead, but we still have to communicate something, that's the same problem in all the crises." (P2)

Stakeholder analysis, who the relevant stakeholders are and what they expect, guides the strategy-making process from preparedness to recovery, including, for example, defining risk groups, and targeting those who are directly or indirectly affected. In a situation where risk groups have not yet been defined:

> "[. . .] now strategy is be open, direct, mass, because we don't know who were at that place at that time [. . .]" (P3)

Moreover, public communication should be based on the *information needs and previous knowledge* of the publics:

> "[. . .] maybe we should start by giving information to the public about what is anthrax because anthrax is well-known for terrorist attacks [. . .] but I don't think many people will know actually what it is [. . .]" (P5)

Sometimes security concerns and classified information restrict what can be communicated to the publics and overrule the latter's information needs.

A factor that may change over the various phases of a crisis is the *scale of the crisis* and the *level* on which to conduct communication activities, which can range from the international to the national level, and from the central government to the regional and local level. Regarding recovery efforts and communication one participant suggested:

> "And we have to decrease the level from which do we communicate in this case, it's not anymore from the government level, but I would suggest, I don't know maybe to establish one agency or one group [. . .] to take care over for all these questions." (P7)

3.2.3. Considering Effects and Scenarios, Prioritising Issues

In the process of making choices about communication actions to be taken, the participants spent a lot of time weighing the effects of their possible actions when, for example, providing information to the public:

> "[. . .] transparency—if we have information that is important to the public, we share it directly, but we think about the effects of that information, so we give it in the form that is suitable for the different stakeholder groups." (P3)

The effects that were given most consideration included those on the health sector as a result of people's *behavioural response* to the crisis. Regarding the release of information on anthrax and its possible treatment, it was pointed out:

> "[. . .] we have to be really sensitive toward what kind of general information about anthrax we're going to release, because, for instance, if you release the information that antibiotics [. . .] are used to prevent the threat of anthrax, it will be a huge, you know . . . " (P7) "Queue at the pharmacy." (P1)

Moreover, the *emotional response* of public groups can be a result of over-dramatizing or frightening people with too much or unsuitable information, as was discussed, for example, regarding communication on the long-term risks of contamination:

> "There is an effect, if you are directing your communication for the long-term in this kind of regulation, the effect can be contrary to what you want, because you frighten people [. . .]" (P3)

Thus, *how much*—neither too little nor too much—is said and communicated to publics is critical. Possible *scenarios* in deciding about communication strategies were also mentioned:

> "[. . .] we need to know the long-term scenarios in health, in reputation, in all the issues which are a challenge for us. Based on that, we can come with a long-term communication strategy [. . .]" (P3)

Prioritisation of issues in terms of the order and timing of communication was also discussed regarding, in particular, people's health and safety:

> "[. . .] maybe the terror thing isn't the one first thing they need to say something. Yes this is serious. And what is really important for us to say is that, have you been to this station, you need to do that, and then in the end maybe, answer questions about the terrorism. But if the journalists start asking about terror, I think our advice should be, what we are concerned about, are people's health [. . .]" (P4)

3.2.4. Weighing Goals and Principles

When discussing what actions to take and why, some goals and principles underlying certain choices of action were discussed. In the beginning of a crisis, the urgency of communicating something immediately is, for example, justified by the need to *make rapid contact* with all the parties involved and to *take the lead* or control over the situation:

> "[. . .] if you don't say something immediately, you lose control, then you'll be at the back seat, and somebody else takes the lead." (P6)

Moreover, the objective of advising and informing other countries about the situation is to *create preparedness*, and thus also *mitigate the spread of fear*. *Empowering people* to act so as to make them feel in control of their lives after a possibly traumatic experience and enable them to express their emotions in a safe environment was mentioned as an important goal in the later phases of the crisis.

> "And if you give people some action to do, they feel they can take back a little bit of control again, it's a psychological aspect of that." (P6)

Reassuring people and helping them to carry on with their lives and *addressing* their *concerns* in the long run were also mentioned. This includes accounts by authorities in the aftermath of the situation detailing what the crisis has taught them. According to one expert, a specific strategy is needed to *avoid* the affected city being subjected to *stigma*:

> "We have to design also a strategy that will help us not to put a stigma on the city as well, because stigmas are really, we know from the radiological accidents, for instance Qoiânia, their economy dropped completely after the accident [. . .]" (P7)

Regarding principles, it was pointed out that communication should be *constant* and *take place despite uncertainties*:

> "You have to communicate when there is a threat to the people, whether you have access to information or not, you have to say something to the public." (P2)

Once information is available, *transparency* and *openness* are mentioned in sharing it:

> "[. . .] I don't think that we can have information, and not share it, so I think we should share everything [. . .] (P5)

Sometimes the principle of openness contradicts with the requirement of providing *complete information* and necessary facts:

> "But complete information, when and why and all this stuff, we have this problem with iodine tablets [. . .] people have these iodine tablets and they know that they are, they are available there, but then if they don't take them at the moment that we say this to them, they're not useful, so, it's important that we communicate full information about this, not only partial." (P7)

Moreover, messages should be coordinated with other actors in the network to ensure *consistency*. *Ethical principles* come into play, for example, in ensuring that all relevant language groups are reached. *Emotions* should not be forgotten in messages, and sometimes there is a need for direct communication. Finally, *timeliness* as a principle when deciding about communication with the public was mentioned:

> "[. . .] in a crisis what we all say, you have this golden hour which you have, to need to get your facts straight and to give information to the public [. . .]" (P5)

3.2.5. Seeking Guidance from Preparedness Plans, Roles, and Responsibilities

Not all decisions need to be made in the heat of the moment, but *plans* can also be made that can guide decision-making during the crisis situation and that may be especially helpful in the beginning of the crisis to activate crisis communication:

> "[. . .] there are all kinds of plans to work with, [. . .] there are channels to use, for national information, so we are going to do it, we are going to start [. . .]" (P3)

Moreover, *roles and responsibilities* that are defined in preparedness plans and/or readjusted in the beginning of the situation and to some extent re-negotiated as the crisis evolves can also guide decision-making on communication strategies. On communication about a mass funeral, the experts discussed some of the difficulties:

> "[. . .] we are the ones who need to communicate to somebody: 'I am sorry your, your father and sister will not have decent funeral' [. . .]" (P5)

> "Is this our responsibility?" (P3)

> "No, we're the ones . . . (P5)

> "I hope it's part of the health strategy." (P3)

> "Yes, but we're the ones who have to tell them, how do you do this—by press statement? That's very impersonal." (P5)

Insofar as the crisis situation matches existing plans, communication strategies can also be predefined and relevant stakeholders identified in advance:

> "[. . .] we should not stay in sending information, there is a point, and then you need your strategic plan, and you need your evaluation of the stakeholders, to do on, what moment do you stop sending and..." (P3)

> "Start receiving." (P5)

> "Precise." (P3)

4. Discussion

For analytical clarity, and guided by the formulation of the two research questions, the topic of how communication experts cope with complexity in evolving CBRN terrorism crises was split into two parts: (1) following the evolving situation and (2) making communication strategy choices. To describe this process and to summarize the main findings of this study, a figure is presented (see Figure 1). This may give the impression that the process represents a continuum from 1 to 2, as it is sometimes described in the literature: situational awareness as "a prelude to decision-making" [5]. This was not, however, the case. Instead, the participants tended to switch back and forth from gathering inputs and interpreting them to deciding about actions, and back again to a situation where more information was needed to further clarify the situation at different points in the evolution of the crisis situation.

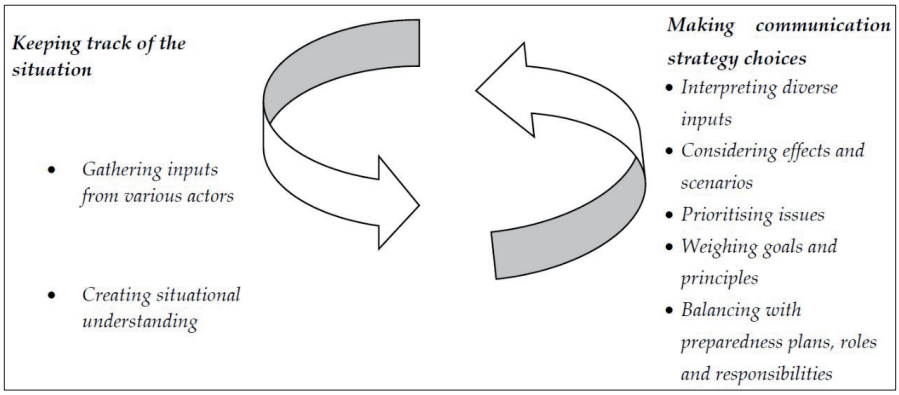

Figure 1. Overview of core elements in coping with complexity in evolving crises.

Hence, the figure shows that in complex evolving crisis situations, such as those involving CBRN terrorism, coping is a continuous, cyclic process. In the figure, keeping track of the situation and deciding on communication strategies are not separate steps along a linear continuum but overlapping, interacting parts of a dynamic whole. Moreover, the process of strategy-making is decomposed so as to illustrate the core elements involved.

The findings of this study provide insights on how the experts cope with an evolving crisis situation by detailing the core elements involved and illustrating the actual process. The results of the study fit in with a process view on crisis management and underline some recent views about crisis management and communication according to which current crises, such as terrorism, are especially complex, dynamic and challenging [1,2]. As a consequence, crisis teams often operate in challenging conditions, under pressures of uncertainty, stress, and urgency. This results in a situation where a traditional process of planning [10] or ideal models of decision-making may not always apply [5]. To complement preparedness, flexibility in the face of changing circumstances is needed, reflected in what Gilpin and Murphy [25] describe as a complexity perspective and adaptive strategies of (1) remaining continuously informed about evolving conditions; (2) maintaining dynamic networks beyond organisational boundaries; and (3) cultivating flexibility to re-orient and act as a consequence of new circumstances.

While the overall process described in the figure reflects more modern approaches of flexible crisis management and communication, some of its elements are also in line with traditional perspectives [26]. In fact, some views presented by the communication experts continued to express characteristics of older crisis communication thinking ([26], p. 523). For example, guidance was sought in preparedness plans and in previously assigned roles and responsibilities. Therefore, what the figure contains is a combination of traditional and modern views in coping with complexity in evolving crises, such as those involving CBRN terrorism. This is in accordance with Falkheimer and Heide [26], who speak about flexible plans and continuous training.

One could question if the findings of the study are specific for complex crises, such as CBRN terrorism. The process and the core elements might be relevant for other crises also, but they are especially important for the more severe kinds of crises, such as CBRN terrorism, where urgency, emotional overload, high damage potential, and a large response network, among other things, call for a need to have a strong basis in preparedness—but in combination with an ability to stay open and flexible to act in the face of uncertainty, complexity, ambiguity, and evolving conditions. How CBRN terrorism crises evolve is especially difficult to predict, which calls for a high level of flexibility.

5. Conclusions

The aim of this study was to clarify how communication experts cope with complexity in evolving and complex crisis situations, such as those involving CBRN terrorism. In particular, the aim was to find out how communication experts follow an evolving situation and how they come to choices about communication strategies during such crises.

The research problem was approached by two research questions which were analysed in the light of data gathered from a table-top discussion among crisis communication experts focusing on a scenario of an anthrax attack. In answer to the first research question it was found that communication experts keep track of the evolving crisis situation by gathering diverse inputs from various actors in the crisis management network as well as from their own sources. Gathering inputs is a process where giving and receiving alternate. Moreover, communication experts create situational understanding by bringing those inputs together in their attempt to clarify the situation and the crisis case at hand. This includes stakeholder analysis, and analysis of the affected publics' information needs, perceptions, reactions, and concerns through, for example, social and news media analysis. Moreover, the experts identify issues, verify information and its sources, and consider different scenarios. The situation at hand is also compared with previous crises of various kinds.

Regarding the second research question on how communication experts make communication strategy choices in CBRN terrorist crises, it emerged that they interpret various inputs, gained both from the actions and decisions of other crisis management actors as well as from their own analysis of the outside world, in deciding on further actions. Moreover, other factors which count in deciding about communication strategies include timing and the results from stakeholder analyses, including the information needs of affected publics. Communication experts consider the effects of their possible actions along with potential scenarios. Moreover, they try to prioritise issues when deciding about actions, and weigh different goals and principles. Guidance is also sought from preparedness plans, roles, and responsibilities, which are re-negotiated throughout the evolving crisis situation. Hence, it seems that older planning models suggested in the literature are accompanied by more intuitive and flexible ways of constructing communication strategies, consistent with new insights in the literature.

Evaluation of the Study

Although the fact that the structure of the table-top discussion was kept open can be credited with producing rich and genuine data, some critical afterthoughts should also be mentioned. Rich in nuances, the data was challenging to analyse, and requiring many rounds of reading. Moreover, following at times the pattern of a natural-like interaction in the heat of crisis, the discussion was sometimes hasty due to a sense of urgency, with new topics emerging every now and then. Thus, a more structured approach with more intermediate questions could have allowed the participants to dwell deeper on some issues.

As the research setting consisted of table-top discussions on a realistic scenario, a future study could be conducted to test the findings, and the related figure, in a different setting, including a simulated exercise or a real crisis situation. Moreover, follow-up interviews could complement the results and be used to gain deeper insights into some of the areas discussed and so assist in further developing and fine-tuning the figure.

By shedding light on how communication experts cope with complexity in evolving crisis situations, such as those involving CBRN terrorism, this study makes a contribution towards clarifying core elements in the process of decision-making on communication strategies during an ongoing evolving crisis situation. The results show this process to be a continuous, cyclic one. The underlying process of coping with complexity reflects modern views of flexible crisis management and communication, while traditional preparedness approaches are also relevant. From a praxis perspective, this implies that planning and procedures are needed in combination with continuous training supporting creativity and improvisation. From a theory perspective, to meet communication challenges that are characteristic of more complex crises, CBRN terrorism in particular, a combination of traditional approaches, stressing the functional and instrumental nature of communication, together with modern approaches, emphasizing the role of continuous analysis and adaptation, is relevant. By clarifying the process of communication strategy-making and the core elements involved, the findings of this study provide a more detailed picture of communication strategy-making, thus promoting preparedness and professional resilience in the field.

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Abbreviations

The following abbreviations are used in this manuscript:

CBRN	chemical, biological, radiological, nuclear
CATO	CBRN Crisis Management, Architecture, Technologies and Operational Procedures

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