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Enhancing cross-border disaster management in the Balkans: a framework for collaboration part I

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Abstract

This abstract presents the methodological approach employed in a comprehensive study focusing on decision making in a collaborative manner in disaster management, with a specific emphasis on cross-border disasters in the Balkan region. Disasters, characterized by their sudden and profound impacts on human life, property, and the environment, necessitate a well-coordinated response. Emergency management, which encompasses preparation, response, and recovery phases, relies on the collective efforts of diverse agencies, organizations, and individuals to ensure an efficient response. The preparedness phase is particularly vital, entailing the formulation and execution of plans, policies, and procedures to effectively respond to disasters. Cross-border disasters, which transcend international borders and affect multiple countries and communities, present unique challenges due to the need for coordination and cooperation among various national governments and organizations. This research addresses the multifaceted aspects of disaster preparedness and cross-border disaster management within the intricate context of the Balkan region. The management of disasters demands a coordinated and proactive approach, especially when dealing with cross-border disasters. International cooperation and effective communication are essential for an effective response and minimizing the disaster's impact on affected communities. Consequently, it is imperative to establish collaborative frameworks that enhance cross-border disaster risk reduction on various levels. To construct the components of a cross-border emergency preparedness framework, an extensive literature review was conducted, identifying ten essential pillars for disaster management. Subsequently, 129 recommendations formed the initial framework, which became the subject of a Delphi study. In this study, 104 experts from 12 participating Balkan countries aimed to reach a consensus on the framework's elements. The study unveiled common aspects necessary for a cross-border preparedness framework tailored to the Balkans' geographical characteristics. This framework was jointly endorsed by various emergency management experts with distinct functions and roles in disaster response. The process and results of this thesis underscore the critical need among Balkan countries to establish a tangible and sustained collaborative environment. This environment should foster a shared mindset and create a pathway towards resilient and sustainable cross-border emergency management cooperation and unity among Balkan countries.

Keywords: Decision-making, Regional development, Cross-border emergency management, Delphi study

Introduction

The changing landscape of disaster management

Disasters, both natural and man-made, have long cast a shadow over human existence, conjuring images of ruin and despair. The word "disaster" itself, with its roots in Proto-Indo-European, once signified the unfavourable aspects of celestial bodies. Ancient civilizations often blamed the stars for the calamities that befell them. However, in today's interconnected world, we can no longer point fingers at the stars. Disasters persist, and our understanding of them must evolve.

Mami Mizutori, a prominent Japanese diplomat and United Nations Office Special Representative for Disaster Risk Reduction, reminds us that disasters disproportionately affect marginalized and vulnerable communities. Natural hazards alone do not constitute disasters; it is the combination of hazards, exposure, and vulnerability that transforms them into catastrophic events. This realization underscores the need for a new approach to disaster management, one that acknowledges the inevitability of disasters and focuses on reducing their impact.

As we journey through time, from the distant past when humanity emerged to the dawn of civilization, we encounter the emergence of complex societies and settlements. With these advancements came new challenges—crises, catastrophes, and disasters. The seeds of disaster management were sown in these early societies, as they grappled with the need to be resilient in the face of adversity.

Today, the modern concept of emergency management (EM) has taken centre stage. It provides the framework for communities to reduce vulnerability, manage risks, and cope with disasters. The COVID-19 pandemic of 2020 was a stark reminder of the critical role played by effective emergency management systems. Disasters, whether natural or man-made, inflict significant financial, environmental, and societal losses. The scientific community has been repeatedly called upon to provide evidence-based strategies for disaster preparedness and management in an increasingly crisis-prone world (Sever et al., 2018).

This paper which is the first part of a doctoral research, explores disaster management in a cross-border context, a subject that has garnered limited attention to date. Cross-border areas are characterized by shared risks, increased vulnerability, coordination challenges, and, at times, conflicts and displacement. Addressing these challenges requires a collaborative, multidisciplinary approach involving multiple stakeholders from different countries and sectors. In this context, this research seeks to provide insights into the dimensions of disaster preparedness and contribute to the concept of cross-border emergency management.

Disaster management today entails more than just responding to emergencies; it encompasses comprehensive risk management strategies that fuse threats with vulnerabilities. The core objective of disaster management is to circumvent disasters altogether, underlining the significance of the preparedness phase (Stenchion, 1997). Logistics, particularly in humanitarian aid, has emerged as a vital component in averting suffering and preserving lives during disasters. However, humanitarian operations are rife with unpredictability and complexity, demanding innovative solutions, such as pre-positioning

supplies, inter-agency coordination, and technology-driven supply chain management (Tomasini & Wassenhove, 2009).

Talking about cross-border

Disasters are more likely to strike border areas. Since nations are frequently separated geographically by rivers or mountains, they are greatly prone to natural disasters (Flemming, 2011). Cross-border regions are intricate and dynamic places. Although they suggest separation, they are really points of contact between various levels at the same stage (Fontal et al., 2021). This became evident in Europe as early as the 60 s. In Europe, cross-border cooperation has a long history. Border areas were already bringing their unique issues to the attention of the European and national governments in the 1960s, and they were working together to seek solutions. Because of their remote position and the difficulties in their way on an administrative, legal, language, and infrastructure level, these areas were at a serious disadvantage. Parallel to these endeavours, the Treaty of Maastricht (1992), which formalised efforts to establish the open internal market, removed internal administrative boundaries inside the EU, theoretically enabling the free movement of goods, people, services, and money.

Paquay et. al. (2021) investigated 1771 articles and found that there are limited scientific studies on disaster management preparedness in the countries the EU region. The realm of cross-border disaster management and collaborative efforts in disaster preparedness is a subject that has received limited scholarly attention (Benzie et al., 2017). This doctoral research aims to fill this gap by delving into the intricate domain of cross-border disaster management in regions with a history of geopolitical turmoil, with a particular focus on disaster risk reduction (DRR). The Balkans, a region historically marked by political divisions, provides a unique backdrop for this study.

However, cross-border cooperation is a broad sense and it does not mean that every country of the European continent, whether a union member or not, enjoyed the advantages provided by this cooperation to its maximum extent. Cross-border issues such as cross-border disaster management could be seen under the umbrella of European programmes that fostered cooperation among countries and allowed border regions to tackle various common problems from economic to environmental, to regional competitiveness as well as disaster resilience. Although the aforementioned description makes it evident how important the aspect of cross-border cooperation is, it is impossible to say much about the specific results on these cooperation activities that was able to be achieved in terms of institutional, managerial, and operational integration for each country (Pedrazzini, 2005).

With this in mind, the same success story cannot be said for the Balkan region. The geopolitical and economic situation in the Balkans, which is heavily impacted by its complex and persistent historical heritage, has placed restrictions on how the cooperation policy process was implemented. The transformation process was proven to be non-linear and violent and destructive despite several attempts to manage and address it. In fact, the Kosovo War in 1998–1999 and the war in Bosnia between 1993 and 1995 marked the heights of ethnic violence. In reality, until today, there are still unsolved historical conflicts in the territory of the former Yugoslavia notwithstanding the economic and political progress made during the first phase of the transition process and the

concurrent process of the EU integration (Berisha, 2018). Still, progress has been made in terms of disaster risk reduction by all the countries of the Balkans lagging, however, behind on the cross-border dimension due to the historical geopolitical turmoil that exists between the countries.

Having this in mind, the full integration of the Balkan Region is deemed an essential step for the future of the EU (Berisha et al., 2021) the development of cross-border cooperation (CBC) programmes and activities encompassing the regions intends to tackle issues of mutual relevance, producing benefits in terms of political understandings, economic and social prosperity and increased integration in general (Blasco et al., 2010). That is why this research targets its research in the Balkan peninsula not only to address the challenges of cross-border cooperation in terms of disaster management but also to contribute and expand the efforts that have been done so far to provide new insights on better disaster risk reduction in the Balkans and pave the way for a better cross-border collaborative disaster management.

Cross-border frameworks

Cross-border cooperation in times of disaster has not been extensively studied. Even fewer studies have looked at the issue of neighbouring countries that are not part of a federal state or union and share a natural hazard that has the potential to bring substantial damage to both societies (Simon et al., 2015).

Attempts for conceptual frameworks for issues on the cross-border dimension have been previously made, targeting specific topics, such as climate change and cross-border impacts. Benzie et. al. (2017) argue that to date there is limited work done on the topic of cross-border impacts. The unique characteristic of cross-border disasters in terms not only of socioeconomic impacts in the affected areas but also of operational needs, international collaboration and decision-making processes needs to be taken into account and puts to the table the prospects of joint cross-border strategies. This endeavour is represented in the conceptual framework that the research tries to develop and creates the opportunity in the long term to establish the mentality of cross-border risk management through joint mechanisms that set apart the geopolitical impediments of the Balkan countries and bring forth the urgency for the much-needed joint cross border disaster risk reduction practices in the region.

Intrinsic challenges of cross-border resilience to unanticipated large-scale disasters continue to be an unresolved scientific subject as well as a pressing one for practitioners. A coordinated effort between the two countries involved is necessary for a successful intervention, as is a thorough understanding of the administrative and economic contexts on each side of the border, as well as the capacity to get past intercultural barriers caused by language, administrative processes, customs, and social norms. A particularly insightful example to investigate cross-border resilience is the French–German border area. Practitioners and decision-makers would be led astray if they assumed that a country's resilience could be inferred from its apparent economic growth and integration. The French–German border still has hidden but significant vulnerabilities; thus, it is crucial to fully take into account its unique characteristics to assess and increase its resilience (Adrot et al., 2018).

The tricky role of cross-border emergency management

Boin et. al. (2013) focused on the issues of building European Union capacity to manage cross-border crises and through their results they indicated that more research is required to determine how organisational paradigms improve or degrade the effectiveness of cross-border crisis management. This might be used as information in a conversation between the EU and its member states about the structure and procedures for cross-border crisis management in the future. The desired outcome of such a discussion could have been a distinct separation between horizontal and vertical competences. Horizontal competences refer to the ability of different actors to coordinate and collaborate with each other across different policy areas and levels of governance. In the context of crisis management, horizontal competences involve the ability of different government agencies, civil society organizations, and private sector actors to work together in a coherent and effective manner. The development of horizontal competences is essential for managing complex, transboundary crises that involve multiple actors and policy domains (Boin et al., 2013). Vertical competences, on the other hand, refer to the ability of different levels of government to work together in a coordinated and effective manner. In the context of the European Union, vertical competences involve the ability of national, regional, and local authorities to work with the EU institutions and agencies to manage crises that affect multiple jurisdictions. The development of vertical competences is essential for ensuring effective and efficient crisis management that is responsive to the needs and interests of all stakeholders (Boin et al., 2013). By interplaying with the horizontal and vertical competences would lead to a formal response framework, made up of networks and agencies, that fits the fundamental characteristics of the Union and results in a coordinated, successful response to cross-border crises. However, formal cross-border response frameworks have not yet been established let alone cross-border preparedness frameworks in the EU context.

Following Carter's argument (2021) that to date, there is limited work done on cross-border topics (e.g., cross-border impacts) and Boin's research arguments (2013), and this research builds upon this existing gap, specifically focusing on the less investigated preparedness dimension for developing a formal cross-border framework contributing to the preparedness literature on cross-border disaster management and endeavouring to establish a common framework for emergency management challenges that exist in neighbouring countries, focusing on a very diverse region in Europe, the Balkan Peninsula.

Although political boundaries have little bearing on the likelihood of a natural disaster occurring, cross-border communities typically experience less effective crisis preparedness, post-disaster relief, and recovery efforts. To improve policymakers' and practitioners' job performances in the prevention, readiness, and relief of border-related natural disasters, this research provides an insight on an innovative, cross-border collaborative framework that could be potentially exploited jointly by the Balkan countries.

Theoretical background

Preparedness is key prior to an effective response. Since disaster management is a cycle that includes several distinct phases, including prevention/mitigation, preparedness, response, and recovery, there is the need to have sound knowledge and practices in each face in order for all of them to facilitate the improvement of the realm of emergency management (IFRC, 2019). Each of these phases is interconnected and relies on the effectiveness of the others to be successful. If preparedness is lagging behind, response will also lag behind since the system cycle is interconnected (UNDRR, 2020). The preparedness phase is very complex, and thus, space for improvements is open. The current research first will establish its limits by focusing on the theoretical and practical insights on disaster preparedness and set its scope on cross-border disaster preparedness management. Although there is a small body of literature focusing on the dynamics of cross-border issues in EU regions, such as the work done for the euregio-meuse-rhine region, or between France, Germany and Switzerland (Abad et al., 2018), there has not been a particular study on the very challenging region both geographically and geopolitically of the Balkan peninsula.

Thus, the current research contributed and shed light upon the much less studied geographical region of the Balkans and contributed to the very limited literature that exists in terms of cross-border disaster management. That is why, it is essential to build upon good disaster risk reduction mechanisms to grow and enhance the coping capacities of all these countries. This will build a strong pool of neighbouring countries in the Balkans ready to be able to help not only themselves in the event of disasters but also other countries that would need disaster relief without having the burden of heavy socio-economic losses as a consequence.

The research brought together all the major emergency management stakeholders from governmental ones to operational groups and humanitarian organisations. These different stakeholders showed similarities among them and their resources have a collaborative aspect in cross-border aspects. However, these different emergency management stakeholders have also inherent differences among them and it is important to try to understand what causes these different objectives and dissimilarities. For example, first responders' stakeholders have different problems and needs than, e.g., civil protection agencies. Thus, it would be insightful to cluster such differences and commonalities to find a common pattern. This is in line with the research of Carayannis et. al. (2019) which showed that using a quadruple/quintuple helix innovation model suggests using a systematic, collaborative approach that can address the numerous problems facing society. They highlighted the development of social innovations at the local level, and the inclusion of other pertinent players may contribute to their continued growth and sustainability as well. Above all, the invention of the quadruple/quintuple helix may offer a participatory domain, including several stakeholders in a common process of knowledge generation. The current research's scope was to cluster these groups of interest with their various commonalities and differences and build upon their shared goal for a common cross-border disaster preparedness framework that each of the stakeholders will build upon their prioritised aspects of the agreed framework.

As a summary of this work, this research explored the emergency preparedness management in the context of cross border (CB) disasters in the Balkans and investigated the strategic preparedness phase of cross-border emergency management.

Through the methods that will be analysed in this first part, cross-border collaboration in the Balkans is endeavoured to be enhanced through the development of a cross-border preparedness framework targeted to facilitate nations on commonly accepted cross-border dimensions that need to be in place as part of the cross-border cooperation between the Balkan countries for natural disasters. Understanding the importance of cross-border collaboration and creating the path for joint cross-border emergency management processes in the Balkan case is essential and this can provide policy incentives for the involvement of different relevant emergency management actors and enhancing the relationships of neighbouring countries in emergency preparedness and in civil protection. Thus, the first step is to build the building blocks for such a long-term cooperation on disaster risk reduction in the Balkans. This research can be viewed as a co-creational process for cross-border disaster management targeting the phase of preparedness among the countries in the Balkans.

The complex nature of disaster preparedness, involving a multitude of stakeholders from both public and non-public sectors, poses a significant challenge to effective collaboration during disasters. As (Ying & Pheng, 2014) emphasize, collaboration during disasters differs markedly from collaboration in normal circumstances. It prompts the fundamental question: what factors hinder stakeholders from effectively collaborating during disasters to achieve common goals that are unattainable through individual efforts?

This research aims to lay the foundation for a collaborative framework that can guide cross-sector cooperation during the preparedness phase of the emergency management process. In this paper, it seeks to address the first two research questions:

RQ1: What are the essential dimensions for creating a coherent cross-border emergency management in the Balkans as the foundations to facilitate the preparedness phase in inter-regional and cross-border cooperation?

RQ2: What could be a co-creational preparedness framework to enhance the disaster risk reduction and preparedness dimensions of cross-border disaster management using the region of the Balkans as the investigative basis?

These research questions will serve as the foundation for exploring the intricacies of cross-border disaster management in the Balkans and, ultimately, contributing valuable insights that can guide policymakers, practitioners, and researchers in their collaborative efforts to enhance disaster preparedness and risk reduction in this region.

The current research might be considered as a forecasting attempt and endeavour in the formation of a better foundational framework in the preparedness dimension of cross-border disaster management. This doctoral research can be viewed as the provision of a foundational basis that so far does not exist in the region for evaluating and monitoring the quality of cross-border cooperation. This first foundational basis will enhance the fundamental joint understanding of cross border emergency management issues in Balkans.

To give a context, the Balkan region has faced significant challenges in disaster management, including limited resources, political instability, and ethnic tensions. However, the region has made progress in disaster management, particularly in preparedness and response. This progress can be attributed to factors, such as building strong partnerships, effective communication strategies, and investing in preparedness measures to reduce disaster risk.

This research "brought together" 12 countries in the development of a cross-border disaster preparedness framework in the Balkans. The categories presented in the framework were recurring in the literature and through the research methods the experts reached a consensus that all ten categories of the framework are relevant when we want to have a common basis for what should be prioritised in cross-border disaster management in the Balkans. The recommendations presented in each category of the framework was subject to differences based on the nature of the organisation and not all sub-topics managed to make it in the framework. The views of the experts do not represent necessarily the views for their own organisation but what should exist as a whole that would be also helpful in the long run for their own efficient practices and collaboration in terms of cross-border disaster preparedness actions to be improved commonly in each country. This will ultimately contribute to the enhancement of cross-border disaster risk reduction in the Balkans (Fig. 1).

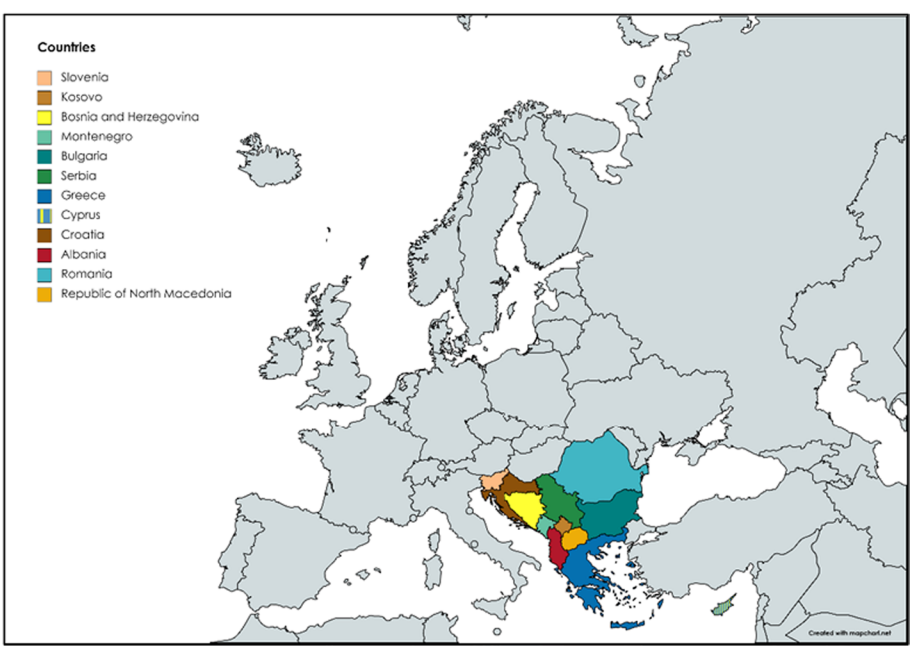

Fig. 1 Map of the countries that the research dealt with

Importance of the cross-border preparedness framework in the Balkans

As the growth in the Balkan countries continues, so does their exposure to risk from climate change and natural disasters. The unprecedented floods in 2014 cost Bosnia and Herzegovina over €2 billion in losses and damages (almost 15% of the country's GDP), and Serbia over €1.5 billion in losses and damages (almost 5% of Serbia's GDP). In 2018, extreme heat caused hundreds of fires to break out across the Balkans and created a drought in Serbia that reduced agricultural output by about 10%, and compelled Albania to spend $200 million on energy imports in the midst of a terrible drought (Van Gelder, 2018). These catastrophic occurrences serve as vivid reminders of the area's vulnerability to shocks associated with disasters and the reminder that in order for the Balkan countries to keep their rate of development up, they need to be as resilient to disasters as possible. To manage or prevent the catastrophic results in socioeconomic and environmental terms, there is the necessity for joint cross-border disaster preparedness management between the Balkan countries. The following factors were taken also into consideration for the selection of the study area to develop a framework:

1. The Balkans have higher degrees of hazard exposure and prone to disaster risks;
2. The border regions of the countries with their rural population are in a more disadvantageous economic development position due to their depopulation and there have distinct vulnerabilities;
3. A number of collaborative initiatives for disaster preparedness have been working in this area for improving the disaster risk reduction mechanisms of the Balkan countries, the community livelihoods by adaptation strategies, enhance resilience capacity, and overall disaster management and risk awareness;
4. There is a strong political momentum for the non-EU countries of the research for meeting the transitional process towards EU accession and thus, this paves the way for better cross-border collaboration with the neighbouring countries in all dimensions (social, political, economic, environmental, entrepreneurial) and subsequently for better disaster management;

Since, until this point no basis on common cross-border frameworks exist in the Balkans a conceptual cross-border framework can be helpful for:

- Providing a nomenclature or common language to define the structural components and interconnections of cross-border climate change impacts;
- Improving comprehension and increasing awareness by identifying and categorising the many factors at play (such as the drivers, triggers, processes, dynamics, and scales) to give a transparent and systematic mapping of cross-border climate change impacts;
- Enabling consistent comparison of cross-border impacts across various industries and regions within a single framework, even if these analyses may have taken place

across a variety of disciplines using contrasting data and methodologies of varying degrees of complexity (e.g., compare the cross-border effects of flooding in the context of a trans-boundary river basin versus a global financial network);

- Providing a framework for investigating, identifying, and evaluating the risks and uncertainties caused by cross-border climate change impacts as well as for focusing on effective solutions within the larger context of building resilience, enabling adaptation planning.

Methodology

The Balkan countries had a very tempestuous geopolitical history the past decades filled with political unrest, wars, fragmentations and devastating socio-economic results that slowly and steadily had started to recover and gain momentum again after the 1990s and 2000s. In this complicated mix of events, cross-border emergency management in the Balkans was not prominent in the previous decades due to its problematic geopolitical history. Cross-border disaster management is an emerging issue mostly in the current decade as it can also be seen in the shift of European civil protection focus towards the notions of disaster preparedness and the dimensions of the borders. This research was conducted aiming to contribute to the conceptual issues of cross-border emergency management in a very diverse and challenging geographical area, such as the Balkans from both research and an applied perspective. The current research might be considered as a forecasting attempt and endeavour in the formation of a better foundational framework in the preparedness dimension of disaster management in the context of cross-border emergency management as well as the provision of a basis that so far does not exist for evaluating and monitoring the quality of cross-border cooperation, by enhancing the fundamental joint understanding of cross border emergency management issues in Balkans. The following section introduces the methods used to achieve the aforementioned endeavour.

Qualitative methodologies bring value to the research of how institutions/organisations/agencies may learn from jointly establishing foundations for cross-border disaster management. Qualitative methodologies are important for figuring out how things operate and why. In qualitative research, things are described and understood based on individual viewpoints and experiences (Drupsteen, 2014). There is no doubt that decision-making will become more thorough and comprehensive as a result of collective wisdom (Habibi et al., 2015). Meissner et. al. (2011) noted that an explanatory sequential design involves first gathering quantitative data and then gathering qualitative data to supplement or further explain the quantitative results. The justification for this study is that, while quantitative data and findings would give a broad image of the research topic, further analysis, particularly through the gathering of qualitative data, is required to enhance, expand, or explain the overall picture. Finally, in terms of the ecosystem of the stakeholders of the quadruple helix the that would be part of the research, the current research followed the work of Carayannis et. al. (2017) who offered a theoretical

framework for the investigation and creation of co-opetitive innovation ecosystems at the regional and sectoral levels. To model, explain, and predict the nature and dynamics of the role and behaviour of the constituent elements of ecosystems—that is, government, university, industry, and civil society entities operating within a triple bottom line (social, financial, and environmental excellence) mandate—they have proposed and profiled the introduction and use of the quadruple/quintuple innovation helix system framework as an enabler and enactor of innovation and entrepreneurship ecosystems in general and regional/sectoral competitive ecosystems in particular. The current research followed the research design approach as presented below (Fig. 2):

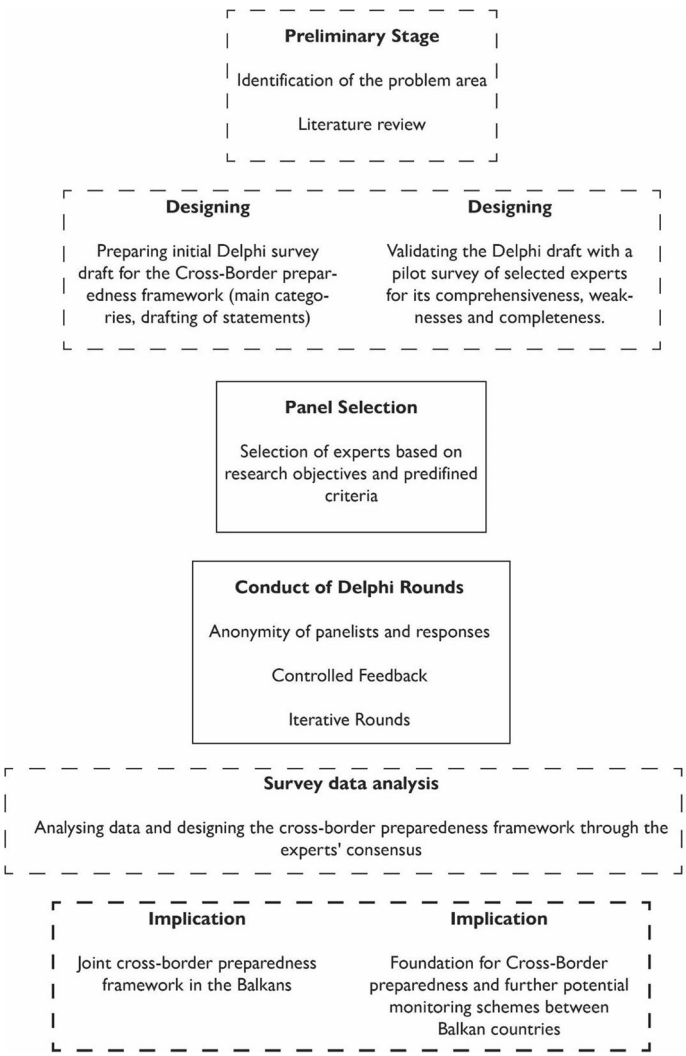

Fig. 2 Research design

The DELPHI method

The Delphi study of this research was performed through a two-round Delphi iterative consultation process with experts (Keeney et al., 2006). The technique is broadly utilised in the research context (Blasco et al., 2010; Peeraer & Van Petegem, 2015; Yeh & Cheng, 2015) have already described its validity for questionnaire development. This section provides an analysis of the method used for the elaboration of the research survey.

Historically, the Delphi methodology, which was first created by Dalkey and Helmer in 1963 at the Rand Corporation in the 1950s, is a widely acknowledged and utilised strategy for reaching consensus of opinion about real-world knowledge obtained from experts in certain issue areas. Dalkey and Helmer (1963) while employed by the Rand Corporation, undertook experimental research that eventually led to the development of Delphi. The initial experiment, known as Project Delphi, "*was designed to apply expert opinion to the selection, from a Soviet strategic planner's viewpoint, of an ideal U.S. industrial target system and to the estimation of the number of atomic bombs required to reduce the munitions output by a prescribed amount*" (p. 458).

The Delphi methodology is a research technique that involves the use of expert opinion to forecast future events or identify solutions to complex problems. Linstone and Turoff (1975), and Okoli and Pawlowski (2004) analysed the advantages and disadvantages, which must be taken into consideration when deciding to use this approach. These are:

Advantages

- Anonymity: The Delphi method provides anonymity to the experts, which allows them to provide their honest opinions without fear of criticism or judgment.
- Expert consensus: The Delphi method seeks to achieve consensus among experts, which can lead to more accurate and reliable results.
- Flexibility: The Delphi method is a flexible approach that can be adapted to different research contexts and can be used to answer a variety of research questions.

Disadvantages

- Resource-intensive: The Delphi method can be resource-intensive and time-consuming, as it involves multiple rounds of data collection and analysis.
- Limited sample size: The Delphi method typically involves a small sample size, which may not be representative of the broader population.
- Limited scope: The Delphi method is typically focused on a specific topic or research question, which may limit the generalizability of the findings.

The Delphi method can be a useful research approach in situations where there is limited information or knowledge about a particular topic or problem which in our case is the limited work on cross-border disaster preparedness management in the Balkans. Thus, this method can provide valuable insights and expert opinions that

can be used to inform decision-making processes. However, it is important to consider the limitations of the approach and to carefully design the research to minimize potential biases and limitations.

According to the analysis of Hsu and Sandford (2007) the Delphi method is a well-known and acknowledged way to collect information from respondents within their field of expertise. The method is intended to establish consensus of view on a particular real-world topic through group communication (Ab Latif et al., 2017; Keeney et al., 2011). The Delphi method has been used to develop a full variety of alternatives, explore or expose underlying assumptions, as well as correlate judgments on a subject that encompasses a variety of disciplines, in a number of different fields of study, including program planning, needs assessment, policy determination, and resource utilisation. By employing a series of questionnaires distributed through many rounds to collect data from a panel of chosen individuals, the Delphi methodology is particularly suited as a way for fostering consensus. When planning and executing Delphi research, it is important to take into account factors including subject selection, study duration, the likelihood of low response rates, and inadvertently directing responder group responses.

The Delphi method is often used to collect the input from an expert panel on a predefined topic (Diamond et al., 2014). It includes multiple rounds of data collection and thus represents an iterative way to structure decision-making processes. In a classical Delphi study, the first round is used to collect participants' ideas and/or opinions on a certain topic. In the subsequent rounds, participants receive anonymised feedback on the statements generated in the previous round and are then asked to re-evaluate their answers, considering the answers of the other panellists. While the Delphi method historically was used to make predictions, it is nowadays most often applied to reach consensus among experts on complex topics (Flemming, 2011).

The Delphi method has been used in the literature for a variety of purposes, including program planning, needs analysis, establishing policies, and resource use. According to Delbecq et. al. (1975), the Delphi technique may be used to accomplish the following goals:

1. To develop or determine a variety of potential program alternatives;
2. To examine or uncover underlying assumptions or data that produce various conclusions;
3. To look for material that could lead to a consensus among the response group;
4. To correlate well-informed opinions on a subject spanning several fields, and;
5. To educate the response group of the topic's diverse and connected facets (p. 11).

By employing a series of questionnaires to gather information from a panel of chosen individuals, the Delphi procedure is an effective way to generate consensus (Dalkey, 1969; Dalkey & Helmer, 1963; Lindeman, 1981; Linstone & Turoff, 1975; Martino, 1983; Young & Jamieson, 2001). Prior to starting the study, it is important to give serious thought to the subject selection and the timelines for conducting and finishing a Delphi study. The study's design and execution should additionally take into account the extra safeguards around low response rates, unintentionally influencing feedback, and

assessing panellists about their poor subject knowledge rather than asking for their expert opinions.

For the purposes of the current research the Delphi method was chosen due to the fact that the Delphi method's characteristics, such as a series of thorough surveys and controlled feedback on the opinion, are essential because they attempt to obtain a very credible consensus of opinion from a group of experts (Dalkey & Helmer, 1963). In fact, Delphi goes beyond straightforward expert assessments based on intuition since it maintains a rather tight control over the techniques used to interview and re-question panellists and to summarise the findings (Linstone & Turoff, 1975; Sackman, 1975).

Selection of experts

The fundamental principle of the Delphi process is regulated indirect interaction amongst experts (participants who possess expertise of the subject matter of Delphi), with a tendency for the experts' opinions to converge over time. A minimal standard must be established to identify the experts. According to (Melnyk et al., 2009), group members must be acknowledged and verified as subject matter experts while researchers continue to work to elicit a wide range of individual viewpoints on those standards. Although there is no standard, panels of fewer than 10 and more than 1000 experts are uncommon, with 10–100-expert panels being the most typical (Avella, 2016). In the Delphi literature, it is indicated that the panel size varies from only a few to hundreds of experts and so far, there is no agreement regarding the size of the panel (IFRC, 2019). For the Delphi study of this research, a minimum threshold of 50 experts was set and the target was to reach at least 100 in total from all the countries of the Balkans under investigation. It was essential to have representation of experts from each country, but it was also challenging to reach out, find the respective experts from each country and have the full commitment of them for all the Delphi rounds.

Simultaneously with preparing the first questionnaire, a list of experts from the Balkan countries who would be invited to participate in the Delphi method survey was formed. The selection of experts was based on (Dalkey, 1972). The experts in the Delphi approach, according to Dalkey (1972), are knowledgeable and experienced in a specific subject. Experts are characterised as those with knowledge, experience, and the ability to influence policy (Baker et al., 2006). Delphi panellists are chosen based on their competence in the issue so they may contribute to the discussion (Hatcher & Colton, 2007). Individuals are considered qualified to be recruited to participate in Delphi research if they have relatively comparable backgrounds and experiences regarding the information linked to the target topic, according to the criteria used to guide the selection of Delphi participants.

Following the above steps, a total of 104 experts from the countries discussed in the previous chapter were identified and were finalised as the expert participants to be invited in the research Delphi survey.

DELPHI rounds data collection

A two-round Delphi method was used in this research. After rounds 1 and 2, the data were analysed, synthesised and were used to finalise the cross-border emergency preparedness framework.

Data collection took place at two distinct time periods. The first Delphi round was conducted between January and February 2022 and the second round between June and July 2022. The complete Delphi study consisted of two rounds. In each round, a selected panel of experts in emergency management were invited via email to take part in the study. Data were collected using an online tool (Qualtrics XM) and the experts had at least 3 weeks to provide their answers. It was possible to interrupt the completion of the questionnaire and continue at a later point in time if they wished to do so. Reminders were also sent by email after the third week of the initial time frame for the completion of the questionnaire by the experts. Phone calls were also carried out to increase the response rate and to avoid dropouts.

Regarding Round 2, regardless of whether the experts had taken part in earlier rounds or not, all experts who were approached for participation at the beginning of the Delphi research were contacted again and requested to take part. According to Boel et. al. (2021) despite the fact that this may not be a common practice in Delphi research, it can be advantageous in that it results in a more accurate representation of opinions in the original panel and can prevent false consensus.

According to Delbecq et. al. (1975), when determining how many participants should be included in a Delphi study, researchers should choose a minimum adequate number of participants and should aim to confirm the findings by additional research. According to Ludwig (1994), "usually, the number of experts necessary to produce a representative pooling of judgements and the information processing power of the research team" define the number of experts utilised in a Delphi study (p. 52). However, there is never agreement in the literature about the ideal number of participants in a Delphi survey. If the background of the Delphi subjects is uniform, 10–15 subjects would be adequate, according to Delbecq et. al. (1975). In contrast, more participants may likely be required for a Delphi investigation if different reference groups are included. The average size of a Delphi panel, according to Witkin and Altschuld (1995), is about 50, while larger panels have been used. The bulk of Delphi investigations, according to Ludwig (1997), "have utilised between 15 and 20 respondents".

Based on the above, the current research took into account the guidelines of Witkin and Altschuld (1995), to Delbecq et. al. (1975), and Ludwig (1997) and defined a minimum set of 50 experts to be utilised in the current cross-border research Delphi study.

Building the joint cross-border emergency preparedness framework

This section provides answers for the first research question as stated in the introductory chapter. RQ1: what are the essential dimensions for creating a coherent cross-border emergency management in the Balkans as the foundations to facilitate the preparedness phase in inter-regional and cross-border cooperation?

To pave the path for a joint cross-border emergency management among the Balkan countries by establishing a common foundational framework, first, it was important to identify the pillars that were crucial in terms of disaster management that exist

throughout the EM cycle and that will be the basis to enhance them on the preparedness stage. A literature review was conducted to identify the thematic categories and pillars to be integrated in in the preparedness EM framework. The literature review was necessary to extract the EM pillars that would be embedded in the Delphi Study adopting also the dimension for cross-border disaster management. Cross-border disaster management in many levels has not been done yet (Klein, 2021). Thus, the current research will contribute and shed light upon the much less studied geographical region of the Balkans and contribute to the very limited literature that exists in terms of cross-border disaster management. The literature review focused on worldwide literature pertaining disasters, cross-border or transboundary disasters and crisis, emergency management and disaster preparedness.

The selection of literature for identifying the essential core pillars of emergency management was guided by established best practices in research methodology, including the use of systematic and transparent processes for searching, screening, and selecting literature (Booth et al., 2016). Factors that were considered, included the research questions, the scope of the project, and the available resources. A systematic search of databases, journals, and other relevant sources using keywords and search terms related to the research questions were conducted. The results of the search were then screened based on relevance, quality, and date of publication criteria. Articles that met the criteria were then selected for further review and analysis. Ten (10) core categories were identified that will be presented below and will make up the foundational framework pillars for cross-border preparedness management in the Balkans. In several studies (Abad et al., 2018; Adrot et al., 2018; Alexander & Sagramola, 2014; Ansell et al., 2010), the authors have identified the challenges in establishing cross-border resilience and putting forth the importance of cross-border strategies and the roles of decision-making and governance in managing cross-border crisis. Cross-border networking was deemed essential for achieving cross-border disaster resilience.

Barriers and facilitators in interorganizational disaster response across Europe were identified in the works of Berchtold et. al. (2020), Brown et. al. (2008), and Cardona et. al. (2003). In CBM (2019), COE (2013), DG ECHO (2019, 2021), and Edwards (2009) aspects for risk analysis, technological issues needed for effective emergency management along with the importance of community engagement were identified. EUNAD (2017) prompted the need for inclusion of vulnerable groups, the importance in assisting people with disabilities in case of disasters). Issues on public health emergency preparedness along with various aspects of resource identification in disaster contexts were identified through the work done in European Centre for Disease Prevention and Control & Italian Institute of Public Health (2016) and European Commission (2021). In disaster management, command and control are essential to the coordination of resources, personnel, activities to ensure an effective response to the disaster along with that building and maintaining the capacity of organizations and communities to respond to disasters is critical for effective disaster management. Various aspects of capacity building, the need for established trainings, risk assessments and command and control along with technology and information security issues in disaster situations were deemed essential through the literature review (FEMA, 2008; Freitas et al., 2018; GFDRR, 2017, 2020; IFRC, 2010, 2020; International Federation of Red Cross & Red Crescent Societies, 2016,

2018; Khan et al., 2019; Larken et al., 2001; Maini et al., 2017; Marin-Ferrer et al., 2017; Murphy et al., 2016; OECD, 2008; Palm & Ramsell, 2007; Patrisina et al., 2018; Princen et al., 2016; Simon et al., 2015; Turnbull et al., 2013; UNDP, 2014; UN/ISDR & UN/OCHA, 2008; UN Economic & Social Council, 2020, 2021; UN Human Rights Council, 2020; Wittkowski et al., 2004). The ten pillars for the cross-border framework are:

1. Governance and leadership
2. Command and control
3. Technology and information security
4. Capacity building and maintenance (education, training and simulation exercise)
5. Risk analysis
6. Workforce capacity
7. Cross border networks
8. Community engagement
9. Resources
10. Health care

In these ten core pillars, a total of 129 recommendations for emergency management including cross-border aspects were identified, adapted or newly developed based on the gaps identified. These 10 core pillars along with their respective recommendations made up the initial framework which was the subject of the Delphi study that the selected experts from the participating Balkan countries tried to reach a common consensus. These framework elements present the most important and interconnected elements that exist in an emergency management regime with some additional elements identified and added that play an important role in cross-border EM context.

Based on each category, the initial relevant recommendations will be the basis for the first Delphi round until a consensus for all the required recommendations needed in a cross-border context is reached. Open questions for additional recommendations from the experts will be taken into consideration for the second Delphi round along with the statements/recommendations that reached consensus on the first round. After consensus has been reached, a priority ranking order of each statement would be further elaborated with the insights of the experts. From these recommendations, a further step and endeavour for future studies are the possibility for the creation of key performance indicators that can be developed as a further step as an initial monitoring approach on essential aspects that are jointly agreed from the EM experts of the Balkan region which could help the countries to have a common comparative basis among them to promote common lines of action. This section provides answers for the following research question:

RQ2: What could be a co-creational preparedness framework to enhance the disaster risk reduction and preparedness dimensions of cross-border disaster management using the region of the Balkans as the investigative basis?

The experts that took part in the research from the Balkan countries were representing: Greece, Albania, Republic of North Macedonia, Bulgaria, Montenegro, Kosovo, Bosnia and Herzegovina, Romania, Serbia and Slovenia with the addition of Cyprus. The experts that participated covered a broad spectrum of the civil protection and

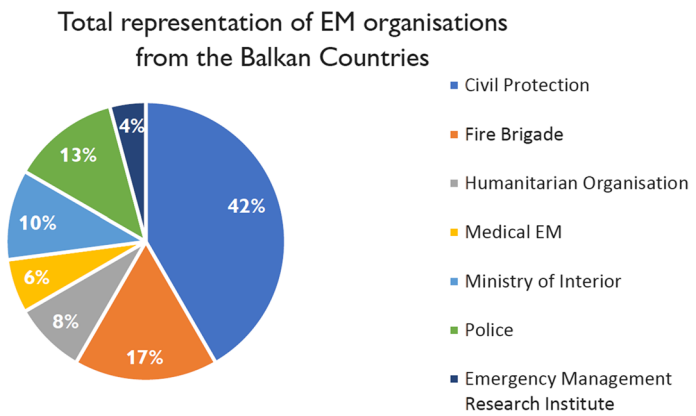

Fig. 3 Total representation of organisations from the Balkan countries

emergency management field. They were senior experts and head officers from civil protection agencies and ministries, first responders emergency management experts (head officers and operationals) from fire brigade, police, emergency medical personnel ambulance, humanitarian aid operationals (e.g., Red Cross) and experts from civil protection regional departments and emergency management research institutes from the aforementioned countries. Figure 3 shows the total representation of the organisations through its experts that took part in the Delphi survey from all the participating countries of the Balkans.

Delphi round 1

The first Delphi round took place from mid-January 2022 to mid-February 2022 sending individual formal invitations and private policy disclosures to each identified expert from the participating countries. The invitation provided a short outline of the research, its objectives, the expected number of rounds, and anticipated time commitment. The Delphi was conducted through the platform Qualtrics XM and the analysis of the results were made with the program Microsoft Excel. Reminders were sent via email to experts 3 weeks after the initial invitation. The nature of the responsibilities in emergency management organisations especially in seasons with high alert levels makes it difficult to receive timely answers and that is why the first and the second Delphi round had a time span of 1 month to give the appropriate time and space to the experts to participate in the survey. However, for the first Round almost all the initial invitees took part in the Delphi survey, reaching 102 recorded responses.

From the total number of 129 statements in the first Delphi questionnaire round across 10 thematic categories in round 1, 36 statements reached unanimously consensus. Therefore, the statements that reached consensus in the first round will not be used for the second round (Table 1). The Likert scale of agreement was a 5-point Likert scale ('1—not at all important' to '5—very important').

Table 1 Total number of statements in R1 and their consensus level

Thematic category	Total number of statements	No. of statements that reached consensus	Chosen criteria to keep statements from round 1
Governance and leadership	46	20	Median = 5, QD ≤ 0.5
Command and control	10	3	Median = 5, QD ≤ 0.5
Technology and information security	16	1	Median = 5, QD ≤ 0.5
Capacity building and maintenance (education, training and simulation exercise)	14	6	Median = 5, QD ≤ 0.5
Risk analysis	12	1	Median = 5, QD ≤ 0.5
Workforce capacity	7	3	Median = 5, QD ≤ 0.5
Cross border networks	5	1	Median = 5, QD ≤ 0.5
Community engagement	6	0	Median = 5, QD ≤ 0.5
Resources	7	0	Median = 5, QD ≤ 0.5
Health care	6	1	Median = 5, QD ≤ 0.5
Total	129	36	

The most common definition for consensus is percent agreement with 75% being the median threshold to define consensus. This is the lightest threshold that would deem that a statement reached group agreement. It is at the discretion of the researcher to choose how strict and for what purpose the threshold for consensus should be. In the current study for the Cross-Border Emergency Readiness Response Framework in the Balkan region there was the need to keep only the most important statements that are unanimously essential for the cross-border context. For that reason, the Median values and the Quartile Deviation were also used to set the strict threshold and only the statements that had the highest agreement value ($M = 5$) and very small dispersion of the values in QD ($QD \leq 0.5$) were kept as statements that reached consensus. Small QD dispersion shows a rigid high consensus on the importance level that cannot change. Thus, these statements were kept from round 1 and will not run again on the second round as they reached the desired consensus.

The second round of the Delphi survey will only take into consideration the statements that were on the level of importance ($QD \leq 0.5$) and ($M = 4$). These statements are regarded as important but not the highest degree of importance, and thus, we will iterate the process to see if there is a change of opinion related to the feedback that will be given. The process will be terminated after achievement of consensus based on the selection criteria and the stability of results. However, due to the fact that it was extremely hard to find experts from all the Balkan countries and with the current geopolitical challenges in the area it is almost impossible to keep all the experts committed for many rounds and the results will be meaningful if stability and final consensus is reached from the second round.

Table 2 Total number of statements in R2 and their consensus level

Thematic category	Total number of statements	No. of statements that reached consensus	Chosen criteria to keep statements from round 1
Governance and leadership	25	8	Median ≥ 4.5, QD ≤ 0.5
Command and control	7	1	Median ≥ 4.5, QD ≤ 0.5
Technology and information security	15	3	Median ≥ 4.5, QD ≤ 0.5
Capacity building and maintenance (education, training and simulation exercise)	8	5	Median ≥ 4.5, QD ≤ 0.5
Risk analysis	11	3	Median ≥ 4.5, QD ≤ 0.5
Workforce capacity	4	2	Median ≥ 4.5, QD ≤ 0.5
Cross border networks	4	1	Median ≥ 4.5, QD ≤ 0.5
Community engagement	6	1	Median ≥ 4.5, QD ≤ 0.5
Resources	7	3	Median ≥ 4.5, QD ≤ 0.5
Health care	5	3	Median ≥ 4.5, QD ≤ 0.5
Total	92	30	

Delphi round 2

The second Delphi round took place from mid-June 2022 to mid-July 2022 sending individual formal invitations and private policy disclosures to each identified expert that participated in the first round. The second round was developed based on the responses of the first round. The statements that reached consensus from the first round were not reiterated in the second round. Along with the invitation and the questionnaire of the second round the experts were also provided with a summary of the statements of the first round that did not reach consensus and showed the percentage of agreement among all the experts that have participated in Round 1 for each statement. These statements were iterated in the second Delphi round to identify which will be the final statements that will ultimately reach consensus and be included in the final cross-border framework. Reminders were sent via email to experts 3 weeks after the initial invitation.

As the summer season is a very stressful period and with many incidents for the civil protection authorities, ministries and emergency management stakeholders it was expected that there would be a dropout rate due to heavy duties in that period from the experts. The total number of answers for the second Delphi round amounted to 70 responses. That is a 30% dropout but the number of experts based on the requirements of the Delphi remained again very high (70) and did not jeopardise the quality of the survey outcomes (Table 2).

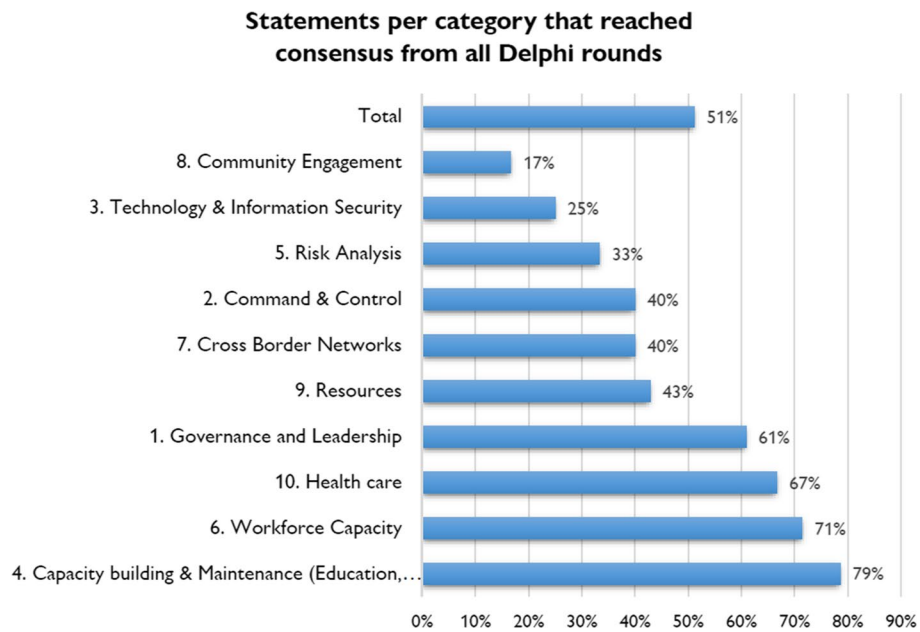

Fig. 4 Percentage of statements that reached consensus from all Delphi rounds in each category

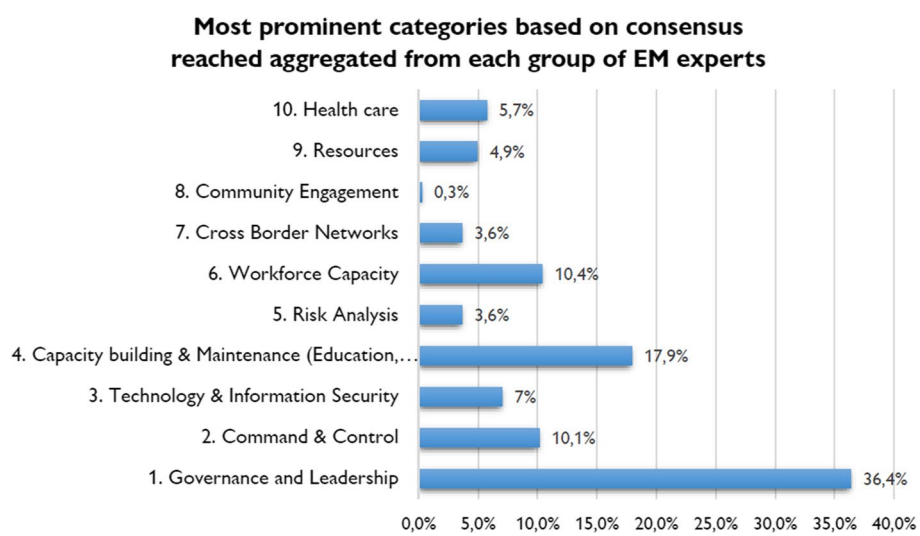

Fig. 5 Most prominent categories based on consensus reached aggregated from each group of EM experts

Analysis of Delphi results from R1 and R2

This section provides a synthesis of the two Delphi survey rounds and presents a clear picture about the most prominent pillars that pinpoint a priority direction for them to be worked upon in a joint cross border emergency management framework (Fig. 4).

After analysing the results from both Delphi rounds, out of the total 129 statements in the Delphi survey across 10 thematic categories 66 statements or 51% of the total number of statements reached consensus that make up the final framework across the categories (Fig. 5).

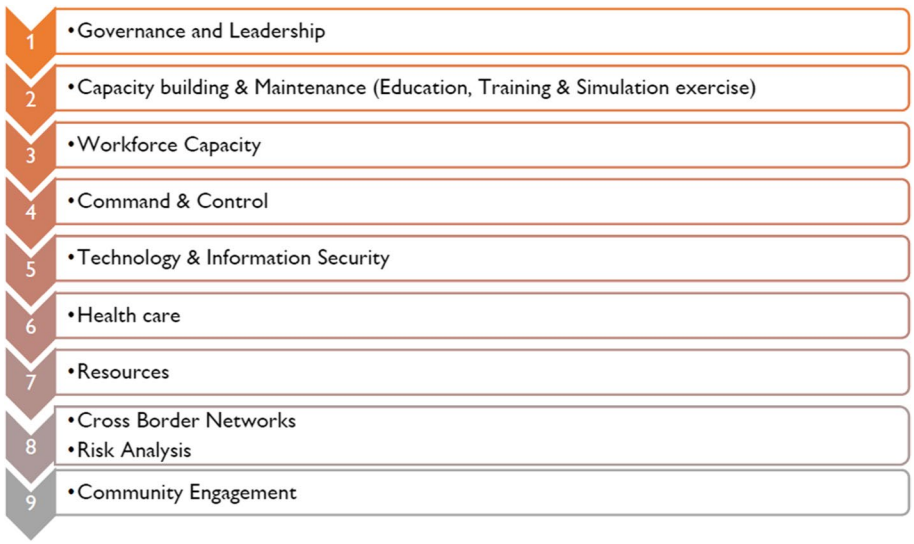

Fig. 6 Ranking of experts' priorities

The ranking below presents based on the experts' consensus the priorities from highest to lowest that need to be put forth and developed in the Balkan countries for advancing cross-border disaster preparedness among the counties. The Priority ranked categories of the framework are based on consensus reached aggregated from each group of EM experts (Fig. 6).

Conclusions

Cross-border areas regularly experience disasters that affect many countries (Nivolianitou & Synodinou, 2011). Cross-border cooperation is necessary for a successful response to the disaster (Newman, 2006). Until now few studies have addressed the issue of cross-border collaboration in disaster situations. Even fewer studies have looked at the problem of neighbouring nations that are not part of a federal state or union and share a natural hazard that has the potential to bring substantial damage to both societies. One such instance was the 2010 earthquake on Hispaniola Island, which is shared by Haiti and the Dominican Republic. The Dominican Republic suffered very minimal damage from the powerful earthquake, while Haiti's ports and airports were completely shut down. Despite tensions between the two nations, the Dominican Republic functioned as a global logistical gateway to provide relief to Haiti over the common border (Forman, 2011).

The Balkan countries share borders that are situated on various geomorphological and geographically diverse environments, therefore, are exposed to a joint threat, and maybe imminent, hazard. Each country alone will most probably be unable to independently provide an effective response to occurrence of a large-scale cross-border disaster. The present research exemplified the potential and interest of all the participating countries' emergency experts to have a coordinated joint cross-border framework that will enable them to cooperate in an emergency situation and build their preparedness on common topics and challenges. It further emphasised that although different countries have different hazards and risks to tackle, it is essential that a joint cross-border framework

exists to overcome the barriers that are commonly acknowledged and exist regardless of the diverse disaster situations.

In today's globalised world, the border area plays a key function as the initial point of contact between the systems and nations in the case of a cross-border disaster. As a result, improving cross-border cooperation to boost disaster resilience is a topic that is receiving more and more attention. By developing framework potential for enhancing cross-border collaboration, both theoretically from an organisational and risk management perspective and empirically to support decision-making for responsible stakeholders, this research contributes to the strategic preparedness phase of cross-border emergency management. To identify significant obstacles and determine success criteria for cross-border collaboration, a twofold research strategy combining literature review and an empirical method with in-depth systematic qualitative methodology Delphi study is used.

The study contributed to this cross-border collaboration through the development of a cross-border preparedness framework targeted to facilitate nations on commonly accepted cross-border dimensions that need to be in place as part of the cross-border cooperation between the Balkan countries for natural disasters. It is clear that each emergency management stakeholder has its own unique functions, needs, problems and strategies, however, they all work together under the umbrella of disaster management and in this particular case the cross-border disaster management. The Balkan countries have a long-history and in the field of disaster management the cross-border dimension is yet to be strengthened between the countries. Steps on this collaboration have been made with national efforts between countries through bilateral agreements and the support of the European civil protection mechanism and through national initiatives.

This research underlying objective tried to give answers on very important topics that are getting momentum in the emergency management realm in the Balkans and that need to be brought into the surface if we want to move forward past the geopolitical rationale and focus on clear collaborative cross-border disaster management with an anthropocentric perspective along with its environmental. The research objective was to set the grounds and provide findings that indicate not only the need to build joint cross-border disaster frameworks but the commonalities that each entity exhibited show the need to open the dialogue on disaster management and truly bring forth the need that it is emerging from this research, to bring the Balkan countries together on a mutual basis of understanding to advance DRR and preparedness levels in the Balkans. This will be achieved with a collaborative and co-creational mindset which this research validated by presenting the consensus reached for creating a common basis of understanding for a common goal which is cross-border disaster management from experts from 12 different countries with different geopolitical agendas. The endeavour of this research was to present the necessity that it indicated through the experts for concrete collaboration among the involved emergency management stakeholders to overcome the common obstacles that exist in the region. Thinking about how cross-border disaster management can be improved by taking into account the countries' experts the research reveals that the countries may gain from a greater

level of interaction with one another through collaborative frameworks. However, their effectiveness and actual operationalisation are yet to be tested.

The second part of the research will analyse the unanimous elements which are the sub-statements for each category that reached consensus and will be used as the building blocks for the future preparedness indicators for cross border emergency management as well as answer the remaining following research questions:

RQ3: What are the commonalities and disparities in the experiences of emergency management experts from Balkan countries, laying the groundwork for collaborative cross-border disaster management?

RQ4: How can the levels of preparedness in the Balkans be elevated through the application of a co-creational framework, considering both the facilitators and barriers to fostering collaboration among emergency management stakeholders?

RQ5: In what ways can a cross-border framework designed to enhance the preparedness dimension of essential emergency management components be leveraged to secure the long-term benefits of Balkan countries?

Finally, this research built upon the existing disaster theory, elaborated and enriched further various elements of cross-border emergency management in a comprehensive and cohesive way. By synthesizing existing literature, highlighting connections and relationships between different ideas, and proposing new directions for research, this research can make a valuable contribution to our understanding of cross-border disasters and how we can better prepare for them. This research demonstrates the importance of enriching the theory in cross-border disaster management, which can help to inform and improve disaster management policies and practices across different countries and regions.

In addition to the previous overarching theoretical contribution, this research makes several additional important theoretical contributions. Developing integrative EM research topics of statements and evaluating them using an expert group with inherent capabilities was an important step towards addressing the paucity of research in the comprehensive assessment disaster management topics focused on the preparedness phase for the adoption of cross-border disaster management. This research not only addresses this important research gap on the less researched topic of cross-border EM but also serves to introduce the co-creational notion of joint decision-making to enhance the disaster risk reduction and preparedness dimensions of cross-border disaster management in the Balkans.

Abbreviations

EM Emergency management
CBC Cross-border cooperation
CB Cross border

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Author contributions
DK had the main work of conceptualization, analysis, interpretation and conduct of the research. IB had the supervising responsibility of the research. All authors read and approved the final manuscript.

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Availability of data and materials
Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare that they have no competing interests.

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References

Ab Latif, R., Dahlan, A., Ab Mulud, Z., & Mat Nor, M. Z. (2017). The Delphi technique as a method to obtain consensus in health care education research. *Education in Medicine Journal, 9*(3), 89–102. https://doi.org/10.21315/eimj2017.9.3.10

Abad, J., Booth, L., Marx, S., Ettinger, S., & Gérard, F. (2018). Comparison of national strategies in France, Germany and Switzerland for DRR and cross-border crisis management. *Procedia Engineering, 212*, 879–886. https://doi.org/10.1016/j.proeng.2018.01.113

Adrot, A., Fiedrich, F., Lotter, A., Münzberg, T., Rigaud, E., Wiens, M., Raskob, W., & Schultmann, F. (2018). Challenges in establishing cross-border resilience. In A. Fekete & F. Fiedrich (Eds.), *Urban disaster resilience and security* (pp. 429–457). Springer International Publishing. https://doi.org/10.1007/978-3-319-68606-6_25

Alexander, D., & Sagramola, S. (2014). For assisting people with disabilities during emergencies, crises and disasters (AP/CAT (2013) 11). EUR-OPA. https://www.coe.int/t/dg4/majorhazards/ressources/Apcat2013/APCAT2013_11_Gudelines_Disability_Alexander_Sagramola_17jan2014_en.pdf

Ansell, C., Boin, A., & Keller, A. (2010). Managing transboundary crises: Identifying the building blocks of an effective response system. *Journal of Contingencies and Crisis Management, 18*(4), 195–207.

Avella, J. R. (2016). Delphi panels: Research design, procedures, advantages, and challenges. *International Journal of Doctoral Studies, 11*(1), 305–321.

Baker, J., Lovell, K., & Harris, H. (2006). How experts are the experts? An exploration of the concept of "expert" within Delphi panel technique. *Nurse Researcher, 14*(1), 59–70. https://doi.org/10.7748/nr2006.10.14.1.59.c6010

Benzie, M., Carter, T., Groundstroem, F., Carlsen, H., Savvidou, G., et al. (2017). *Implications for the EU of cross-border climate change impacts*. EU FP7 IMPRESSIONS Project Deliverable D3A.2. http://www.impressions-project.eu/getatt.php?filename=D3A.2Indirect_Impacts_FINAL_14206.pdf

Berchtold, C., Vollmer, M., Sendrowski, P., Neisser, F., Müller, L., & Grigoleit, S. (2020). Barriers and facilitators in interorganizational disaster response: Identifying examples across Europe. *International Journal of Disaster Risk Science, 11*(1), 46–58. https://doi.org/10.1007/s13753-020-00249-y

Berisha, E. (2018). The importance of cross-border cooperation in the Balkans: Evidence from the bilateral agreement between Albania and Kosovo. https://www.researchgate.net/publication/34657=0401_The_importance_of_cross border_cooperation_in_the_Balkans_Evidence_from_the_bilateral_agreement_between_Albania_and_Kosovo

Berisha, E., Cotella, G., & Solly, A. (2021). *Governing territorial development in the western Balkans*. Advances in Spatial ScienceSpringer. https://doi.org/10.1007/978-3-030-72124-4

Blasco, J. E., López, A., & Mengual, S. (2010). Validación mediante método Delphi de un cuestionario para conocer las experiencias e interés hacia las actividades acuáticas. *AGORA, 12*(1), 75–79.

Boel, A., Navarro-Compán, V., Landewé, R., & van der Heijde, D. (2019). Two different invitation approaches for consecutive rounds of a Delphi survey led to comparable final outcome. *Journal of Clinical Epidemiology, 129*, 31–39.

Boin, A., Busuioc, M., & Groenleer, M. (2013). Building European Union capacity to manage transboundary crises: Network or lead-agency model? *Regulation & Governance, 8*(4), 418–436. https://doi.org/10.1111/rego.12035

Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic approaches to a successful literature review*. Sage.

Brown, D., Saito, K., Spence, R., Chenvidyakarn, T., Adams, B., Mcmillan, A., & Platt, S. (2008). *Indicators for measuring, monitoring and evaluating post-disaster recovery*. In 6th international workshop on remote sensing for disaster applications, Pavia, Italy.

Carayannis, E. G., Grigoroudis, E., Campbell, D. F. J., Meissner, D., & Stamati, D. (2017). The ecosystem as helix: An exploratory theory-building study of regional co-opetitive entrepreneurial ecosystems as quadruple/quintuple helix innovation models. *R&D Management, 48*(1), 148–162. https://doi.org/10.1111/radm.12300

Carayannis, E. G., Grigoroudis, E., Stamati, D., & Valvi, T. (2019). Social business model innovation: A quadruple/quintuple helix-based social innovation ecosystem. *IEEE Transactions on Engineering Management*. https://doi.org/10.1109/tem.2019.2914408

Cardona, O. D., Hurtado, J. E., Chardon, A. C., Duque, G., Velásquez, L. S., Moreno, A., Prieto, S. D., Davis, I., Barbat, A., Briguglio, L., Cannon, T., Doherty, N., Clarke, C., Lavell, A., Masure, P., Comfort, L., Maskrey, A., Solo, T., & Keipi, K. (2003). *Indicators for risk measurement*. IDEA UN.

Carter, T. R., Benzie, M., Campiglio, E., Carlsen, H., Fronzek, S., Hildén, M., Reyer, C. P., & West, C. (2021). A conceptual framework for cross-border impacts of climate change. *Global Environmental Change, 69*, 102307. https://doi.org/10.1016/j.gloenvcha.2021.1023

CBM. (2019). *Disability inclusive disaster risk management*. https://www.cbm.org/fileadmin/user_upload/Publications/Disability_Inclusive_Disaster_Risk_Management.pdf

COE. (2013). *Manual on removing obstacles to cross-border cooperation*. https://ec.europa.eu/futurium/en/system/files/ged/manual-on-removing-obstacles-to-cross-border-cooperation.pdf

Dalkey, N. C. (1972). The Delphi method: An experimental study of group opinion. In N. C. Dalkey, D. L. Rourke, R. Lewis, & D. Snyder (Eds.), *Studies in the quality of life: Delphi and decision-making* (pp. 13–54). Lexington Books.

Dalkey, N. C., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science, 9*(3), 458–467.

Dalkey, N. C., Brown, B. B., & Cochran, S. (1969). *The Delphi method: An experimental study of group opinion* (Vol. 3, p. 107). Santa Monica, CA: Rand Corporation.
Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (1975). *Group techniques for program planning*. Scott, Foresman and Co.
DG ECHO. (2019). *The inclusion of persons with disabilities in EU-funded humanitarian aid operations*. https://ec.europa.eu/echo/sites/default/files/201901_disability_inclusion_guidance_note.pdf
DG ECHO. (2021). *Management plan 2021*. https://ec.europa.eu/info/system/files/management-plan-echo-2021_en.pdf
Diamond, I. R., Grant, R. C., Feldman, B. M., Pencharz, P. B., Ling, S. C., Moore, A. M., & Wales, P. W. (2014). Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies. *Journal of Clinical Epidemiology, 67*(4), 401–409. https://doi.org/10.1016/j.jclinepi.2013.12.002
Drupsteen, L. (2014). Improving organisational safety through better learning from incidents and accidents. *PhD Thesis*. Centre for Industrial Production—Aalborg University Denmark.
Edwards, F. L. (2009). Effective disaster response in cross border events. *Journal of Contingencies and Crisis Management, 17*(4), 255–265. https://doi.org/10.1111/j.1468-5973.2009.00584.x
EUNAD. (2017). *Assisting people with disabilities in case of disaster European network for psychosocial crisis management*. http://www.cop.es/uploads/PDF/ASSISTING-PEOPLE.pdf.
European Commission. (2021). *Union of equality: Strategy for the rights of persons with disabilities 2021–2030*. https://www.un.org/development/desa/disabilities/wp-content/uploads/sites/15/2021/04/European-Strategy-2021-2030_EN.pdf
European Centre for Disease Prevention and Control & Italian Institute of Public Health. (2016). *Handbook on using the ECDC preparedness checklist tool to strengthen preparedness against communicable disease outbreaks at migrant reception/detention centres*. Publications Office. https://doi.org/10.2900/979277
FEMA. (2008). *Emergency management research and people with disabilities*. https://www2.ed.gov/rschstat/research/pubs/guide-emergency-management-pwd.pdf
Flemming, A. (2011). *Konsequenzen aus dem Hochwasser 2010*. Retrieved June 9, 2011, from https://www.deutschlandfunk.de/konsequenzen-aus-dem-hochwasser2010.697.de.html?dram:article_id=78219
Fontal, A., Marsico, G., Ossa, J. C., Millán, J. D., & Prado, A. (2021). The dynamic functionality of borders: A study from a cultural perspective. *Identity at the borders and between the borders* (pp. 37–52). Springer.
Forman, M. (2011). Job stress in disaster case managers working with hurricane Ike recovery (Doctoral dissertation, Texas A & M University).
Freitas, Â., Santana, P., Oliveira, M. D., Almendra, R., Bana e Costa, J. C., & Bana e Costa, C. A. (2018). Indicators for evaluating European population health: A Delphi selection process. *BMC Public Health, 18*(1), 557. https://doi.org/10.1186/s12889-018-5463-0
GFDRR. (2017). *Disability inclusion in disaster risk management*. https://www.gfdrr.org/sites/default/files/publication/GFDRR%20Disability%20inclusion%20in%20DRM%20Report_F.pdf
GFDRR. (2020). *Bringing resilience to scale*. https://www.gfdrr.org/sites/default/files/publication/GFDRR_annual_report2020.pdf
Habibi, A., Sarafrazi, A., & Izadyar, S. (2015). Delphi technique theoretical framework in qualitative research. *The International Journal of Engineering and Science, 3*(4), 08–13.
Hatcher, T., & Colton, S. (2007). Using the internet to improve HRD research: The case of the web-based Delphi research technique to achieve content validity of an HRD-oriented measurement. *Journal of European Industrial Training, 31*(7), 570–587. https://doi.org/10.1108/03090590710820060
Hsu, C.-C., & Sandford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research, and Evaluation, 12*(10), 8.
IFRC. (2010). *Analysis of law in the EU CB relief study-synthesis-report*. https://www.ifrc.org/Global/Publications/IDRL/country%20studies/EU-IDRL-Study-Synthesis-Report.pdf
IFRC. (2019). *Disaster preparedness*. https://www.ifrc.org/en/what-we-do/disaster-management/preparedness/
IFRC. (2020). *World disasters report: Come heat or high water*. https://media.ifrc.org/ifrc/wp-content/uploads/2020/11/20201116_WorldDisasters_Full.pdf
International Federation of Red Cross and Red Crescent Societies. (2016). *World disasters report 2016: Resilience: Saving lives today, investing for tomorrow*. https://www.preventionweb.net/files/50615_wdr2016finalweb2.pdf
International Federation of Red Cross and Red Crescent Societies. (2018). *World disasters report 2018: Leaving no one behind*. https://media.ifrc.org/ifrc/wp-content/uploads/2018/10/B-WDR-2018-EN-LR.pdf
Keeney, S., Hasson, F., & Mckenna, H. (2006). Consulting the oracle: Ten lessons from using the Delphi technique in nursing research. *Journal of Advanced Nursing, 53*(2), 205–212.
Keeney, S., McKenna, H., & Hasson, F. (2011). *The Delphi technique in nursing and health research*. Wiley.
Khan, Y., Brown, A. D., Gagliardi, A. R., O'Sullivan, T., Lacarte, S., Henry, B., & Schwartz, B. (2019). Are we prepared? The development of performance indicators for public health emergency preparedness using a modified Delphi approach. *PLoS ONE, 14*(12), e0226489. https://doi.org/10.1371/journal.pone.0226489
Klein, M. I. (2021). Cross-border collaboration in disaster management (Doctoral dissertation, Dissertation, Karlsruhe, Karlsruher Institut für Technologie (KIT)).
Larken, J., Shannon, H., Strutt, J. E., & Jones, B. J. (2001). *Performance indicators for the assessment of emergency preparedness in major accident hazards*. HSE Books.
Lindeman, C. A. (1981). *Priorities within the health care system: A Delphi survey*. American Nurses' Association.
Linstone, H. A., & Turoff, M. (1975). Introduction. In H. A. Linstone & M. Turoff (Eds.), *The Delphi method: Techniques and applications* (pp. 3–12). Addison-Wesley Publishing Company.
Ludwig, B. G. (1994). *Internationalizing extension: An exploration of the characteristics evident in a state university extension system that achieves internationalization*. Unpublished doctoral dissertation, The Ohio State University, Columbus.
Ludwig, B. (1997). Predicting the future: Have you considered using the Delphi methodology? *Journal of Extension, 35*(5), 1–4.

Maini, R., Clarke, L., Blanchard, K., & Murray, V. (2017). The Sendai framework for disaster risk reduction and its indicators—Where does health fit in? *International Journal of Disaster Risk Science, 8*(2), 150–155. https://doi.org/10.1007/s13753-017-0120-2

Marin-Ferrer, M., Vernaccini, L., Poljansek, K. (2017). Index for risk management INFORM concept and methodology report-version 2017. EUR 28655 EN. https://doi.org/10.2760/094023

Martino, J. P. (1983). *Technological forecasting for decision making*. North-Holland.

Meissner, H., Creswell, J., Klassen, A. C., Plano, V., & Smith, K. C. (2011). Best practices for mixed methods research in the health sciences. *Methods, 29*, 1–39. https://doi.org/10.1002/cdq.12009

Melnyk, S. A., Lummus, R. R., Vokurka, R. J., Burns, L. J., & Sandor, J. (2009). Mapping the future of supply chain management: A Delphi study. *International Journal of Production Research, 47*(16), 4629–4653.

Murphy, C., Creamer, C., McClelland, A., & Boyle, M. (2016). The value of cross-border emergency management in adapting to climate change. *Borderlands: the Journal of Spatial Planning in Ireland., 5*, 34–46.

Newman, D. (2006). Borders and bordering: Towards an interdisciplinary dialogue. *European Journal of Social Theory, 9*(2), 171–186.

Nivolianitou, Z., & Synodinou, B. (2011). Towards emergency management of natural disasters and critical accidents: The Greek experience. *Journal of Environmental Management, 92*(10), 2657–2665.

OECD, European Union, & Joint Research Centre-European Commission. (2008). *Handbook on constructing composite indicators: Methodology and user guide*. OECD. https://doi.org/10.1787/9789264043466-en

Okoli, C., & Pawlowski, S. D. (2004). The Delphi method as a research tool: An example, design considerations and applications. *Information & Management, 42*(1), 15–29.

Palm, J., & Ramsell, E. (2007). Developing local emergency management by co-ordination between municipalities in policy networks: Experiences from Sweden: Developing local emergency management. *Journal of Contingencies and Crisis Management, 15*(4), 173–182. https://doi.org/10.1111/j.1468-5973.2007.00525.x

Paquay, M., Chevalier, S., Sommer, A., Ledoux, C., Gontariuk, M., Beckers, S. K., Van Der Auwermeulen, L., Krafft, T., & Ghuysen, A. (2021). Disaster management training in the euregio-meuse-rhine: What can we learn from each other to improve cross-border practices? *International Journal of Disaster Risk Reduction, 56*, 102134. https://doi.org/10.1016/j.ijdrr.2021.102134

Patrisina, R., Emetia, F., Sirivongpaisal, N., Suthummanon, S., Alfadhlani, A., & Fatrias, D. (2018). Key performance indicators of disaster preparedness: A case study of a tsunami disaster. *MATEC Web of Conferences, 229*, 01010. https://doi.org/10.1051/matecconf/201822901010

Pedrazzini, L. (2005). Applying the ESDP through INTERREG III: A southern perspective. *European Planning Studies, 13*(2), 297–317.

Peeraer, J., & Van Petegem, P. (2015). Integration or transformation? Looking in the future of information and communication technology in education in Vietnam. *Evaluation and Program Planning, 48*, 47–56. https://doi.org/10.1016/j.evalprogplan.2014.09.005

Princen, S., Geuijen, K., Candel, J., Folgerts, O., & Hooijer, R. (2016). Establishing cross-border co-operation between professional organizations: Police, fire brigades and emergency health services in Dutch border regions. *European Urban and Regional Studies, 23*(3), 497–512. https://doi.org/10.1177/0969776414522082

Sackman, H. (1975). *Delphi critiques*. Lexington.

Sever, M., Remuzzi, G., & Vanholder, R. (2018). Disaster medicine and response: Optimizing life-saving potential. *American Journal of Disaster Medicine, 13*(4), 253–264. https://doi.org/10.5055/ajdm.2018.0305

Simon, T., Aharonson-Daniel, L., El-Hadid, M., & Adini, B. (2015). Cross-border emergency coordination and communications using social media: Developing a joint Israeli-Jordanian standard operating procedure for leveraging social media in emergencies. *International Journal of Emergency Management, 11*(2), 169–190.

Stenchion, P. (1997). Development and disaster management. *The Australian Journal of Emergency Management, 12*(3), 40–44. https://doi.org/10.3316/ielapa.397086657696665

Tomasini, R., & Wassenhove, L. V. (2009). Logistics of humanitarian aid. *Humanitarian Logistics*. https://doi.org/10.1057/9780230233485_1

Turnbull, M., Sterrett, C. L., & Hilleboe, A. (2013). *Toward resilience: A guide to disaster risk reduction and climate change adaptation*. Practical Action Publishing Ltd.

UN Economic and Social Council. (2020). *Project for a recommendation on cross-border management of humanitarian relief*. https://unece.org/fileadmin/DAM/cefact/cf_plenary/2020_Plenary/ECE_TRADE_C_CEFACT_2020_09E_EmergencyRelief.pdf

UN Economic and Social Council. (2021). *Project for a recommendation on cross-border management of humanitarian relief*. https://unece.org/fileadmin/DAM/cefact/cf_plenary/2020_Plenary/ECE_TRADE_C_CEFACT_2020_09E_EmergencyRelief.pdf

UN/ISDR & UN/OCHA. (2008). Disaster preparedness for effective response guidance and indicator package for implementing priority five of the Hyogo framework. *United Nations secretariat of the International Strategy for Disaster Reduction (UN/ISDR) and the United Nations Office for Coordination of Humanitarian Affairs (UN/OCHA)*, Geneva, Switzerland, p. 51+iv.

UNDP. (2014). *Disaster resilience measurements*. https://www.preventionweb.net/files/37916_disasterresiliencemeasurementsundpt.pdf

UNDRR. (2020). *Sendai framework for disaster risk reduction 2015–2030*. https://www.undrr.org/implementing-sendai-framework/sendai-framework-monitoring-and-reporting/sendai-framework-disaster-risk

Van Gelder, L. (2018). *It is time for action on climate risk in the Balkans*. World Bank. https://www.worldbank.org/en/news/opinion/2018/09/17/it-is-time-for-action-on-climate-risk-in-the-balkans

Witkin, B. R., & Altschuld, J. W. (1995). *Planning and conducting needs assessment: A practical guide*. Sage Publications Inc.

Wittkowski, K. M., Lee, E., Nussbaum, R., Chamian, F. N., & Krueger, J. G. (2004). Combining several ordinal measures in clinical studies. *Statistics in Medicine, 23*(10), 1579–1592. https://doi.org/10.1002/sim.1778

UN Human Rights Council. (2020). *Analytical study on the promotion and protection of the rights of persons with disabilities in the context of climate change*. https://unece.org/fileadmin/DAM/cefact/cf_plenary/2020_Plenary/ECE_TRADE_C_CEFACT_2020_09E_EmergencyRelief.pdf.

Yeh, D. Y., & Cheng, C. H. (2015). Recommendation system for popular tourist attractions in Taiwan using Delphi panel and repertory grid techniques. *Tourism Management, 46*, 164–176.

Ying, Z., & Pheng, L. S. (2014). Project communication management in complex. *Environments*. https://doi.org/10.1007/978-981-4560-64-1

Young, S. J., & Jamieson, L. M. (2001). Delivery methodology of the Delphi: A comparison of two approaches. *Journal of Park and Recreation Administration, 19*(1), 42–58.

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