

What were we thinking? A scoping review of crisis management pandemic literature (1984–2019)

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Abstract

Pandemics are now the focus of research attention in the fields of preparedness and crisis management. As pandemics are some of the largest crises to occur, an important question becomes 'what were the field of crisis management thinking about pandemic management'. This paper investigates how the field of crisis management have incorporated the body of knowledge arising from pandemics into its science (from 1984 to 2019). We performed a scoping review of 4 journals on crisis management and what they have written about pandemics (230 papers). The findings are summarized in eight different categories. The main result is that the field of crisis management have shown sparse interest in pandemics. We attribute this to factors such as fragmentation of academic sciences when the problem-solving needs integration, perceived incommensurability and the organization of attention. We argue that the coronavirus disease 2019 pandemic can provide a basis for posing new questions in research on, and the political debate around, societal vulnerability at large and not only restricted to recent experiences of particular crises. Finally, we argue that this will need a stronger integration of research strands and communities, which in turn require the ability to 'connect the dots' between different sources of knowledge.

KEYWORDS

COVID-19, crisis, disaster, epidemics, pandemic, review, risk

1 | INTRODUCTION

Pandemics are now the focus of research attention in the fields of preparedness and crisis management as a result of the worldwide struggle against coronavirus disease 2019 (COVID-19). However, the story of the human struggle against diseasesⁱ is as old as civilization itself. Given the historical frequency of some of 'the big ones', the next pandemic is likely to lie not too far into the future. This human history of being exposed to the risks of pathogens, sometimes humbling our self-perceived capacities for managing them, quite naturally gives way for reaching into the field of crisis management to understand better how to deal with such extreme events. Just as the crisis management field gained 'momentum' during the 1980s and 1990s, because of the need to manage a varied sets of events that usurped the status quoⁱⁱ ('t Hart, 2022), the field will surely experience a new boost from the

shocks of COVID-19. Despite the momentum the field have had throughout the years, the COVID-19 pandemic still caught nations around the globe off-guard in important respects. This provides an opportunity for introspection on behalf of the field of research into crises and crisis management. Where were we in creating knowledge that could serve to direct the attention toward the risk of pandemics and to give advice on how to manage them? In this paper, we thus want to take a step back and consider how research within crisis management contributed to addressing—specifically—the topic of pandemic crisis management before the COVID-19 pandemic brought the scenario to the forefront of attention. The reasoning behind this focus is that pandemics were predicted 'by everyone' as one of the most challenging crisis scenarios that could emerge and with an empirical basis shown in the numerous outbreaks that have occurred throughout human history (what Wucker [2016] would label a grey rhino).

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The COVID-19 pandemic provides an opportunity for several research communities, albeit in hindsight, to engage in reflective self-scrutiny around the capacity to provide knowledge that could inform policy on the management challenges involved with a pandemic. We ask the question about what characterized thinking and empirical research in the intersection between the problem of pandemics and crisis management research before the COVID-19 pandemic. We do this by means of a scoping study of the literature on crisis management in four selected journals. Our aim is not to create strawmen to be attacked with normative arguments in hindsight. The aim is simply to search for frameworks and/or theory that could describe and provide advice on the challenges of pandemic crises as seen from the view of crisis management in academic journals. This allows for using the benefit of hindsight as a starting point for double-loop learning (Argyris and Schön, 1996) and invite reflection and discussion about how research can provide the basis for policy related to the management of society-wide crises like a pandemic.

This being said, it is part of the story that the article is based on an assumption that there is something missing in the relationship between generic crisis management research and pandemic-specific management. Part of this assumption stems from attempts to address this relationship before the COVID-19 pandemic. In early 2019, the first author (then working with health preparedness at national level) submitted a review paper discussing the state of the art regarding crisis management in pandemics for publication and the paper received a more or less disinterested reception in various journals. Although the reviewers' comments could surely be attributed to the overall quality of the paper, it is worth noting that reviewers repeatedly questioned the relevance of the study for their respective fields. One of them summed up the review in this way:

'The fourth conclusion is normative stating that there should be more research in the intersection of the two [pandemics and crisis management]. It might be the opinion of the author that more such research should be conducted, but I think the arguments in support of the opinion should be clarified. Just because there is no research in a specific area does not mean that there should be'.

After receiving an acceptance (major revision) late fall 2019, it had to be put aside—ironically it was never finalized because the author had to spend all his time doing crisis management during the COVID-19 pandemic! To send the same paper to a journal today would be like 'kicking in open doors', as anyone would agree that pandemics are highly relevant for crisis management. However, revisiting the paper and its reception presents a hindsight opportunity to consider the reviewers' comments as an illustration that the boundaries between professional and scientific domains can serve as barriers when addressing comprehensive threats.

Our point here is not to question the reviewers' intentions or abilities, but rather focus on identifying research studies and

frameworks that provides insight into specific challenges of pandemic crises. This excludes the 'grey literature', meaning that national and international contingency plans for managing pandemics will be left out of the scope of this review. Although this is certainly important literature, the scope of this paper is to strictly focus on academically published papers on the theme. The review is a scoping review of selected journals on the field of crisis management and has involved a complete reading and structuration of 230 different papers.

2 | BACKGROUND AND STRUCTURE OF THE ARTICLE

2.1 | The pandemic phenomenon

The years between 1816 and 1899 saw 6 cholera outbreaks and can be seen as the start of a 'modern' period of global health threats, where the reasoning for calling them modern is that the spread of the diseases is seen in close relation to patterns associated with the industrial revolution (Markel, 2014). This fact already reveals some insights into the nature of pandemic management: it is of course not only the pathogenⁱⁱⁱ in itself that cause widespread pandemic, they also need some sort of vessels to reach humans. In the period between ca. 1800 and 1900, steam-driven transport, railways and borders more open for trade were all wonders of the century, but also involved people becoming closer to each other in time and space, and thus also each other's diseases (Clift, 2013).

Cutting a long story of human development short, the emergence of modernity produced new threats that arose from the interconnectedness we humans strive to achieve and this interconnectedness has increased further during the twentieth and twenty-first centuries. There has been a constant battle between our societies (creating more and more complex systems, infrastructures and institutions to care of us and our health^{iv}) and various illnesses that poses threats to them. This acknowledgement is connected to Beck's (1992) arguments of how we are producing hazards and risks ourselves by transitioning to a society, which is characterized by not being able to foresee the impacts of day-to-day actions in neither space nor time. Modern societies are complexly connected, providing pathways for pathogens' pool of possibilities. The history of recent and more well-known pandemic outbreaks can illustrate this: Spanish flu (1918–1920), Cholera (1961–present), acquired immunodeficiency syndrome (1981–present), severe acute respiratory syndrome (SARS; 2003), Middle East respiratory syndrome (MERS; 2012–present), Swine flu (2009–2010), Ebola (2014–2016), Zika (2015–2016) and, of course, COVID-19 (2019–present).

Sadly, the frequency of global health threats seems far from receding^v. Factors contributing to how pathogens are created can be overpopulation, older age, complex humanitarian emergencies, international travel, commerce, food processing, land use and absent or ineffective health and surveillance systems (Noji, 2001, pp. 226–228; Ross et al., 2015). Such factors can be seen as traits of modernity contributing to an increased frequency of pandemics.

2.2 | Structure and questions for discussion

This paper is a continuation of Karlsen and Kruke (2018), which looked at some aspects of pandemic management with a lens from crisis management. Some themes were pandemics in relation to creeping, long shadows, fast burning and cathartic crisis—or typologies of crisis development and termination patterns ('t Hart & Boin, 2001); the social construction of pandemic crisis; pandemic crisis acknowledgement; socio-political influences in decision-making at executive levels at the World Health Organization (WHO); however, mostly it is centred around sensemaking and uncertainty as defined in the transboundary crisis framework (Ansell et al., 2010). This paper aims for a more structured approach to mapping the field of crisis management treatment of pandemics, where a guiding question is which descriptions or advice could be extracted from research on crisis management for those working with managing a pandemic crisis. We ask three questions related to the knowledge in the intersection between pandemics and crisis management:

1. 'What were we thinking?' Here, we use the results of the review to characterize the thinking and framing of pandemic crisis management before the COVID-19 pandemic.
2. 'How did we get there?' The status of knowledge in the intersection between scientific fields and research communities can be influenced by several factors and dynamics, which will be discussed in this section.
3. 'Where do we go from here?' This question is used as the starting point of a concluding reflection of the future development of research and practice in pandemic crisis management.

In Section 1 of this paper, we have set the stage for why crisis management is important and delineated the research questions that will guide the reflections based on the review in Section 4, the prime question being which important lessons we could have acquired on crisis management in relation to the pandemic scenario. Section 2 of the paper describes the strategy for data collection and data reduction. Section 3 describes the results of the sampling of literature into categories summarize the main research themes. In Section 4, we discuss the results with the aim of describing which advice the crisis management community could have been able to give to authorities when it comes to coping with pandemics. Section 5 concludes the paper, with final reflections about the relationship between the broad fields of crisis management and research into pandemics.

3 | DATA COLLECTION AND DATA REDUCTION

Acquiring the data was done through a scoping review. In general terms, a scoping review aims at mapping existing literature in a field of interest (Arksey & O'Malley, 2005) and, in our case, the mapping of the interface between crisis management and pandemics in academic journals. Common aims for scoping reviews are to examine the extent

of a theme, the contents of this theme, determine its applicability to predefined criteria and, in the end, summarize and disseminate research findings (Arksey & O'Malley, 2005). As opposed to other types of review, such as systematic or narrative, a scoping review is well suited when searching for 'knowledge gaps, scoping a body of literature or clarifying concepts' (Munn et al., 2018). Some common limitations (see Pham et al., 2014) in scoping reviews is database selection (in our case, the selection of journals), the exclusion of grey literature and of course the exclusion of non-English papers.

We identified the following four journals for the scoping review: *Journal of Contingencies and Crisis Management*, *Disaster Prevention and Management*, *International Journal of Mass Emergencies and Disasters* and *International Journal of Disaster Risk Reduction*. The reasoning behind this selection was that the journals are cases of outlets where one could expect to find both specific case studies of disasters and more general frameworks relevant for crisis management. There were other journals that could have been included, for example, within general risk research or public health, but as the focus for the scoping review was to target the link between the generalized knowledge of crisis management and more specific knowledge of pandemic scenarios, the selection of the four journals was deemed sufficient for the purposes of the paper. The selection also generated a sufficient amount of literature.

The reviewing has been done through a complete reading of all relevant papers within the journals to both classify and search for theories and/or frameworks that describes or provides advice for crisis management in pandemics. The review of crisis management literature includes in total 344 papers, although not all papers were relevant.

The search terms used in the journals was:

- ('pandemic' OR 'pandemics')

After the initial searches on 'pandemics' in the journals, we quickly noticed that many researchers use the words 'pandemic' and 'epidemic' interchangeably when discussing them, also for border-crossing health threats. Therefore, the search terms were revised to:

- ('pandemic' OR 'pandemics') AND ('epidemic' OR 'epidemics').

3.1 | Data reduction

A total of 140 articles were identified under 'pandemics' with an additional 204 articles coming to the light when including 'epidemics', giving a total of 344 (see Table 1). However, many of these were not specifically related to epidemics and pandemics but rather used as examples in passing (e.g., Brinke et al., 2017; p. 313) or in discussions of breaks in historical population data (e.g., Belle et al., 2017; p. 195). Such papers have been excluded from the review (in total 62 unrelated), bringing the total relevant papers to 282.

However, as noted earlier, the wording of 'epidemic' and 'pandemic' was used interchangeably, and thus there was a need to check if some of the papers used both words, thereby providing duplicates in the literature search results (see Table 2).

TABLE 1 Research papers related to pandemic/epidemic response and crisis management.

Name of journal	Search on 'pandemics'
<i>Journal of Contingencies and Crisis Management</i>	65 – 16 unrelated = 49 in total
<i>Disaster Prevention and Management</i>	26 – 01 unrelated = 25 in total
<i>International Journal of Mass Emergencies and Disasters</i>	05 – 00 unrelated = 05 in total
<i>International Journal of Disaster Risk Reduction</i>	44 – 11 unrelated = 33 in total
	Search on 'epidemics'
<i>Journal of Contingencies and Crisis Management</i>	77 – 12 unrelated = 65 in total
<i>Disaster Prevention and Management</i>	30 – 01 unrelated = 29 in total
<i>International Journal of Mass Emergencies and Disasters</i>	08 – 00 unrelated = 08 in total
<i>International Journal of Disaster Risk Reduction</i>	88 – 21 unrelated = 67 in total
Total	344 – 62 unrelated = 282 in total

TABLE 2 Total number of relevant research papers minus overlap.

Journal name	Number of research papers (minus overlap)	Years
<i>Journal of Contingencies and Crisis Management</i>	114 – 19 duplicates = 95 in total	1993–2019
<i>Disaster Prevention and Management</i>	054 – 12 duplicates = 42 in total	2008–2019
<i>International Journal of Mass Emergencies and Disasters</i>	013 – 02 duplicates = 11 in total	1984–2019
<i>International Journal of Disaster Risk Reduction</i>	100 – 18 duplicates = 82 in total	2012–2019
Total	281 – 51 duplicates = 230 in total	1984–2019

In total, 51 duplicates were found, resulting in a total amount of 230 research papers, spanning from 1984 to 2019.

categorization provides an overview of recurring themes of crisis management research covering the specific scenario of pandemics.

3.2 | Thematic analysis

The publications resulting from the literature search were structured in thematic categories, although some of the papers did not thematically match many of the others and were placed under an assorted category. The analytical strategy used was thematic analysis, which has been identified as a flexible and useful tool for research when trying to manage large amounts of data, and to structurally reduce this data into recurring themes or categories (Clarke & Braun, 2017). In our case, we used an excel file, with columns for identifying recurring themes in the papers and one row pr. paper. The process of empirical analysis aimed to freely create as many relevant categories and themes we could think of, before moving over to reduce the overall number of themes into some overarching representative ones. As such, the thematic analysis served as a way structurally being able to look for patterns. The end result of the excel-file is presented in Appendix Table A1.

Due to some publications covering several themes, the different categories are not mutually exclusive. Hence, other researchers might have ended up with different clustering of the literature or different labels for the identified categories identified. Nevertheless, the

4 | RESULTS

4.1 | Category 1 and 2: Mapping/review of fields of research, media and framing

Some papers mention the terms 'pandemic' and 'epidemic' only as part of their argumentations, mapping, or examples. This focus on using pandemics or epidemics in these author's research is probably related to such happenings being interesting and usable as examples of something one would want to avoid. Or when mapping is regarded, they will stand out as happenings which seriously damage society (for papers that have the most citations within this category, see e.g., Eshghi & Larson, 2008; Fritzson et al., 2007; Rosenthal & Kouzmin, 1997; Shaluf, 2007; Shaluf & Ahmadun, 2006; Smet et al., 2012; Unlu et al., 2010; Xu et al., 2016).

Another large part of the papers mentioning pandemics was related to media, communication, framing, information, or warning. Most of these tell us that the nature of crisis management is changing because of social media, the use of mobile applications and our interaction with this technology—see, for example, Cheng (2018) or Tan et al. (2017) for papers nearing 100 citations. Further, the paper with

the largest number of citations (876) by Veil et al. (2011) informs us how social media can be incorporated into risk and crisis communication. Palttala and Vos (2012), on the other hand, suggests quality indicators for better measurement and improvement of crisis communication for public authorities. Both the latter papers have a focus on general knowledge and are not aimed specifically at pandemics.

The theme of mapping or reviewing the field of crisis management does give way for some insight into pandemics in a crisis management context, although the interest from the crisis management research community seems to have been very limited. For example, Bradford (1994) reflects on how disease outbreak can be seen as some of the historically earliest tasks that emergency management was occupied with and how even primitive cultures developed strategies for such outbreak management—drawing on history all the way back to Thucydides description of plague in Athens over 2000 years ago. Their reflections are well suited for giving insight into pandemics and crisis management, in a general ‘opening-the-door’ to the phenomenon (p. 41):

While to date disease and contamination have been addressed primarily through public health channels, it is evident that emergency managers will need to become increasingly involved in biological hazard outbreaks, ones which may affect hundreds or thousands of people in a very short time and whose origin and effects may not be immediately apparent.

Some 10 years later, Thorson and Ekdahl (2005) with the paper ‘Avian influenza – Is the world on the verge of a pandemic?...and can it be stopped?’ has a focus on how ‘socio-cultural factors are important when implementing control and surveillance measures’ in relation to influenza. The authors present many revealing insights regarding avian influenza that should have been likely to be relevant for many other types of pandemics. For example, see pp. 25–26:

Since first-line choices to reduce morbidity and mortality such as vaccines or widely available antivirals will be scarce, time-saving measures to prevent the epidemic from becoming a pandemic are critically important.

Increased transparency and boosted information sharing between countries are crucial. Early and accurate reports on progress of the epidemic or signs of inter-human transmission are imperative, if international collaborative initiatives are to succeed.

The shortage of vaccines and antivirals will force national authorities to make difficult priorities on who will be in first line to receive the scarce doses available. Ahead of the elderly and those with certain chronic diseases that are primarily targeted during the interpandemic influenza campaigns, key persons such

as medical personnel, emergency responders and leaders may be targeted for priority protection due to their critical roles during the pandemic response... These difficult decisions with ethical, economic and political implications are best made well in advance of a pandemic situation.

The extracts above show that the door had indeed been opened for studying the phenomenon of pandemics in relation to crisis management, although the lack of citations from these papers show a general disinterest in the theme from crisis research. Anyway, this is an example that the challenges of pandemics have no doubt been on the radar when risk and crisis researchers scanned the horizon for future challenges.

4.2 | Category 3: Risk/risk reduction, preparedness and contingency

Many research papers are about risk or risk reduction—and although this is of course a crucial part of preventing and preparing for an epidemic or a pandemic, and even reducing some of the consequences if they do occur—they do not explain to us how to manage a pandemic once it has occurred (Brown et al., 2017; Cerè et al., 2019; Chmutina & Rose, 2018; Hakaloba et al., 2016; Herrgard et al., 2017; Nanda & Raina, 2019; Pascapurnama et al. (2018); Solinska-Nowak et al., 2018).

Further, many papers on risk reduction try to measure the effects of either the Hyogo or Sendai framework, where pandemics or epidemics are mentioned or used as examples (e.g., Al-Nammari & Alzaghal, 2015; Faivre et al., 2018; Johansson, 2017; Sternberg & Batbuyan, 2013). In addition, a large portion of the papers were somewhat related to risk, in the sense that they write about preparedness (Ainuddin & Routray, 2012; Brattberg, 2012; Burling & Hyle, 1997; Burns & Marx, 2014; Frost, 1994; Iles, 1994; Mitchell et al., 2016; Olofsson, 2011; Sundar et al., 2017; Surjan & Shaw, 2009; van Vactor, 2012).

In addition, risk assessment, perception, understanding and interpretations have been of interest regarding pandemics and epidemics (Eiser et al., 2012; Galarza-Villamar et al., 2018; Hajito et al., 2015; Hou et al., 2019; van Laere, 2013; Wei et al., 2018). The paper with most citations in this category (579) is Eiser et al. (2012) about risk perception, interpretation and corresponding actions—where the authors develop a conceptual framework based on this.

Rosenthal and Kouzmin (1993) highlight general insights and the whole of their paper is probably relevant to any points we want to make about COVID-19 today, even though it is not centred around pandemics. However, ‘epidemics’ are mentioned as part of ‘Public sector contingencies and crises’ happenings of interest and thus part of the authors’ focus on the importance of contingency thinking (p. 3):

More often than not contingency thinking tended to culminate in unimaginable combinations of adverse

developments. Worst-case scenarios were considered to be the cornerstone of contingency analysis... Contingency analysis and contingency planning do not limit themselves to threat averting and worst-case scenarios. Rather, they derive their relevance from imaginative and creative scenarios for alternative futures... Contingency analysis and contingency planning are, or at least should be, intimately related to crisis research and crisis management. They provide crisis research and crisis management with context and process. A contingency approach to crises will prevent crises from being conceived in unique terms, incomparable to other crises and having an immanent quality which makes it impossible to place crisis events or processes into broader perspectives.

What is referred to as contingency in this line of research, is in our view strongly related to risk analysis and risk research. Interestingly, also Turner (1994) has a paper about risk science and research in the *Journal of Contingencies and Crisis Management* where he presents a review of the field. The paper gives insight into 'the future of risk research'—based on two cases where epidemics and pandemics were centre stage (pp. 154–155):

...Secondly, this extends to a need to understand the limits of risk management, to acknowledge the significance of context, of initial assumptions and of framing issues, for calls to broaden risk analysis create a particular double bind when the efficacy of the techniques used are tied to a limited, specified mode of operation... Thirdly, risk managers need to participate in training, discussion or other means of attuning themselves to both the political and cultural conflicts which now surround risk management and to the emotional and ethical aspects of risk... Finally, it is necessary to recognize that risk management is concerned with the management of uncertainty and not the management of certainty.

4.3 | Categories 4, 5 and 6: Assorted themes, resilience/learning, 'meta'-papers and government/business continuity

Next, there were a plethora of themes that were hard to classify within one category, as there were few repeating numbers of them, such as follows: mass death; humanitarian logistics; recovery and reconstruction; vulnerability; sanitation; poverty; wildlife hazard; altitude illness and mass gatherings, to name a few examples—these we have called assorted themes.

In addition, two themes seemed to stand out. These were resilience (Atallah, 2016; Darkow, 2018; Dobson, 2017; Kim & Park, 2018;

Manyena, 2014; Normandin & Therrien, 2016; Ntontis et al., 2019; Teo et al., 2017) and learning (Beerens & Tehler, 2016; Broekema et al., 2017; Connolly, 2014; Crichton et al., 2009; Lefevre et al., 2018; Mignan et al., 2016; O'Brien et al., 2010; Robert & Lajtha, 2002; Sienkiewicz-Mahjurek et al., 2019; Skryabina et al., 2017).

Although, looking back at the twenty-first century and the increase of new pathogens (SARS, H1N1, Ebola, MERS, Zika, COVID-19 and so on), it is not a far stretch to assume that learning is of interest in this field, because you would like to prepare for the next such event—and resilience would get research traction in regard to epidemics and pandemics, because you want to not experience the same full set of consequences as the last time.

Seeing as pandemics and epidemics have such an impact on society, there also seems to have been done extensive research on a 'meta level', where pandemics and epidemics are mentioned or used as examples (political perspectives; ethics; gender; linked crisis event; disaster diplomacy and collaborative workflows, to name a few examples). In addition, the nature of epidemics and pandemics as permeating the whole of society have probably also given rise to the numerous papers where either the business sector or the public sector is a main theme.

4.4 | Category 7: Natural disasters and natural disaster management

Starting to narrow down the mass of papers, we arrive at another large portion of research, which were about some kind of natural disasters, where pandemics and epidemics were either mentioned as a type of natural disaster, or as a consequence of the disaster (e.g., drought: Munro, 2006; earthquake: Baytiyeh & Naja, 2013; Gunn, 1995; Shrestha et al., 2019; flood: Abbas & Routray, 2014; Singh et al., 2018; Wung & Aka, 2019; or hurricane: Wilt et al., 2018). Further, many papers proposed management of such natural disasters with overarching models for natural hazards crisis management where epidemics and pandemics were mentioned briefly—although these do not focus explicitly on management of pandemics or epidemics (Kapucu, 2006; Moe & Pathranarakul, 2006; Moe et al., 2007; Metri, 2006). As this research is not built around empirical studies on epidemics or pandemics but, for example, tsunami (Moe & Pathranarakul, 2006), flood (Moe et al., 2007), or hazardscape perception (Ley-García et al., 2015), we are reluctant to propose them as examples of frameworks for pandemic and epidemic management understood in crisis management terms. Even though there is a lack of pandemic and epidemic focus, there are of course elements from these papers that are of interest and relevance for management practices in any crisis.

There were also four papers that explicitly mentioned and used pandemics for explaining frameworks for pandemic crisis management. It is remarked by Benini and Bradford-Benini (1996) that poverty and low international status makes an affected country rely on foreign organizations to respond to the epidemic as a natural disaster. Noji (2001) also points out the sad irony that the countries with the most

significant health threats are also the least capable of effectively dealing with them. Sinha (2000) proposes a framework for managing plague epidemic where the community itself should manage the health threat. A last paper that explicitly tries to develop a framework for explaining pandemic crisis as part of natural disaster management is Callaghan (2016) on social media—and how crowd-sourcing could be of immense importance for managing an epidemic or a pandemic. The argument being that pooling knowledge for a cumulative result could be a solution for creating the information crucial in combating an emerging unknown pathogen (this paper could easily have been included under the media category, but since the launching point for it was natural disasters, it have been included under this theme).

4.5 | Category 8: Transboundary crises

Finally, we arrive at publications addressing the sometimes global nature of crises. Although epidemics and pandemics have been mentioned, neither these papers focus empirically on pandemics or epidemics for developing their frameworks. The papers revolve around the concept of 'transboundary crisis', where the main message is that threats are becoming international, and that local threats can eventually cross national borders because of the growing interconnectedness in society (Ansell et al., 2010; Boin & Ekengren, 2009; Boin et al., 2014; Hermann & Dayton, 2009). There is also the identification of some of the main challenges in managing such threats (Ansell et al., 2010): (1) coping with uncertainty; (2) providing surge capacity; (3) organizing a response; (4) and communicating with the public.

As with any crisis, epidemics and pandemics require rapid response under conditions of uncertainty and stress (Rosenthal et al., 1989), and Ansell et al. (2010) argues that crisis management becomes even more challenging when a crisis is spread across geographical borders, policy boundaries and when there is an involvement of many response actors. One of the earliest papers on this subject were Quarantelli et al. (2007), where they speak of 'trans-system social ruptures' (p. 27). Later, Boin and Rhinard (2008) coin the term 'transboundary threats' (pp. 6–7) and 'transboundary crisis' (p. 4). Furthermore, in more recent publications, Boin (2019) has refined the concept of transboundary crisis, although the main idea of societies as complex, intertwined entities still hold. As such, it is maintained that a transboundary crisis could still 'effortlessly stretch across geographical, judicial, administrative, cultural and public-private borders' (p. 94).

Of course, the phenomena of a complex problem, risk, crisis or threat—and the need for understanding them as something more than a mere incident happening in a vacuum—is something that other authors have written about. There are many insights to be made about the context that a threat, risk, or crisis occur in from many early and wide ranging works^{vi}. Even earlier, texts produced by example Jean Jacques Rousseau asked why housing was built in areas prone to earthquakes in 1775. In another example, Daniel Defoe asked deeply ethical and societal questions about quarantine measures

regarding the threat management of the London Plague in 1665. The point being, wondering and investigating how threats, risks and crisis connects with a context is not overtly new, although the abstraction of such knowledge might be.

4.6 | Summary

The results are presented in Appendix Table A1, divided into categories based on the theme or focus of the investigated papers. In addition, there is a category for 'assorted themes' with themes that did not seem to fit anywhere. In all, it has been reduced to eight different categories where either pandemics or epidemics are mentioned:

- Mapping/review of the field—of hazards, threats, or risks; various trends of threat and hazards; the changing crisis; lack of data in disasters.
- Media and public framing—communication; framing; information; warning; data protection; mobile applications (apps); reputation.
- Risk/preparedness—disaster risk reduction; planning; Hyogo/Sendai framework; risk index; assessment; perception; understanding; interpretations; hazard adjustment; risk-informed decisions.
- Assorted themes—aid work; mass death; humanitarian logistics; recovery and reconstruction; vulnerability; sanitation; poverty; health education; resilience; armed conflict; riots; extreme stress; elder abuse and neglect; prison crisis management; wildlife hazard; altitude illness; water distribution; drinking water; mass gatherings; health indicators; social determinants; external experts, learning.
- 'Meta level'—political perspectives; regime types; societal safety; symbols, rituals and power; ethics; gender; fractal crisis; multi-layered challenges; linked crisis event; psychology; disaster diplomacy; collaborative workflows.
- Government/business continuity—economy; consumer response; public-private partnership; leadership; cost-benefit; microfinance; industry; institutional failure, organizations, policy implications, EU capacity, social services, duty of care, critical infrastructure, community/resident response/resilience, water treatment, incident command system, local involvement.
- Natural disasters and natural disaster management—drought; earthquake; flood; hurricane; tsunami; flood; perceptions of the hazard landscape.
- The transboundary crisis—threats are becoming international; crossing of national borders; interconnectedness in society; coping with uncertainty; providing surge capacity; organizing a response; communicating with the public.

5 | DISCUSSION

The aim of this scoping review was to consider how research in selected crisis and disaster journals had described or provided advice on the topic of pandemic crisis management in the years before the

COVID-19 pandemic. In this section, we discuss the two first questions mentioned in the introduction:

1. What were we thinking?
2. How did we get there?

The question of 'where to go from here' will be the topic of a concluding discussion.

5.1 | What were we thinking?

Although there seems to be a substantial amount of research on health threats and crisis management (in total 230 papers), surprisingly few of the reviewed papers suggest how crisis management frameworks or theory can or should be applicable to pandemics or epidemics. The general orientation is on how different pandemics and epidemics were managed in the past, but it does not seem to be the aim of the studies to provide insights and implications for considering how to better manage pandemics in the future. Although there are certainly implications for pandemic crisis management within several strands of the research, no framework or theory seems to be aimed at connecting the dots specifically aimed at global crises that have consequences for virtually all societal sectors. There are however some main points we can draw from the assessment of the categories:

- First, many papers were more occupied with understanding the process leading up to the crisis management phase rather than the management phase itself. The way in which a threat or risk is framed (in this case, a pandemic) will affect both when the crisis management starts but also how it will be conducted. Value assessments, prior experiences, assumptions, attention, power, politics, symbolism, stakes, framing and meaning can be some key words that are highly relevant for understanding the phase that comes before a crisis, or even if it will be defined as a crisis at all.
- Second, there is an understanding that the temporal dimension is important when investigating pandemics—and that risk management and crisis management to some degree converge because of this. Again, we see that much of the importance for pandemic crisis is to understand and interpret them before the crisis management phase occur.
- Third, a pandemic will cross geographic boundaries and sectoral areas of management and levels of governance. Complexities and uncertainties are abundant in this crisscross of society.
- Fourth, the conceptual framework that seems to fit best for explaining and understanding a pandemic crisis is that of transboundary crises. This framework does not focus as extensively on the 'before' stage leading up to a crisis.

These four points are all important elements of understanding pandemic crises and the crisis management challenges they can entail. A main conclusion from this scoping study is, therefore, that

there were definitely nuggets of knowledge of importance for pandemic crisis management in the identified literature between the years 1984 and 2019. Many of the papers contain important seeds for understanding and managing pandemics (e.g., Bradford [1994] and Thorson & Ekdahl [2005]). These papers are examples that do put pandemics on the radar, although if we look at their citing score, Bradford (1994) had three citations, and Thorson and Ekdahl (2005) had two citations (before the avian influenza happened anyway). However, we have not been able to identify any integrative frameworks connecting the dots between the various strands of literature. Based on this review, therefore, it seems safe to say that the interest has not been flourishing in crisis management research when pandemics are concerned.

5.2 | How did we get here?

As should be clear by now, we argue that the scoping review indicates that there were blind spots in the research-based knowledge concerning the management of pandemics. This statement should not be interpreted as a hindsight criticism but rather as an observation that can be used as a starting point for using the experience from the COVID-19 pandemic as a source of reflection and introspection into some of the underlying structures influencing the vision and blind spots of crisis research broadly defined. This, in turn, can be a basis for considering the orientation and perhaps ultimately an integration of the broad field of crisis and crisis-related research. What are possible factors influencing the ability to address problems that lie in the intersection of several research disciplines and stakeholders?

5.2.1 | Fragmentation and perceived incommensurability

The first and most obvious factor influencing the ability to develop such knowledge has to do with the division of labour between different academic disciplines. Academia is no less resistant to a fragmentation of knowledge when what we are investigating is complex, than other veins of problem management in society. In academia, this comes to be expressed as the specialization of education, of journals and reviewers, and ultimately of researchers and academic careers. This creates two different but related challenges: one is that the fragmentation of a problem into different areas of investigation can lead to a silo-oriented thinking around complex and 'wicked' problems comprised by several interconnected subproblems. In a pandemic, epidemiologists and emergency preparedness professionals could have very different ideas about the nature of the problem they are managing—whereas one of them could lean towards a slow management based on scientific evidence, while the other is working towards implementing precautionary measures to deal with uncertainty (the lack of evidence-based knowledge), preferably yesterday. The combination of the properties

of a pathogen, and of the societies in which they are transmitted, indicates that the management of pandemic crises need to happen both within the health sciences (e.g., epidemiology and medical response) and broader decision-making in society at large (where also crisis management has a place). Taking a sample of literature on pandemic response, which seems to dominate within the health sciences (before COVID-19 at least), this display of management process which is rather technical and 'straightforward' manner come to light (Figure 1).

The figure above is based on the review by Adivar and Selen (2013) of 74 publications within health and medicine, which shows that the most proposed measures of control policies during epidemics is through vaccination and quarantine on the governmental level, and increased awareness in the general population on the individual level. The discussion and conclusion in Carney and Bennett (2014) hints at some troublesome aspects with the above figure, where they write in their review on how pandemic management is framed that a more 'socio-political' nuanced response to pandemics is needed. The above figure is also in contrast to the reality explained by Dr. Bruce Aylward, Senior Advisor to the Director-General of WHO and well versed in pandemic management from both Ebola and now COVID-19:

'...the stark realization that classic Ebola strategy was not going to work kept me awake at night (WHO, 2015a) ... We have to bring in the science

and rigour of crisis management on top of the science of epidemic response. Otherwise the risk is of being run by scientists and doctors and not people who know how to run an emergency' (WHO, 2015b).

This pandemic manager is practically begging for help, well before the COVID-19 pandemic, pointing to the need for integration between medical and epidemiological research communities and crisis management expertise.

There is also another form of fragmentation in need of consideration, the fragmentation within the crisis management field itself. Put very broadly, publications within crisis management research can be sorted under two general categories. The first consists of a wide variety of case studies that provides rich insight into the specificities of one or a few particular crisis, as the categories of our finding show. The other consists of generic perspectives on crisis phenomena, including typologies of different forms of crisis (as seen in Category 1). This literature is more oriented towards building generalized knowledge, ideally based on the empirical knowledge from case studies. The links between this generalized knowledge and domain-specific case studies and policy advice is, however, often unclear.

As a result, crisis management research appears fragmented according to the area of application resulting in the building of subdomains (e.g., preparedness against cyberattacks, flooding, earthquake, or medical emergencies), which are not necessarily

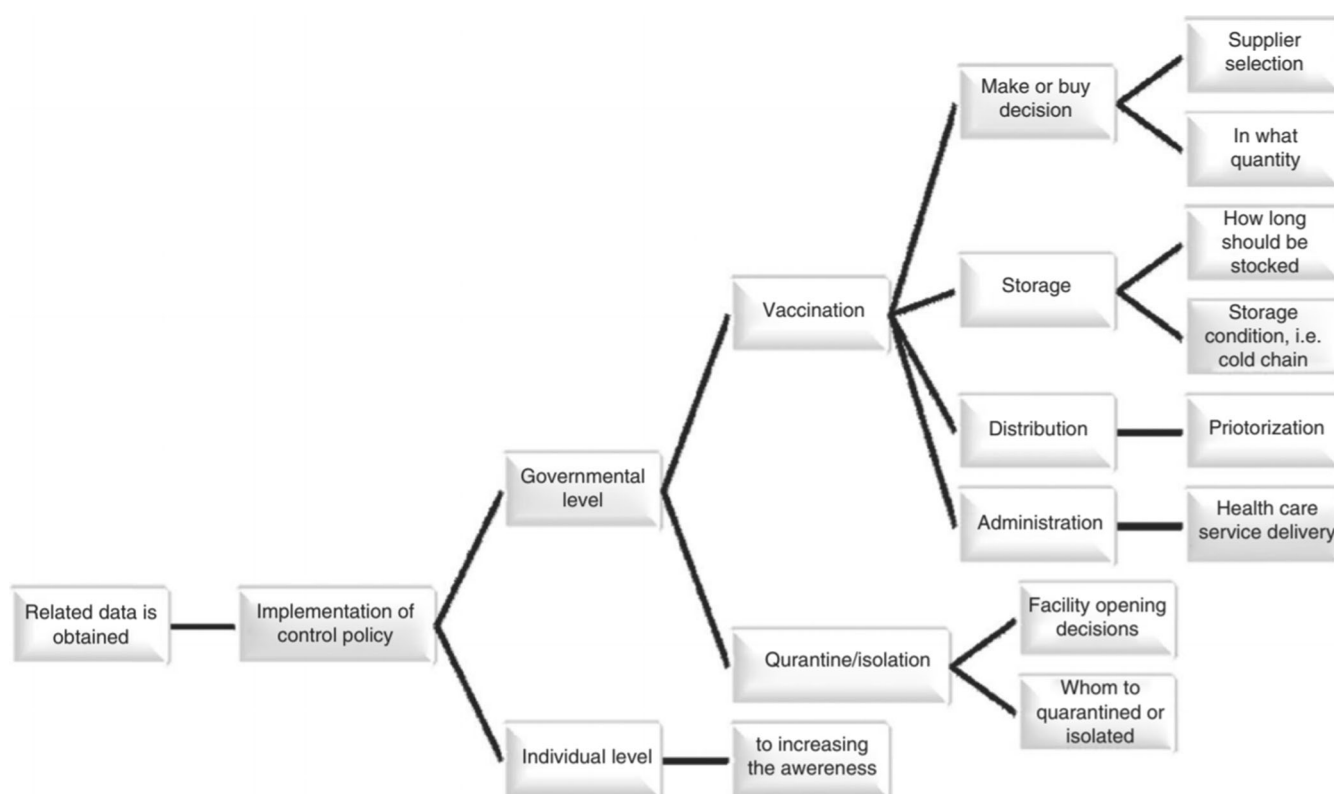


FIGURE 1 Related decisions in responding to epidemic disasters (Adivar & Selen, 2013; p. 256).

coupled to the existing generalized knowledge of crises. The point here is not to say that there is not important domain and situation specific characteristics that are crucial to understand the variety of crises that may occur, which is certainly the case. Our point is rather to underline the importance of the link between the two sources of knowledge, as this link contains the potential for cumulative and more integrated knowledge of crises.

Currently, single-case studies still seem to be the prevailing approach (Wolbers et al., 2021). It could also be argued that there are different 'waves' in the types of crises that are the most common subjects of studies—typically the ones that have become 'hot' to investigate due to their recent occurrence. This is both understandable and highly useful but creates an obvious reactivity trap when it comes to emerging risks and novel crises. As is well-known, the next crisis is rarely a repetition of the last one and although it is possible to make generic plans applicable for many kinds of crises, we cannot without reflection copy response patterns and actor responsibilities across scenarios that differ in their temporality, spatiality, complexity, the need to involve citizens and so on. Therefore, it is our argument that if we stay within the 'silos' of professional domains and areas of application, instead of connecting the dots between them, we risk failing in providing both empirically grounded general claims about crisis management, as well as domain-specific policy advice.

A fragmented approach to the framing of pandemic management could be an important influencing factor (together with several others, e.g., differences in institutional setup and policy styles) of when nation states around the world chose different national strategies for managing the COVID-19 crisis, even among countries that are quite similar. In particular, there were two main fields of research involved: a field of crisis research dominated by case studies, primarily of sudden 'big-bang events', generalizing experiences from the management of particular past crises into normative lessons, and a field of medical response based on epidemiology, which in turn rests on what may be labelled an evidence-based approach, where the criteria for evidence are strict and requires a controlled experimental setting. These two positions can seem incommensurable, in the sense that they have different demarcations of what constitutes sound knowledge and diverging views on how to handle the uncertainties stemming from that lack of knowledge—in essence, the scientific domains speak two different languages in terms of management of some parts of the pandemic. Such seeming incommensurability constrains our understanding of pandemics as crisis phenomena and ultimately the management of them.

If the occurrence of a pandemic was a 'white swan' phenomenon, then it is possible to view the intricate specialization of science as contributing to a coloration process that paints the swan black in terms of creating divergent and perhaps conflicting framings for understanding the same phenomenon. The reference here is that knowable threats can be turned into something that can still surprise the management apparatus devised to handle them because we create conditions for uncertainty in attempts to specialize both knowledge production and problem-solving. Having multiple framings of the same problem is unavoidable and having diversity in perspectives is in many instances a

source of requisite variety increasing the ability to recognize weak signals of danger (Antonsen, 2009; Westrum, 1993). However, scientific specialization without integration entails the risk of creating pockets of assumptions about what knowledge and implications that are 'ours' and what belong to 'others', and meeting integrated problems with specialized approaches might prove to be a risky strategy.

5.2.2 | The organization of attention

In addition to fragmentation leading to different specializations that can be perceived as incommensurable, it is our view that it also influences the ability to prime the public and political attention for signals of danger. As is well known from research into the social amplification and attenuation of risk, 'each society selects its worry beads, the particular risks that we choose to rub and polish assiduously while we relegate others to inattention' (Kasperson & Kasperson, 1996; p. 102). Academia is of course not immune to the same social construction of perceived risks.

Moreover, the social and political processes involved in the foregrounding and backgrounding of hazards also influence the financial resources available for risk assessments, contingency planning and risk research. This is probably an important reason why money is more easily spent on improving the ability to deal with the last crisis than towards dealing with low-probability events. As both money and attention are scarce resources, it is not surprising that there is an inherent tension between the destructive potential of crises and a low political prioritization of the ones with which one has limited historical evidence (Drennan et al., 2014). It does, however, involve a reactive orientation in both research and practice concerning crisis preparedness and management, including pandemics, in that the consequences of specific threats, to some extent, need to be experienced before being politically and financially prioritized.

Another related point to be made about attention to threats is by the way we in scientific terms try to define what a concept or phenomenon consists of and not. For example, this review was originally meant to investigate the *Journal of Contingencies and Crisis Management* and its insight into pandemics, and the expectation was that there would be many theories and frameworks for understanding pandemic crisis. However, as the review went on it was discovered that there were in fact very few papers that had this as a theme but pandemics did however show up in relation to disaster management in journals on crisis management. Boin, 't Hart and Kuipers (2017, p. 24) writes about the 'philosophy' behind crisis like this:

'Speaking of a crisis is in an odd way deeply optimistic: it suggests that the threat in question may still be averted if people, communities, institutions, leaders or systems rise to the challenge'.

From the findings, we can argue that as pandemics traditionally have been treated as problems for developing countries and health threats seldom challenge many developed societies beyond some

expected problem solving, the term disaster management seem a common heading for understanding and explaining pandemics. As such, disaster management could be understood as a type of crisis management, but where the threat is seen as more uncontrollable, because, for example, of states with weaker institutions, health systems and financial resources than in richer parts of the world.

The social amplification and attenuation of risk, in research communities and practitioners' fields, point to the importance of the way particular hazards are framed, as our perceptions about a phenomenon and how we have defined what constitutes it will influence what our attuned 'radar' picks up. This is not only a question about what may constitute a problem in need of management but also for whom this constitutes a problem big enough to be prioritized. In this respect, crisis research should take note that the very definition of a crisis is highly fluid and hinges on the perceived characteristics of a threat. Urgency, uncertainty and stress, for example, are all subjective components and are likely to be heavily influenced by societal factors; through political manipulation, one could avoid labelling something as a crisis, which ironically can lead to an even worse humanitarian disaster—as argued by Karlsen and Kruke (2018). The process of framing will probably be particularly important for pandemics, characterized by both uncertainty and ambiguity, and opening up for a polyphony of interpretations, which challenges both decision and management procedures.

6 | CONCLUDING REFLECTIONS: WHERE DO WE GO FROM HERE?

Our scoping review has indicated that the years before COVID-19 were characterized by loose couplings between research communities constituting vital sources for the knowledge needed to be better prepared for dealing with crisis management in a pandemic. The nuggets of insight were certainly there but did not reach a critical mass for lifting the issue to the forefront of attention. This is, of course, common to the creeping crises that are hiding in plain sight (Boin et al., 2020), which are not 'black swans' or 'unknown unknowns' in terms of knowledge production. Rather they may be the 'unknown knowns'—the possible problems of which knowledge is available, yet not combined, and where there is low public and political urgency to prioritize them.

Although the years up to 2019 saw a very limited number of papers discussing the intersection between crisis management and pandemic risk, the number of publications has virtually exploded after the COVID-19 pandemic. The explosion of publications into the COVID-19 pandemic illustrates that the research attention towards crisis management in a pandemic scenario has had the kind of upturn that is to be expected in the aftermath of a massive crisis causing high death tolls, disturbances to the functioning of societies and hitherto unknown long-term effects. This is an important occasion for hindsight learning that can improve the knowledge base for the management of future pandemics. As such, where there is hindsight, there is also foresight aiming to prevent history repeating itself.

Even for hindsight learning, there is, however, still a remaining question of how pandemic crisis management is framed and studied. When formulating research questions aimed at learning from COVID-19, there is a risk of recreating silos between the specialized domains of knowledge by restricting the attention only to selected discipline-based components of what is in reality a complex societal problem. If this was to be the case, the ability to provide comprehensive advice on how to deal with crises of this scale is likely to be more limited than it needs to be, influencing the generalization of knowledge, both when it comes to managing future pandemics and the next unknown disaster. Even a new pandemic will most likely differ from COVID-19 in many respects and thus involve the connecting of new dots of knowledge. The next unknown crisis on the scale of COVID-19 may have its origins from terrorist attacks, disasters coming from nature of different variants, technological disasters, cyber-induced catastrophes and so on. Hence, taking lessons from COVID-19 presents research communities with a generalization challenge.

The possibility of foresight based on lessons from COVID-19 is by no means restricted to dealing with future pandemics. On the contrary, COVID-19 experiences presents a window of opportunity for generalization to the class of phenomena to which pandemics belong—the societal crises that are transboundary in space, prolonged in time, and that stretches the capacity and capability of the organizations and people managing them. For instance, the COVID-19 pandemic has provided hard lessons regarding the vulnerable availability of critical material (e.g., personal protective equipment for health personnel) and the capacity of critical emergency services (e.g., intensive care units). Most likely, the various national health authorities will consider the need to create buffers for critical material that are produced and procured according to just-in-time principles, and the capacity of emergency functions that has proved understaffed and underfinanced in dealing with the challenges of COVID-19. However, the organization of public services according to just-in-time value chains and lean organization is by no means restricted to the health sector. On the contrary, it constitutes the organizing principle of virtually every public service, including the ones that are critical to the functioning of society. Seen as a case of the larger category of transboundary, prolonged and possibly simultaneous societal crises, the COVID-19 can provide a basis for posing new questions in research on and the political debate around societal vulnerability at large and not only restricted to recent experiences of particular crises.

To do this, however, would require a stronger integration of research strands and communities focusing on risks within particular domains (e.g., cyber security, natural hazards or pandemics) and the more general knowledge and frameworks of contingencies and crisis management. Having knowledge of a threat is dependent on the horizon of a 'knower' within a knowledge community—it is relative to the information available and deemed credible to the communities in charge of either making risk assessments or managing a crisis. An important prerequisite of this availability and credibility is the possibility of connecting the dots between different sources of knowledge. To make this knowledge more available will, in turn, rest

on the ability and willingness to combine the zooming in and zooming out between the singularities of particular scenarios and risk domains, and the aggregated implications for societal crisis management.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article (Appendix Table A1).

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ENDNOTES

ⁱ Diseases are caused by pathogens, which means microorganisms that causes disease (Gunn, 2013). A disease that is common or that can be usually found in a given geographical area, is labelled as an endemic disease, such as the 'common flu' (Gunn, 2013; Porta, 2008). When a disease breaks the barrier of normal prevalence in a geographical area, it is labelled as an epidemic, and if this disease spreads across international borders it is labelled a pandemic (Gunn, 2013; Porta, 2008).

ⁱⁱ "...the 1980s and 1990s provided a string of 'rude surprises' including the petrochemical catastrophe in Bhopal, India in 1984, Chernobyl, the Exxon Valdez oil spill in Alaska, the Challenger and Columbia space shuttle accidents, crowd disasters at rock concerts and soccer matches, waves of sectarian, ultra-leftist, and regionalist terrorism in West-Germany, Spain, northern Ireland as well as scores of urban riots in unlikely countries such as Denmark, the Netherlands and Switzerland. The UK experienced all of the above in what were grim decades" ('t Hart, 2022, p. 2).

ⁱⁱⁱ The organism that carry disease, for example, virus, bacteria, fungi, and so on (Alberts et al., 2002).

^{iv} Wanting to create good health systems is, of course, no wonder: epidemics and pandemics accounted for almost two-thirds of all deaths from natural disasters between the 1900s and 2000s (Eshghi & Larson, 2008; p. 79).

^v More than 300 new communicable diseases are reported to have emerged between 1940 and 2004 alone, where around 75% of are zoonotic—they transmit from animal to human (United Nations, 2016; p. 28).

^{vi} See, for example, works such as: Beck (1992), Cornell (1976), Deacon (1918), Douglas and Wildavsky (1982), Dynes (1994), Fritz (1961), Perrow (1984), Prince (1920), Short (1984), Starr (1969), Turner (1978), Vaughan (1996), Weick (1987).

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APPENDIX A

(Table A1)

TABLE A1 Overview of themes and authors.

Mapping/review of the field: of hazards or risks; various trends of hazards; the changing crisis; lack of data in disasters	Adivar and Selen (2013); Al-Madhari and Elberier (1996); Alexander (2016); Boin (2005); Bradford (1994); Chipangura et al. (2017); Eshghi and Larson (2008); Fritzson et al. (2007); Helsloot and Jong (2006); Mohammed and Rahman (1998); Ntontis et al. (2019); Osuteye et al. (2017); Pokhrel et al. (2009); Rautela (2006); Rosenthal and Kouzmin (1993, 1996); Ruggiero and Vos (2013); Shaluf (2007); Shaluf and Ahamdun, 2006; Smet et al. (2012); Thorson and Ekdahl (2005); Turner (1994); Unlu et al. (2010); van Niekerk (2015); van Voorst (2015); Xu et al. (2016)
Media and public framing: communication; framing; information; warning; data protection; mobile applications (apps); reputation	Andrew et al. (2018); Arlikatti et al. (2014); Bahir and Peled (2015); Baldini et al. (2012); Bergeron and Cooren (2012); Buus and Olsson (2015); Cheng (2018); Chmutina et al. (2018); Cortiñas-Rovira et al. (2015); Fakhruddin and Chivakidakarn (2014); Friedman et al. (2011); Harro-Loit et al. (2012); Ichinosawa (2006); Jasmontaite and Dimitrova (2017); Kim et al. (2017); Koskan et al. (2012); Lawson et al. (2017); Ley-García et al. (2015); Lindell et al. (2017); Masys (2004); Newsom and Mitrani (1993); Nilsson et al. (2016); Palttala and Vos (2012); Pan and Meng (2016); Rodin et al. (2018); Scott and Enander (2017); Sellnow et al. (2018); Tan et al. (2017); van Dijk et al. (2018); Veil et al. (2011); Watson and Rodrigues (2018)
Risk/preparedness: DRR; planning; Hyogo/Sendai framework; risk index; assessment; perception; understanding; interpretations; hazard adjustment; risk-informed decisions	Al-Nammari and Alzaghal (2015); Blake et al. (2017); Brattberg (2012); Burling and Hyle (1997); Burns and Marx (2014); Cerè et al. (2018); Chmutina and Rose (2018); Cvetkovića (2019); Eiser et al. (2012); Faivre et al. (2018); Galarza-Villamar et al. (2018); Hajito et al. (2015); Hakaloba et al. (2016); Hou et al. (2019); Islam et al. (2013); Johansson (2017); Kachali et al. (2018); Kumar and Bhaduri (2018); Mashi et al. (2019); Mitchell et al. (2016); Nanda and Raina (2019); Olofsson (2011); Sadiq and Graham (2016); Shabanikiya et al. (2019); Shreve et al. (2016); Solinska-Nowak et al. (2018); Sundar et al. (2017); Surjan and Shaw (2009); Sternberg and Batbuyan (2013); van Laere (2013); van Vactor (2012); Veeramany et al. (2016); Wei et al. (2018)
Assorted themes: aid work; mass death; humanitarian logistics; recovery and reconstruction; vulnerability; sanitation; poverty; health education; resilience; armed conflict; riots; extreme stress; elder abuse and neglect; prison crisis management; wildlife hazard; altitude illness; water distribution; drinking water; mass gatherings; health indicators; social determinants; external experts, learning	Ahmad et al. (2017); Aronsson-Storrier (2017); Atallah (2016); Atienza (2015); Bates and Peacock (1989); Bayer (2017); Beerens and Tehler (2016); Benini (1993); Boonmee et al. (2017); Broekema et al. (2017, 2018); Connolly (2014, 2015); Coupet et al. (2013); Crichton et al. (2009); Cuny and Tanner (1995); Darkow (2018); Dobson (2017); Fekete (2018); Fischer (1999); Foxell (1997); Gaillard and Navizet (2012); Gaillard et al. (2019); Gunderson et al. (2012); Gupta and Sharma (2006); Gutman and Yon (2014); Herrgard et al. (2017); Ibrion et al. (2015); Idris and Soh (2014); Illiyas et al. (2013); Kim and Park (2018); Kim et al. (2018); Le Dé and Gaillard (2017); Lefevre et al. (2018); Maikhuri et al. (2017); Marktanner et al. (2015); McEntire (2012); Mignan et al. (2016); Moroto et al. (2018); Nazempour et al. (2018); Nomura et al. (2016); O'Brien et al. (2010); Pascapurnama et al. (2018); Perry (2003); Phillips et al. (2008); Quarantelli (1993); Rabta et al. (2018); Rajakaruna et al. (2017); Régnier et al. (2008); Robert and Lajtha (2002); Sahebi et al. (2017); Saputra et al. (2015); Sarkar and Vogt (2015); Scanlon (2008); Scanlon and McMahon (2011); Scanlon et al. (2007); Shiwaku et al., 2006; Sienkiewicz-Małyjurek et al. (2019); Skryabina et al. (2017); Tselios and Tompkins (2019); Villegas-González et al. (2017); Wachira (1997); Wisner (2017)
Meta level: political perspectives; regime types; societal safety; symbols, rituals and power; ethics; gender; fractal crisis; multi-	Barthe-Delanoë et al. (2018); Chan (2013); Geale (2012); Koukis et al. (2016); Lagadec (2004); Manyena (2014); Miller and Pescaroli (2018); Normandin and Therrien (2016); Olsen et al. (2007); Ren (2000); Sadia

(Continues)

layered challenges; linked crisis event; psychology; disaster diplomacy; collaborative workflows	et al. (2016); Seitz and Davis (1984); Songsore (2017); Stark (2010); 't Hart (1993); Topper and Lagadec (2013); Wright and Foster (2018); Zhang and She (2014)
Government/business continuity; economy; consumer response; public-private partnership; leadership; cost-benefit; microfinance; industry; institutional failure, organizations, policy implications, EU capacity, social services, duty of care, critical infrastructure, community/resident response/resilience, water treatment, incident command system, local involvement	Ahmad and Ahmad (2018); Ahn et al. (2010); Ahrens and Rudolph (2006); Ainnuddin and Routray (2012); Ainnuddin et al. (2013); Backman and Rhinard (2018); Baekkeskov and Rubin (2014); Brown et al. (2017); Caragliano and Manca (2007); Carrel (2005); Chen et al. (2013); Cheng et al. (2017); Clasen et al. (2006); Devitt and Borodzicz (2008); Frank and Schvaneveldt (2014); Frost (1994); Galbusera and Giannopoulos (2018); Gehlich-Shillabeer (2008); Marincioni et al. (2013); Hughes (1993); Iles (1994); Janius et al. (2017); Jensen and Waugh (2014); Jong et al. (2016); Kelman (2017); Lalonde (2007); Lapčević et al. (2019); Nilsson (2010); Pescaroli and Kelman (2017); Pheng et al. (2010); Prager et al. (2018); Pursiainen (2018); Rapeli (2017); Sawalha et al. (2013); Schulman (2011); Sherrieb et al. (2012); Shreve and Kelman (2014); Teo et al. (2017)
Natural disasters & natural disaster management	Abbas and Routray (2014); Adeagbo et al. (2016); Aini et al. (2000); Baytiyeh and Naja (2013); Czaja and Cottrell (2014); Doyle et al. (2019); Ekici et al. (2009); Gunn (1995); Kapucu (2006); Madan and Routray (2015); Metri (2006); Moe and Pathranarakul (2006); Moe et al. (2007); Munro (2006); Rehman et al. (2019); Samaddar et al. (2014); Shrestha et al. (2019); Singh et al. (2018); Wilt et al. (2018); Wung and Aka (2019)
The transboundary crisis	Allen and Taylor (2014); Ansell et al. (2010); Benini and Bradford-Benini (1996); Boin (2019); Boin and Ekengren (2009); Boin et al. (2014); Callaghan (2016); Hermann and Dayton (2009); Neal and Younis (2006); Noji (2001); Sinha (2000)