



Quality management in humanitarian operations and disaster relief management: a review and future research directions

Sachin Modgil¹ · Rohit Kumar Singh¹ · Cyril Foropon²

Published online: 29 June 2020

© Springer Science+Business Media, LLC, part of Springer Nature 2020

Abstract

Quality management has been widely discussed in the literature, and recent special issues on humanitarian supply chains and relief operations have emphasized the increasing importance of quality management in this key emerging area. In this paper, we provide an extensive literature review in the field of quality management in humanitarian operations and disaster relief management. Our comprehensive review, comprising 61 articles published from 2009 to 2018, leads to the identification of enablers (e.g., transparency, policy framework), challenges (e.g., financial services, identity protection), and theory development approaches, as well as numerous research gaps that must be addressed.

Keywords Humanitarian operations · Quality management · Organizational theories · Enablers · Challenges · Disaster relief

1 Introduction

Over the years, climate change, rapid urbanization, greenhouse gas emissions increase, unforeseen cataclysmic events, and natural disasters have frequently occurred (Cassar et al. 2017; Formetta and Feyen 2019; Hoeppe 2016; Paudel and Ryu 2018). Owing to extreme weather events, including floods, heatwaves, bushfires, and earthquakes, impacted populations must leave their homes every year (Fakhruddin et al. 2019; Goswami et al.

✉ Sachin Modgil
s.modgil@imi-k.edu.in

Rohit Kumar Singh
rohit.singh696@gmail.com

Cyril Foropon
c.foropon@montpellier-bs.com

¹ International Management Institute (IMI), Kolkata, 2/4 C, Judges Ct Rd, Alipore, Kolkata, West Bengal 700027, India

² Montpellier Business School (MBS), France, 2300 Avenue des Moulins, 34185 Montpellier, France

2018; Miller et al. 2017). For example, about 17.2 million people were displaced from their homes in 2018 (Fuller 2020). Therefore, it is critical to handle disasters with the utmost care as they displace more people than any violence or conflict events (UNDRR 2020). Moreover, poverty increases owing to disaster displacement activities, especially in developing and low-income countries. Globally, US\$250 billion is lost due to natural hazards and this has forced around 26 million individuals into poverty (UNDRR 2020). Apart from displacement and poverty creation, increasing disaster frequency is one of the main reasons behind mass deaths, both during the event and post-disaster (EM-DAT 2020). Indeed, the current global scenario presents an alarming picture of events in the recent past. Examples include: (1) Cyclone Idai (2019) in Zimbabwe; around 1300 people died, with 1.5 million affected. (2) In 2018, the Sulawesi earthquake and tsunami in Indonesia together took over 4300 lives and left about 165,000 people homeless. (3) The earthquake in Nepal in 2015 had a death toll of 8964 (Daily Afrika 2019; Duggal et al. 2018; Pascapurnama et al. 2018; Paudel and Ryu 2018; Save the Children 2018). In addition, India witnessed disasters in Kerala, Assam, Bihar, and Maharashtra in 2018 and 2019 (Ali et al. 2019; Anusha and Bharathi 2019; Vishnu et al. 2019) that claimed about 150 lives and affected 15 million people in total (India today 2019). Overall, given the trend in the frequency and impacts of disasters, there is a growing need for quality management approaches within the field of disaster relief management.

Despite the fact that control over or prediction of disasters is extremely challenging, a series of principles and approaches exist for use during and post-disaster for addressing the basic needs for food, clothing, and shelter, and these can influence recovery (Aronson-Storrier 2017; Barabadi and Ayele 2018; Ersel 2015; Pascapurnama et al. 2018; Rufat et al. 2015; Tafti and Tomlinson 2019). Both the disaster and post-disaster phases require the integration of multiple stakeholders, such as non-government organizations (NGO), quick-response teams, local administration staff, nearby communities, and governments (Ritchie and Jiang 2019; Mojtahedi and Oo 2017), and structured responses in disaster-like situations are very important (Erbeyoğlu and Bilge 2020; Himes-Cornell et al. 2018; Zhou et al. 2018). Accordingly, there is a need for quality management in humanitarian operations and disaster relief management (HODRM), in which quality can be defined as “the degree to which stated results of the program at the conclusion level are being or have been achieved” (Hilhorst 2002). HODRM includes activities ranging from preparedness to the post-disaster settlement phase, and the outcome of any HODRM program is a result of the process followed (Prasad et al. 2018; Stephenson 2005); this includes security and safety for rescue teams as well as affected people (Sakurai and Murayama 2019; Whittaker et al. 2015). Quality management approaches in HODRM can help in achieving both enhanced accuracy and satisfaction regarding aid received during disasters (Craven 2017; Izumi et al. 2019; Larson and Foropon 2018).

Other aspects of quality management include appropriate transport networks and resources necessary for moving people, animals, and belongings (Baidya and Bera 2019; Pascapurnama et al. 2018; Sinha et al. 2017). Both coordination and agile structures can help agencies to respond better to the affected population (Abidi et al. 2013; Lukosch and Comes 2019; Oloruntoba and Gray 2006). Moreover, quality management practices in HODRM are associated with reduced risk to lives (Ivčević et al. 2019; Pettersson et al. 2019; Maio et al. 2018). For example, 187 UN members have indicated their agreement to adopt the Sendai framework for disaster relief operations; this framework emphasizes strengthening economic and social resilience in order to minimize the negative effects of natural and anthropogenic climate change (Aitsi-Selmi and Murray 2016; Aitsi-Selmi et al. 2015; Lassa et al. 2019). This framework emphasizes social resilience,

that is, strengthening local capacities and available infrastructure (Lyu et al. 2019; Sternberg and Batbuyan 2013; Hegde et al. 2009). On the economic side, various models, on both macro- and micro-scales, aim to estimate losses in such situations using both neo-classical and institutional growth theories (Botzen et al. 2019). Furthermore, the quality management elements of HODRM impact stakeholders and their respective involvements in decision-making processes and the assessment of the information required in disaster relief processes (Meesters and Van de Walle 2014; Zhou et al. 2018). Disasters require close coordination among different agents to ensure speedy response (Izumi et al. 2019; Mohammadfam et al. 2015; Park et al. 2013), and it is worth noting that previous studies have recommended the use of big data and predictive analytics to design a better response in HODRM (Akter and Wamba 2019; Dubey and Gunasekaran 2016, 2018, 2019b; Singh et al. 2019; Prasad et al. 2018).

Although the nature of each disaster is unique, humanitarian stakeholders need to make improvements in the process from rescue to the resettlement of displaced people (Sushil 2019; Van Well et al. 2018). Therefore, quality management approaches in HODRM are needed. The humanitarian response comprises volunteers and NGOs, and both effective and efficient management of resources is desired, which relates to lean aspects within the area of quality management in HODRM (Banomyong et al. 2019; Cozzolino et al. 2012). To save lives and maintain dignity during and post-disaster, sound quality management practices in HODRM are required (Sakurai and Murayama 2019; Kathleen Geale 2012). In addition, effective quality management approaches should strengthen vigilance for the occurrence of such situations in the future (Aliakbari et al. 2015; Al Thobaity et al. 2017; Rukundo et al. 2014). Attentiveness is crucial, as shown by the very recent example of COVID-19 (coronavirus), which has affected millions of people in more than 150 countries (The Guardian 2020). The approach recommended by the World Health Organization for mitigating such a crisis consists of finding, isolating, testing, treating, and tracing those who might have been in contact with affected people (World Health Organization 2020). This five-stage process defines quality management aspects and the approach to adopt in this particular situation, as well as scenarios and related implementations to consider. Overall, there is a clear need to incorporate quality management aspects within the area of disaster relief management.

Both cumulative complexity and uncertainty generate new challenges for humanitarian agencies dealing with disaster relief operations (Altay and Labonte 2014; Kovacic and Di Felice 2019). For example, people living in cities and urban areas are more at risk and, consequently, HODRM agencies face additional challenges in these crowded areas (Admiraal and Cornaro 2019; Dhyani et al. 2018). It is crucial to define specific role(s) for every actor involved in such situations; meanwhile, humanitarian stakeholders are also expected to innovate regarding responses to disasters (Baharmand et al. 2019; Dhyani et al. 2018; Sanderson 2019; Sushil 2019). In addition, public–private partnerships (PPP) can help with financing through, for example, corporate social responsibility programs (Behl and Dutta, 2019a, b; Chen et al. 2019; Staupe-Delgado 2019; Hildebrand et al. 2017; Whittaker et al. 2015). Moreover, appropriate HODRM funding can help in the execution and effective management of the entire humanitarian program. Another appropriate practice consists of maintaining transparency among coordinating stakeholders with a view to ensuring the quality of operations (Dubey et al. 2018; Hallwright and Handmer 2019; Nolte et al. 2012). Both coordination and collaboration can help HODRM (Moshtari and Gonçalves 2017; Moshtari 2016).

Previous studies have indicated that stakeholders' skills may not be fully utilized in such situations (Cid et al. 2018). Stakeholders range from religious organizations, affected

citizens, public–private sector, and military personnel, to local merchants (Fontainha et al. 2017; Jabbour et al. 2019; Jones et al. 2014). Stakeholders define the success of HODRM according to their respective criteria, that is, their perception of the situation requiring improvement (Gaillard and Mercer 2013; Izumi et al. 2019; Scolobig et al. 2015). Other studies have shown that stakeholders' roles and standards overlap and develop a conflicting environment that hampers the speed of disaster relief (Collins et al. 2018; Solinska-Nowak et al. 2018; Jones et al. 2014). Considering the criticality and importance of HODRM, it is essential to understand stakeholders' roles, responsibilities, and accountability while keeping common objectives in mind (Izumi et al. 2019; Lukasiewicz et al. 2017). A system with common objectives can be adopted as a means for accomplishing operational excellence and avoiding the interplay of power dynamics (Vij et al. 2019).

Quality management aspects in the field of HODRM can influence donors' perceptions and funding amounts (Dubey and Gunasekaran 2016; Michaud et al. 2019; Oloruntoba and Kovács 2015). During a few events, crowdsourcing has been adopted for fundraising in HODRM, whereas some other events have relied on gaming mechanisms (Han et al. 2019). Apart from funding sources, unequal power dynamics and the diverse range of actors and their philosophies affect HODRM from global to local levels (Jones et al. 2014; Lafrenière et al. 2019; Vij et al. 2019). The extant literature has indicated that it may be difficult to formalize roles and responsibilities, but it can be useful to visualize a shared view of HODRM independent of the contributions from individuals, groups, or government organizations (Twigg and Mosel 2017; Whittaker et al. 2015). Hence, to foster quality management practices in the area of HODRM, it is necessary to come up with a coherent system for providing aid for HODRM. Therefore, in this paper, we focus on the following objectives:

1. To carry out a state-of-the-art systematic literature review concerning Quality Management in HODRM;
2. To comprehend and describe grounded organizational alignment in the field of HODRM;
3. To identify and present enablers, challenges and future research directions in the field of quality management in HODRM.

The rest of the paper is organized as follows. The next sub-section focuses on core quality management aspects in HODRM. Section 2 presents the review design. Section 3 delineates the discussion emerging from the review. Section 4 indicates the conclusions, and the limitations and scope for future research follow in Sect. 5. To address the research objectives, we first establish a structured process (see Fig. 1) to filter out relevant articles. We then analyze and classify the articles according to different dimensions (presented in Appendices A through E) and further classify the articles through a grounded theory lens. Lastly, we analyze each article to present the challenges and research gaps associated with quality management in HODRM, and present these in Table 3.

1.1 Scope and importance of the study

Quality management practices among humanitarian players currently remain unaligned, thus leading to different value systems (Greer 2012; Hermansson 2019; Whittaker et al. 2015). In addition, it appears that good intentions are no longer sufficient in a world of rising accountability and professionalism (Bodin and Nohrstedt 2016). Accountability starts with affected people or at-risk societies and culminates with taxpayers (Alam et al. 2019; Scolobig et al. 2015). The focus here is on the level of quality that must be maintained

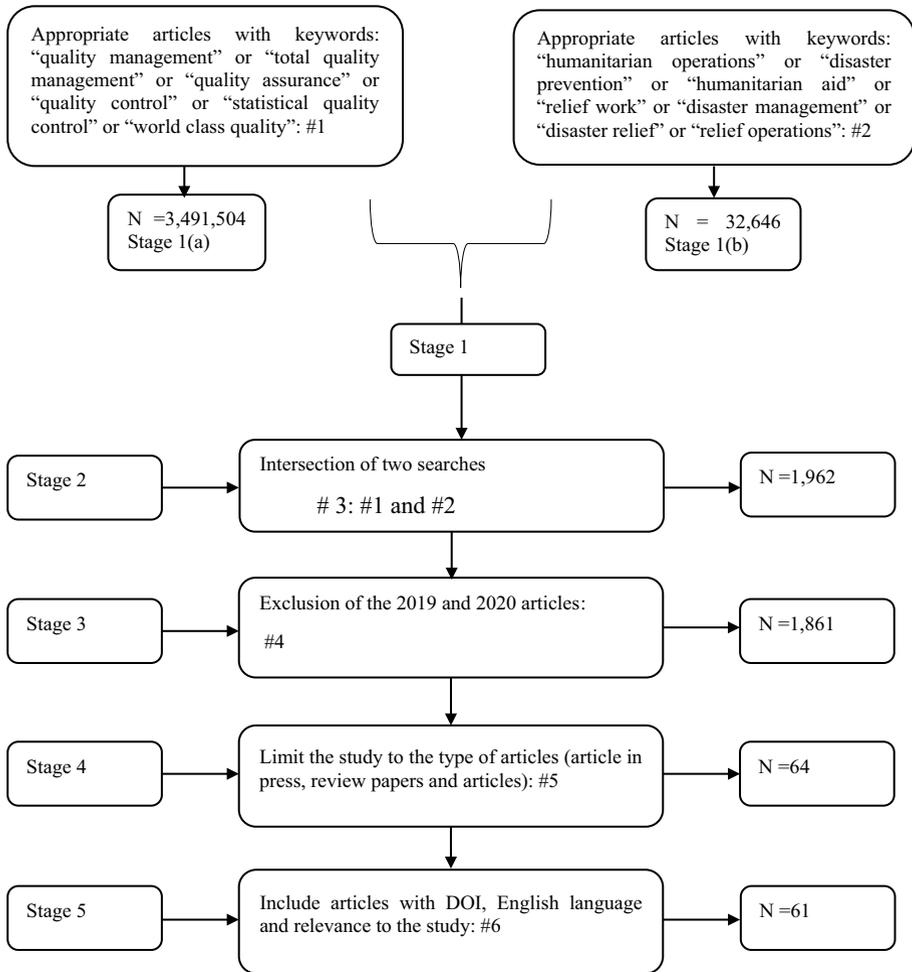


Fig. 1 Data collection process. (Source Scopus Database, August 7, 2019; Author’s compilation)

during such situations. Quality within the area of HODRM can be defined as the degree to which the results of a program or project have been or are being achieved (Puri et al. 2017). Hence, quality parameters can vary depending on the type, scale, and orientation of a disaster. The outcome of the operations performed depends on various factors (Bano-myong et al. 2019; Kovacs and Moshtari 2019; Yadav and Barve 2015). Considering the service orientation aspect of quality provided in HODRM, it becomes critical to provide smooth coordination between affected areas and agencies’ headquarters (Larson and Foropon 2018; Paul and Bagchi 2018).

Another way to look at quality management aspects within HODRM is the relief-providing agency’s certification and its associated value system (Clarke et al. 2019; Holmes 2011; Kovács et al. 2012). Moreover, the delegation of the right person at the right place at the right time with the right skills become crucial for the success of any HODRM program (Albris and Lauta 2019). Systems, tools and methods are effective when someone uses them appropriately. Even skilled personnel need to follow a systematized approach to solve

problems in order to achieve the expected results (Chandana and Leung 2010; Freitas et al. 2019). Hence, it is important to emphasize the provision of appropriate methods, tools, and systems in order to integrate all quality aspects.

A further way to look at quality management could be as a minimum standard requirement that can serve as an initial framework for involved stakeholders (Raikes and McBean 2016; Pothiawala 2015). It is worth noting that quality incurs costs that may occur in any of the critical components that help to outline, investigate, and measure response quality throughout HODRM activities, such as structure, process, and outcome (Kaku 2019).

Structure focuses on the quality of equipment, supplies, appropriate facilities, and strong administration (Cozzolino et al. 2017; Rodríguez-Espíndola et al. 2018). In other words, structure indicates better service access, professionalism, physical and managerial infrastructure. *Process* encompasses the interactions among affected people and the system of HODRM (Gotham and Campanella 2011; Klomp 2019). The quality of these interactions can be measured as the degree of efficiency, safety, continuity, and choice of services and technical performance, measured according to accepted standards (Aven 2016; Rezaei Soufi et al. 2019; Timms 2018). It is usually difficult to measure and predict actual impact when undersized timelines exist and, accordingly, well-known outcome measures, such as satisfaction of the end-user and degree of effectiveness in achieving the desired outcome levels, can be utilized (Ergun et al. 2014; Opdyke et al. 2019; Ma et al. 2019; Solinska-Nowak et al. 2018). The extant literature indicates that quality management in humanitarian operations emphasizes the needs of the affected population; however, focus is needed on both structure and process elements rather than specific outcomes because an outcome is a consequence of the structure and processes followed during HODRM (Gaillard and Peek 2019; Kim and Hastak 2018; Larson and Foropon 2018; Horita et al. 2018). Finally, end-user satisfaction is an essential component, and there is a need for evidence-based approaches and techniques to ensure the quality of operations in disaster relief (Izumi et al. 2019; Jillson et al. 2019; McCabe et al. 2013).

2 Review design

In this paper, the design of the review is based on those conducted by Gupta et al. (2020) and Dubey et al. (2017). The reasons for this inspiration are threefold. First, Dubey et al. (2017) presented a classification of the literature in terms of theory building and application, which are critical for review-based papers. Second, Gupta et al. (2020) have presented both an investigation framework and search syntax, which we have adopted as benchmarks in our study. Third, we have considered and followed the guidelines for systematic literature presented by Gupta et al. (2019, following Tranfield et al. 2003).

The review design is divided into three sections: (1) Preparing for the review, (2) steering the review, and (3) presenting and interpreting the review, as presented in the sub-sections below. Section 2.1 reports the planning for the review as well as the way in which the literature was explored. In Sects. 2.2 and 2.3 we present a diverse view of the quality principles, tools, and techniques used in HODRM.

2.1 Exploring the literature

For the present study we utilized the Scopus database, which is a leading database comprising academic articles, books, and proceedings of distinguished conferences. In

addition, the Scopus database provides useful tools for analyzing, tracking, and carrying out research more effectively. For example, papers can be found from inter-disciplinary areas such as engineering, decision sciences, computer sciences, and social sciences. The performance of HODRM involves multiple stakeholders and different disciplines (Behl and Dutta 2019a, b). Figure 2 shows the array of subject areas selected for this review. Similar to other databases, such as World Cat or Web of Science, the Scopus database provides a leading record of academic journals.

In this study, our focus is to analyze HODRM from a quality management perspective. In the area of relief activities, humanitarian operations form one of the hard components, whereas quality management acts as a soft component (Martin et al. 2015). In humanitarian operations, continuous learning and the assurance of quick delivery of the best services play a critical role in addressing the pressing concerns of affected populations (Whittakar et al. 2015). The service orientation of quality management in relief operations emphasizes reducing waste, focusing on process engineering, and addressing issues raised by the public that help in removing potential obstacles to smooth operations (Larson and Foropon 2018; Tokman and Beitelspacher 2011). Priority services and their delivery design across different platforms play an important role in HODRM (Akbari et al. 2004). Along with process approaches, quality management also supports the adoption of lean methodology within HODRM operations (Larson and Foropon 2018; Cozzolino et al. 2012). Both lean orientation and process focus have played critical roles in increasing organizations' operational performance (Manikas et al. 2019). Both agile and resilient quality management approaches have enabled various stakeholders to respond to changes during relief operations and in the post-disaster phase.

HODRM itself is a complex task to handle owing to its scale and the geographic conditions (Clarke et al. 2019; Jabbour et al. 2019). Humanitarian supply chains and logistics have advanced in terms of coordination and digitization, along with the types of disasters in which they have been applied (Schniederjans et al. 2019). Consideration of human beings have been central to designing such programs in terms of rescuing them and providing food, clothing, shelter, and water and sanitation facilities (Krausmann

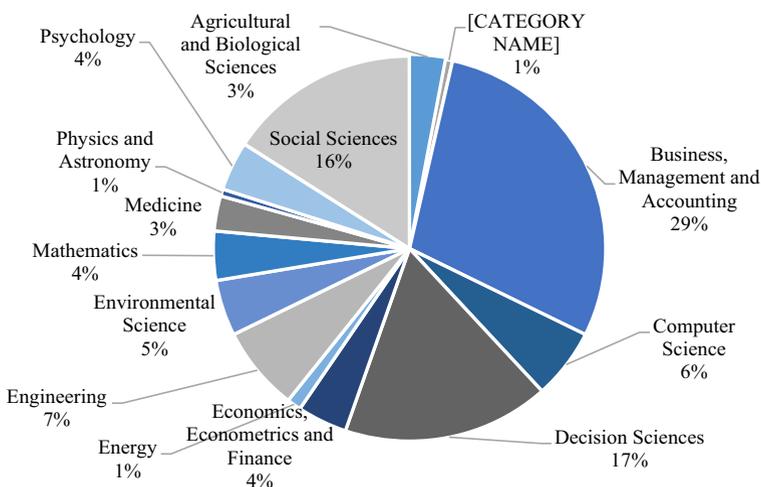


Fig. 2 Areas of Journal Articles after stage 5. (Source Author's compilation)

et al. 2019). Therefore, the resiliency of these operations can be helpful for assuring quality and sustainable outcomes (Goldschmidt and Kumar 2016).

A search for articles relating to these two concepts was performed using the list of keywords disclosed in Table 1. Independent searches on quality and humanitarian operations were executed on Scopus through the OR operator. In addition, both concepts were integrated through Scopus using the AND operator. We have searched different platforms for other keywords mentioned in association with quality; a similar approach was adopted for humanitarian operations. To provide a common output, we used the AND operator in exploration, and Table 2 presents the syntax used in the advanced section of Scopus.

The data collection for this review was been limited to the period 2009–2018 inclusive (10 years), and the search on Scopus was performed on August 7, 2019. Up to 2009, quality concepts in general have been observed to mature enough to be applied in other fields, as exemplified by niche academic journals such as *Journal of Humanitarian Logistics and Supply Chain Management*, beginning in 2011. Recently, in 2020, the *Journal of Operations Management* has announced a special issue on “The Effects of COVID-19 on Global Supply Chains: Responsiveness, Resilience, and Restoration (3Rs),” in which the editors point out the importance of supply chain preparation in HODRM (Besiou and Van Wassenhove 2020; Gupta et al. 2016; Ye et al. 2019). In addition, the *Annals of Operations Research* has recently published a special issue on the “Application of Operations Research (OR) in Disaster Relief Operations (DRO), Part I and Part II.” This illustrates the increasing importance of HODRM and associated research topics. In this review, we excluded part of the year 2019 as the full list of published papers was not available on the date of search. Overall, the set of articles searched is a strict reflection of the data that appeared in the investigation and exploration on August 7, 2019.

The syntax presented in Table 2 resulted in the identification of 61 relevant articles that are reviewed in this study. Quality-related keywords were searched for first (see Table 1). The use of keywords is necessary to define the boundaries of any particular review and to identify related articles. This initial search identifies 3,491,504 documents. A parallel search regarding humanitarian operations was performed using the

Table 1 Keywords used for searching the literature. (Source Author’s compilation)

Keywords			
Quality		Humanitarian operations	
	“quality management”	“humanitarian operations*”	
OR	“quality*”	“disaster prevention”	OR
OR	“total quality management”	“humanitarian aid”	OR
OR	“quality assurance”	“relief work”	OR
OR	“quality control”	“disaster management”	OR
OR	“statistical quality control”	“disaster relief”	OR
OR	“world class quality”	“relief operations”	OR
Search 1(a): 3,491,504 Documents		Search 1(b): 32,646 Documents	
Search 2: Search 1 and Search 2: 1962 Documents			
Search 3: Excluding 2019 and 2020 Papers: 1861 Documents			
Search 4: Limit to 2009 to 2018; Article, Article in Press, Review Papers; Business Management and Accounting and Decision Sciences Domain; English Language: 64 Documents			
Search 5: Limit to Documents with DOI and Excluding conference papers: 61 Documents			

Table 2 Syntax used on Scopus. (Source Author’s compilation)

Search Syntax on Scopus (Search performed on 7 August, 2019 on www.scopus.com)	<pre>((SRCTITLE ("quality management") OR TITLE-ABS-KEY ("quality*") OR TITLE- ABS-KEY ("total quality management") OR TITLE-ABS-KEY ("quality assurance") OR TITLE-ABS-KEY ("quality control") OR TITLE-ABS-KEY ("statistical quality control") OR TITLE-ABS-KEY ("world class quality"))) AND ((SRCTITLE ("humanitarian operations*")) OR TITLE-ABS-KEY ("disaster prevention") OR TITLE-ABS-KEY ("humanitarian aid") OR TITLE-ABS-KEY ("relief work") OR TITLE- ABS-KEY ("disaster management") OR TITLE- ABS-KEY ("disaster relief") OR TITLE-ABS- KEY ("relief operations"))) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "ip")) AND (LIMIT-TO (SUBJAREA , "DECI") OR LIMIT- TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR EXCLUDE (PUBYEAR , 2020) OR EXCLUDE (PUBYEAR , 2019)) AND (LIMIT- TO (LANGUAGE , "English")))</pre>
---------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

keywords shown on the right side of Table 1; this identified 32,646 documents. The intersection of the data resulting from the keywords used in stages 1 and 2 provided the input for the third stage; this resulted in the identification of 1962 documents.

In the next stage, we limited our search up to 2018 only, as the year 2019 was still ongoing; this resulted in 1861 documents. In stage four, we limited our search to articles published or in press in the areas of business management and accounting, along with decision sciences. Decision sciences use multiple disciplines, including engineering, mathematics, and technology, to solve business problems. In addition, the journal *Applied Geography* encourages consideration of the spatial dimension in its articles, hence these aspects are appropriate to HODRM in the current context. We also included the *Journal of Humanitarian Logistics and Supply Chain Management* as Emerald categorizes this journal within the operations and logistics management category. Moreover, we restricted the fifth stage to the English language only; this resulted in 64 articles.

With the exception of those from a computer science background, academics and researchers prefer to publish in journals rather than in conference proceedings (Derntl 2014). Therefore, we used a digital object identifier to exclude conference papers. This resulted in the identification of 61 articles. This set of articles, shown in “Appendix A”, reflects a sample of truly diverse academic backgrounds (see Fig. 2). Appendices A and E indicate that *Applied Geography*, *European Journal of Operations Research*, *International Journal of Physical Distribution and Logistics Management* and *Annals of Operations Research* are among the top journals in terms of number of papers published during the time period considered. Within the scope of humanitarian supply

chains, dedicated journals exist. These include the *Journal of Humanitarian Logistics and Supply Chain Management*, which has published two articles fitting our search criteria of quality and humanitarian operations. Additionally, journals including *Disaster Prevention and Management: An International Journal* have a clear focus on our areas of interest; nevertheless, these focused journals represent fewer papers in our search.

Figure 2 shows the increasing number of published articles located at the intersection of quality management and disaster relief operations, and shows that the field of humanitarian operations has attracted the attention of researchers over the last decade. This may reflect the occurrence of life-threatening disasters such as Hurricane Harvey and the East Africa Floods; these disasters caused significant damage to property and claimed many people's lives (Krausmann et al. 2019). Appendix D presents the citation index of the top 10 papers out of the sample of 61. Finally, "Appendix E" highlights the top 10 journals, instructions, and countries that publish actively in the domain of quality management in HODRM.

2.2 Organizing the literature

In the present study, the selected research articles are organized and classified through organizational theories (Arumugam et al. 2014; Gupta et al. 2020; Sarkis et al. 2011). The identified literature can also be classified according to enablers and building blocks (Gupta et al. 2019; Melnyk et al. 2014; Gunasekaran and Spalanzani 2012). The literature can also be viewed through the lenses of quantitative models (Branenburg et al. 2014). Moreover, we have been inspired by the literature review-based article published by Dubey et al. (2017), in particular the authors' presentation and classification of the literature through a systematic approach without the use of analytical software. These approaches distinguish practical and theory-building studies, and then classify them. Figure 4 and "Appendix B" indicate the status of these studies in this review.

Figure 3 describes the arrangement for classification along with the number of studies in each category. Appendix B provides additional information. As a field, HODRM involves multiple stakeholders and domains; therefore, we have taken a multiple-view approach in this paper. The 61 papers identified are divided into two broad categories, namely: (1) Research-based on the application side, and (2) Theory building. In the first category, the focus is on studies that have analyzed and reported disaster incidents and have identified

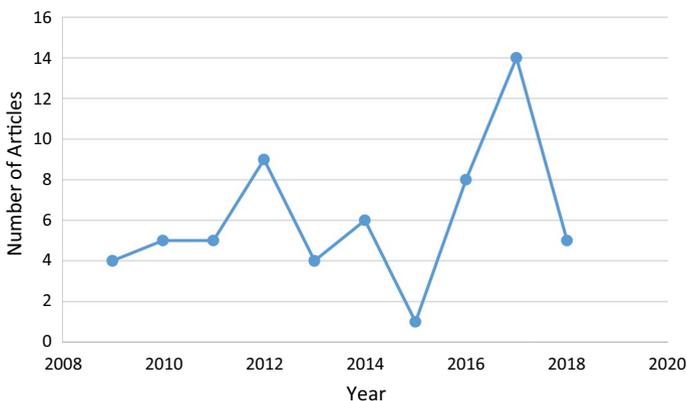


Fig. 3 Number of articles per year. (Source Author's compilation)

patterns and learning points for future planning through mathematical or expert views. In the second category, the focus is on studies supporting, extending, or refuting existing theories. This theory-building approach is further classified in terms of “rational” and “alternative” methods. Articles were further scrutinized according to their level of contribution as well as the current state of research emerging from a critical review; such articles fall under the rationalist approach. Articles were further classified on the basis of conceptual and empirical work or incident-based cases, and are classified as alternative methods. Finally, we have categorized papers with elements of theory and practice under “research based on application,” given that such papers involve experiments and theory-based research.

2.3 Understanding the concepts

We delineated the diverse set of enablers for quality management in humanitarian operations during and post-disaster relief activities on the basis of the 61 identified papers. We identified and listed building blocks and relevant enablers in order to understand how quality management can be maintained in humanitarian operations. Selected articles are classified according to a series of enablers and their respective constituents as presented in “Appendix C”. Apart from enablers, the study also identifies key challenges in disaster relief management.

Enablers support and facilitate the implementation of quality management components in HODRM, whereas barriers restrict both improvement and implementation of HODRM-related activities. We have utilized a thematic analysis approach based on Behl and Dutta (2019a, b) to classify enablers and barriers. A total of 39 themes have been identified from the extant literature with a view to facilitating quality management approaches in HODRM. We further grouped these 39 themes in terms of nearly matching sub-themes, thus resulting in eight new emerging themes classified under “enablers.” All enablers for maintaining quality in HODRM activities are indicated below.

(a) Policy framework

This is an important enabler that guides the entire management of the disaster. It includes the rope rescue method for human beings, animal evacuation, and dead body management to avoid any delay in cremation and handover to family members (Mei et al. 2013; Thompson 2018). In addition, the policy framework indicates the disaster response type and the role of equipment handling in effective disaster management (Jones et al. 2014). Moreover, the policy framework highlights the role played in supporting the coordination of and contribution to international disasters through the training curriculum for organizations’ own officers (Imperiale and Vanclay 2019). National-level policy in disaster management establishes the environment that enables the best relief efforts. The training of vulnerable communities also plays an important role in minimizing the risk of disaster situations (Cedergren et al. 2019; Griffith et al. 2019). Moreover, such frameworks help agencies to have ready their regional vigilance and mitigation strategy through coordination within and among multiple agencies. Identified articles under the policy framework enabler are classified according to the following categories (see “Appendix C”): (1) Guidelines to stimulate interaction between different stakeholders; (2) Guidelines to improve multi-agency coordination; (3) Encourage adaptability, agility, and alignment in value chain; (4) Exchange of ideas among policymakers and humanitarian operation experts; and (5) Common platform for decision making and coordination.

(b) Commitment from stakeholders

Any disaster requires multidisciplinary activities to be performed and coordinated through a unified synergy between all stakeholders (Fakhruddin et al. 2019; Solinska-Nowak et al. 2018; Mojtahedi and Oo 2017). The list of stakeholders ranges from the affected population, to donors, to the task force and other volunteer groups involved in rescue and evacuation (Wilhite et al. 2014). Regional level disaster response teams and local communities can act more quickly than those that are located at the federal level (Carr and Jensen 2015; Edwards 2009). These special teams are trained to provide a specialized response to natural as well as man-made disasters. The teams involve a set of professionals including engineers, electricians, medical officers, paramedics, and a dog squad (Lynn et al. 2018). On the other side, trained volunteers and donors play an important role in supporting and recovering from a disaster. Suitable articles are classified within the following categories: (1) Supporting behavior; (2) Alignment between mandates, goals, and coordination; (3) Long-term vision; (4) Capacity building of humanitarian personnel; (5) Skills use of affected people in humanitarian operations; (6) Cross-community involvement; and (7) Opinion of affected population in disaster recovery.

(c) Transparency and information sharing

Fast information sharing across multiple platforms and maintaining transparency define the success of humanitarian operations. This transparency and information sharing help in cooperation and coordination of resources involved in relief operations at the agency, community, and individual levels (Aker 2017; Peltola and Hämmäinen 2018; Tsukahara 2017; Wamba et al. 2019). The division of tasks, roles, standards, rules, and expected performance can be shared across the network of resources of operations (Hallwright and Handmer 2019; Rodríguez-Espíndola et al. 2018). This helps in managing the time, propensity for innovation, and task execution in the field (Bharosa et al. 2010). In addition, agent-based modelling can be used to simulate the environment in a disaster situation and different ways to execute the task of saving lives (Wagner and Agrawal 2014). At the end of the program, the impact of information sharing and transparency can be evaluated (Dubey et al. 2019a, c; Reuter and Kaufhold 2018). Maintaining transparency also helps stakeholders to view how operations are being performed and how the flow and distribution of goods and funds are maintained. Relevant articles are classified under the following themes: (1) Accountable activities; (2) Flexible and agile flow of information; (3) Information quality; (4) Adequate information processing; (5) Usage of web-based systems to generate swift trust among the affected population and other actors; and (6) Adequate utilization of funds.

(d) Public–Private Partnership (PPP)

Municipalities and local regions can develop their capacity of resilience to tackle crises and catastrophes through the PPP model (Hernantes et al. 2019; Kapucu 2012). This integration can help to take advantage of the competencies and presence of private companies, and it also enables coordination with public organizations (Fontainha et al. 2017). The private sector can be further involved in emergency preparedness by providing training and helping in the response and recovery in such situations (Busch and Givens 2013). Locally

present private and public firms can help in initial actions and measuring the degree of emergency till the full-time taskforce arrives and takes over (Efendi et al. 2019; Moreno and Shaw 2018). Even post-disaster, these types of partnerships can help in overseeing the standards of reconstruction, training of the communities, and regular maintenance of equipment. In addition, this PPP model can help to build population confidence for tackling disasters more effectively (Weichselgartner and Pigeon 2015). Articles have been classified under the following themes: (1) Development of volunteers; (2) Regular training; (3) Developing a trustworthy environment; and (4) Involvement of NGOs and firms' corporate social responsibility arms.

(e) Support from government

Despite the involvement of international aid agencies in disasters, support from domestic government plays a significant role (Klomp and Hoogezand 2018). Effective governance during a disaster can bring many lessons about geography and can prepare the government for any future events in the same category (Dubey et al. 2019d; Walch 2019; Benali et al. 2018). The assistance and protection sought during disasters is a fundamental right of the affected population. For example, governmental nodal agencies such as India's National Disaster Response Force (NDRF) from India are involved in designing the training programs for the development of individuals, volunteers, and professionals to help in a disaster like situation (Rodríguez-Espíndola et al. 2018; Sahay et al. 2016). For crowdfunding, governmental platforms can be trusted by donors, thus enabling its further utilization and the distribution of funds to affected people and for restoring infrastructure (Dubey et al. 2019c). Governments can also support and encourage firms in the effective management of the supply of necessary goods through tax subsidies and other provisions (Kron 2009). Relevant articles have been arranged under the following themes: (1) Provision of human resources; (2) Aid to the affected population; and (3) Subsidies to firms for distribution in affected areas.

(f) Strategic planning

Increasing numbers of disasters across the world have led agencies and governments to be ready with their respective strategic plans (Bae et al. 2016; Sahebjamnia et al. 2015). Each strategic plan involves respective roles for each multi-sector actor in effective disaster management and reducing risk (Paul and MacDonald 2016a; Uhr 2017). Moreover, a strategic plan involves protocols for communication and the selection of resilient and agile suppliers (Venkatesh et al. 2019). Strategic planning includes the design of pre- and post-disaster responses along with location decisions for the relief supplies to be stored (Altay et al. 2009; Madu and Kuei 2014; Qin et al. 2018). The planning for HODRM includes internet restoration and physical infrastructure revival design, including routing and scheduling for evacuation (Cheng et al. 2015; Sabouhi et al. 2019). All options for the transportation mode and network need to be in place to ensure last-mile delivery during and post-disaster (Zhang et al. 2017). Relevant articles have been assigned to the following categories: (1) Planning for a resilient supply chain; (2) Strategic tie-up to fulfill demand via different distribution channels; (3) Disaster readiness; (4) Fleet size and routing decisions; (5)

Long-term planning to establish and advance the affected society; and (6) Establishment of robust and flexible infrastructure (soft and hard) for the future.

(g) Continuous improvement

Humanitarian operations are not just concerned with the evacuation of affected people to nearby shelters. Over the years, they have been extended to inventory planning and control, demand analysis, and collaboration with other organizations (Çankaya et al. 2019; Larson and Foropon 2018; Peng et al. 2014; Madu and Kuei 2014; Davis et al. 2013). Operations need to be further improved, extended, and linked to regional economic and political conditions in order to improve performance (Tang et al. 2019) in a continuous cycle that requires regular monitoring and measurement of activities (Larson and Foropon 2018). Tracking results can help to further improve performance and avoid strategies such as “truck and dump” that fail to establish whether supplies reach those who need them (Ozguven and Ozbay 2013; Rabta et al. 2018). Such operations can be further evaluated based on outreach to discover the perceptions of the affected population, rather than the criteria of efficiency and effectiveness (Utz et al. 2013). Key articles in this category have been classified according to the following themes: (1) Continuous monitoring and evaluation of performance; (2) Improving decision-making processes; (3) Improvement of balance between demand and supply along with appropriate price boundaries; and (4) Measuring the satisfaction level of victims.

(h) Relief speed and safety

Operations design and considerations of the timeframe lead to different phases of disaster management. The speed of the initial response depends upon the initial assessment, level of preparedness and planning, and agencies' implementation capabilities (Galbusera and Giannopoulos 2018; Perry 2007). Response rate can be enhanced through the availability of information about the catastrophe's background along with geographical conditions (Balcik 2017). Such information helps to embed and ensure the safety of the affected population during humanitarian operations, in which safety and security include basic needs and reliable transportation towards hospitals (Goerigk and Grün 2014; Tatham et al. 2017; Yahyaei and Bozorgi-Amiri 2018). Moreover, safety includes the effective treatment of infrastructure and preservation of natural resources (Nagurney and Qiang 2012). Along with safety, the coverage of population density under operations defines the success of a humanitarian program (Bastian et al. 2016). Related articles are categorized in the following themes: (1) Rapid response; (2) Effective reaction to the situation; (3) Ensuring the minimum risk to the public from activities; (4) Minimum risk to public and private infrastructure; (5) Avoiding the destruction of natural resources; (6) Rapid and adequate shelter and medical facilities.

After the analysis of 61 papers, the researchers developed a list of themes following Behl and Dutta (2019a, b). These themes encapsulate ensuring the quality and smooth working of HODRM. In total, 27 themes were identified, categorized under seven main headings. Overall, the seven main themes encompass challenges for ensuring quality in HODRM as described below.

(a) Access to financial services

Financial services are significantly hit in humanitarian crisis settings, and daily necessities become costlier owing to the surge in demand (Watanabe and Hayashi 2015), but affected communities do not have access to formal and informal financial services (Hong et al. 2018). Hence, challenges exist in the provision of affordable and safe access to financial services and their acceptance by local ecosystems (Lee et al. 2011). Further, in strategy terms, data privacy becomes an issue (Altay and Pal 2014). In addition, choosing and establishing a balance between cash disbursement and supply of fundamental goods represents a challenge for agencies. Appendix C highlights the following challenges corresponding to access to financial service: (1) Acceptance of e-money; (2) Cash assistance instead of in-kind items; (3) Profile security; and (4) Internet provision.

(b) Proactive identification

With rapid climate change, it is likely that disasters will become more frequent and more damaging (Shah et al. 2018). Hence, a proactive approach is required to identify communities vulnerable to different disaster types, ranging from droughts and floods to earthquakes (Nagurney and Qiang 2012; De Oliveira Mendes 2009). Agencies need to come up with effective ways to train and raise awareness even among those communities not formerly affected (Cohen et al. 2013). Communities need to be assessed on educational background, ethnicity, and tribal location to reduce risks from humanitarian operations during disaster management (Haworth et al. 2016). The challenges in identifying and preparing to mitigate risk, highlighted in “Appendix C”, are the following: (1) Difficult to map exact location; (2) Unknown scale; (3) Cultural differences; and (4) Non-cooperation for preparedness.

(c) Identity protection

In catastrophes—especially when disasters occur near national borders—it is highly possible that an affected population may become displaced to the territory of another country owing to an earthquake or heavy flooding (Martinez et al. 2018) and in such cases identity protection becomes an issue. For instance, in the last decade in India, the government has introduced the *Aadhar Card* system, a unique identification number provided to every citizen that is valid and digitally secure (Rao and Nair 2019). Nevertheless, it remains challenging to secure land maps and other personal documents that validate the authenticity of a person in such situations. Due to such gaps, identity protection faces challenges such as (1) Accurate land maps; (2) Digitization; and (3) Benefits of identity.

(d) Enhancing the flow of aid

According to Ophiyandri et al. (2013), in many disaster situations affected communities do not have sufficient funds or basic amenities. This is because of constraints associated with humanitarian agencies, public unawareness, and poor government arrangements (Walch 2019). The design of the most effective platforms for collecting money is also an important

question to consider (Kusumasari and Alam 2012). Rarely are there neutral regional bodies that can intervene to catalyze better coordination and help affected communities in the best possible manner (Clarke 2013). In addition, there is a lack of a mechanism that can voice the opinion of affected populations. Challenges regarding the flow of aid are the following: (1) Lack of innovative platforms; (2) Focus on in-kind items; (3) Division of funding lanes; and (4) Lack of transparency in fund utilization.

(e) Direct communication

Direct communication between regional bodies and affected people can act as a trust-building tool, as well as influencing perception of efforts deployed to save people (Dubey et al. 2019a, c). Such two-way communication between agencies, NGOs, and affected communities can help in addressing people's needs (Chen et al. 2013). Moreover, the plan for fulfillment can be divided among actors involved in relief operations. Both adequate information sharing and high quality information can help agencies to plan and design actions (Papadopoulos et al. 2017). Challenges lie in the development of technologies that can facilitate transportation and improve response times in such situations. The unavailability of direct communication can hinder both progress and the involvement of victims, and ultimately affect the actual pace of recovery. Direct communication has certain challenges, namely: (1) Complex environment; (2) Saving life is the priority; (3) Suspended networks, (4) Problems with broadcasting; and (5) Third-party assistance.

(f) Special health facilities

Different people, ranging from children to pregnant women, need special attention in terms of medical care compared with other citizens (Lavin et al. 2012; Sloand et al. 2012). Medical facilities have a responsibility to be effective and to care about culturally sensitive groups (Schulz and Blecken 2010). Mental health intervention and counseling programs can play an important role in stabilizing people who have lost family members and relatives through disasters (Moreno et al. 2018). The challenge lies in two key questions: How can this type of affected population be stabilized? And, what infrastructural arrangements are possible in such settings? Overall, the challenges are the following: (1) Carrying the supporting infrastructure is risky due to hazardous conditions; and (2) Allocation of funds to special health facilities.

(g) Price control

Disasters lead to disruptions in local markets and have an impact on local ecosystems (Sahin et al. 2016). Market disruption brings damage to property and a shortage of basic items in the short run (Cohen et al. 2013). Similar shortage trends have been observed during COVID-19 for hand sanitizer and face masks (ECRI 2020). Due to a sudden increase in demand and the disruption of regular supplies, there is a dearth of food, water, shelter, medicine, and clothing items, and this gives opportunities to local systems to exploit the situation (Ragini et al. 2018). Hence, controlling price gougers in such situations presents a challenge. In addition, on the other side, cost-free supplies from donors and agencies require optimal distribution, utilization and consumption. The challenges in price control

are highlighted in “Appendix C” and include: (1) Monitoring; (2) Supplies; (3) Corruption; (4) Suddenly increased demand; and (5) Opportunistic nature of the situation.

2.4 Underpinning theories

Quality management practices in HODRM during and post-disaster remain challenging and require an integrated approach owing to the involvement of multiple actors (Palttala and Vos 2011). The stakeholder theory argues that disasters impact all stakeholders’ life activities, and this is reflected in price surge situations in the post-disaster environment due to supply shortages (Freeman 2010; Friedman and Miles 2002; Freeman and McVea 2001; Gunasekaran et al. 2018). Supplies are dependent on firms that are either located in the affected geography or in other parts of the world. Firms further depend on their downstream supply chains, and disaster victims are dependent on supplies offered by relief agencies and various individual groups (Carter, 2015; Pfeffer and Salancik 1978, 2003). Behaviors and cooperation between actors define the success of disaster-related situations. Behavioral theory emphasizes that an actor’s behavior may be a result of previous experience with emergency situations (Paek et al. 2010; Petit 1967). This may have an impact on information dissemination approaches, and this can build or lower confidence depending on the prior experience. Behaviors among those involved can further influence the way in which information is provided, and this depends on the way that information is processed and channeled towards actual consumers of information in such situations (Cegielski et al. 2012; James 2011; Egelhoff and Sen 1992). Information flow is critical to social networks, and it defines the levels of interaction and coordination among different actors for better management (Cook and Whitmeyer 1992; Freeman 2004; Gunasekaran et al. 2018; Houston et al. 2015). Social network theory encourages people with similar interests to come together and contribute toward relief operations (Niles et al. 2019). Owing to the complexity and severity of disaster-related operations, relatively few actors act as principals and more as agents, and this situation leads to conflict and may hamper the provision of services and supplies to affected populations (Hoelscher et al. 2017). The “cash crunch” is another issue faced by ecosystems in such situations, and negotiation with vendors for supplies, procurement and low-cost transport route selection can be seen in terms of transaction cost economics (Cohen 2016; Kaur and Singh 2019; Ahrens and Rudolph 2006; Williamson 1979). In addition, the contingency and institutional theories are not exclusively related but explain the ways in which agencies and actors involved in disaster management change their processes and structures to provide efficient responses to geographically challenging environments (Bharosa et al. 2010; Galbraith 1973; Stinchcombe 1987; Drazin and Van de Ven 1985). Institutional theory explains the resilience of social structures and the pressure to perform experienced by actors (Dubey et al. 2015; DiMaggio and Powell 1983). The above-mentioned theories play crucial roles in designing quality management practices in the field of HODRM. Table 3 shows the important features of organizational theories with respect to quality management practices in HODRM and related research gaps that will provide future research directions.

3 Discussion

This section presents the results extracted from the classification derived from the literature review using the Scopus database.

Table 3 Main organizational theories and future research directions. (*Source* Author's compilation)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Resource dependence theory	Lu et al. (2019), Sapat et al. (2019), Prasad et al. (2018), Pazirandeh and Maghsoudi (2018), Gao and Hafsi (2017), Maghsoudi (2016), Hillman et al. (2009), and Pfeffer and Salancik (1978, 2003)	<p>(1) Organizations are dependent on the external resources and actions and are affected by resource utilization</p> <p>(2) The firm's ability to gather, alter and deliver useful services or products at faster speed can augment the performance</p>	<p>(1) In the case of disasters, often demand surges and firms have to respond with their existing resource dependency. Technological platforms along with standardization may help to ramp-up agility internally and in coordination with external agencies (Lu et al. 2019)</p> <p>(2) In the interdependencies of firms, a few are more powerful than others (Skipper et al. 2008). Therefore, it may be noteworthy to uncover the influence of power relations to witness the long-term sustainability in post-disaster recovery (Filo et al. 2015)</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Contingency theory	Imperialte and Vancley (2019), Larson and Foropon (2018), Kunz and Gold (2017), Eriksson and McConnell (2011), Nilsson et al. (2010), Glenn Richey Jr (2009), Donaldson (2001), and Cancel et al. (1997)	<p>(1) There are different ways to derive a program for an organization</p> <p>(2) The optimal way of driving an organization and situation depends on a number of factors that are internal as well as external (Kunz and Reiner 2012)</p>	<p>(1) Contingency theory can be viewed from leadership and organizational perspectives (Shepard and Hougland Jr, 1978). Therefore, it is important to compare the influence of leadership versus the organizational capabilities in disaster relief scenarios</p> <p>(2) Disaster relief coordination needs to view multiple internal and external factors. The interplay of capabilities, resources and specific environment strategy may have an impact on coordination in humanitarian operations (Dubey et al. 2018; Rodríguez-Espindola et al. 2018). Also, agent-based simulation can be used to advance understanding (Altay and Pal 2014)</p> <p>(3) Different organizations have their own handling styles for crises. The government is one of the key players in most scenarios. Hence, it will be interesting to explore the different basic strategies emphasized according to nature, size, and scope (Sousa and Voss 2008) of the disaster and its relation to contingent factors</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Behavioral theory	Sankaranarayanan et al. (2018), Jabbour et al. (2019), Liu et al. (2016), Kuligowski (2013), James et al. (2011), Paek et al. (2010), and Petit (1967)	<p>(1) Explanation of an actor's behavior either in an individual environment or through previous experiences</p> <p>(2) The observation of the subjects in different aspects of tasks in terms of maintaining the relationships, information dissemination and motivation level (Bronfman et al. 2019)</p>	<p>(1) Preparedness for catastrophes helps in mitigating the risk and its impact. The culture and attitude of affected populations play a significant role in emergency preparedness (Appleby-Arnold et al. 2018; Ejeta et al. 2015). Behavioral characteristics differ greatly from the developed to developing worlds. Hence, there is scope to test the relationship among culture, attitude, and governance to prepare the population for emergency situations (Walch 2019).</p> <p>(2) The process, structure, and individuals involved in an organizational framework define the culture (Appleby-Arnold et al. 2018). The multi-dimensional emergency response in a disaster relief situation makes apparent the degree of influence of structure, process, and people on fast recovery</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Information processing theory	Sakurai and Murayama (2019), Fan et al. (2017), Olorunjoba et al. (2016), Othman et al. (2014), Altay and Pal (2014), Preece et al. (2013), Cegielski et al. (2012), James (2011), Masten and Obradovic (2008), and Egelhoff and Sen (1992)	<p>(1) It emphasizes the capability of information processing and its requirement by an organization to achieve optimal performance</p> <p>(2) Organizations, programs, and networks need quality information to address the uncertainty and improve decision making (Kovacic and Di Felice 2019)</p>	<p>(1) Decisions in disasters are taken by different actors pre-disaster or during a disaster; operational decisions such as preparedness, awareness, and planning decisions str taken by urban planners, economists, and policymakers to reboot the entire system (González et al. 2018; Altay and Green III, 2006). Hence, the style of information processing and dissemination starting from pre- to post-disaster can be tracked from the view of its impact on recovery.</p> <p>(2) In most disaster response situations multiple religious, secular, and focused organizations participate along with mainstream military operations (Comfort 2007). Communication, swift trust, coordination and control (Dubey et al. 2019c) have become challenging in such situations and hence are a topic for further research</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Institutional theory	Toinpre et al. (2018), Gupta et al. (2019), Boin et al. (2016), Dubey et al. (2015), Gao (2011), Harries and Penning-Rowsell (2011), Maldonado et al. (2010), Muller and Whiteman (2009), and DiMaggio and Powell (1983)	<p>(1) The behavior of firms is bounded to isomorphic processes such as mimetic, normative, and coercive</p> <p>(2) Mimetic isomorphism is the resultant of the competitive spirit of a group or firm as it competes with rivals to gain advantage</p> <p>(3) Normative isomorphism is the resultant of self-drive, motivation, and monitoring to keep the leap with current and adapt accordingly</p> <p>(4) Coercive isomorphism is the resultant of pressure to perform from other players and perform within the legal boundaries and follow certain regulatory requirements</p>	<p>(1) The three isomorphisms that may have a great degree of impact on the accomplishment of the objectives of specific HODRM and type of catastrophe can be studied in the future</p> <p>(2) The donors or specific influencers in a particular secular or religious group and their contributions to generating mimetic pressure on other groups can be studied by future researchers (Gupta et al. 2019)</p> <p>(3) Disaster relief laws are instrumental in humanitarian response to natural disasters. (Babiak and Trendafilova 2011). Hence, it may be interesting to explore the situations in which these institutional frameworks act as guides to filter the unauthorized access and fasten the recovery of infrastructure and climate for sustainable living</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Social network theory	Tacheva and Simpson (2019), Kim and Hastak (2018), Kapucu and Hu (2016), Houston et al. (2015), Spiekermann et al. (2015), Hamra et al. (2012), Borgatti and Halgin (2011), White et al. (2009), Varda et al. (2009), Suter et al. (2009), Kapucu (2006), Kapusu (2005), Freeman (2004), and Cook and Whitmeyer (1992)	<p>(1) This theory describes the interaction of firms, employees, and stakeholders with each other in that network</p> <p>(2) Social networks are self-organizing and the patterns can be decoded from their structures and levels of interaction.</p> <p>(3) People use social networks to represent their relationships and provide flow and exchange of information with similar interest groups</p>	<p>(1) There is a need to explore the role of network dynamics in relationship development and continuity through trust and goal for the speedy recovery of the affected population (Vasavada 2013)</p> <p>(2) New ways of coordination and new communication technologies may influence the network flexibility to cope with the desired level of humanitarian operations (Skipper et al. 2008)</p> <p>(3) The affected population and different actors consume information on resources and climate forecasts through a social network. There is a lack of studies that focus on how affected populations consume and share information through social networks compared to other sources (Jin et al. 2014)</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Transaction cost economics	Cohen (2016), Goldschmidt and Kumar (2016), Ülkü et al. (2015), Shreve and Kelman (2014), Rose and Kustra (2013), Williamson (2008), Cardenas et al. (2007), Ahrens and Rudolph (2006), and Williamson (1979)	<ol style="list-style-type: none"> (1) Economic exchange within two parties can define the cost of a product (i.e., provider and receiver) (2) The cost of delivery of products or services may rise due to bounded rationality and asymmetric information (3) These costs include the aspects of evaluating a route of delivery and choosing and negotiating with suppliers (4) Transactions can also be viewed from the perspective of the amount of information required to be shared (5) The transaction costs between the two subjects also depend on the organization of transactions and how they are governed through the hierarchy 	<p>(1) Along with the government, private players play a significant role in establishing the disaster-hit areas. Therefore, a matrix solution can be developed that supports institutional arrangements and reduces transaction costs (Ahrens and Rudolph 2006)</p> <p>(2) The disaster-hit areas require products and services in the initial period at high demand rate and lower price. Hence, there is an opportunity to develop a low-transaction-cost model for the supply chain in disaster relief situations</p> <p>(3) Emergency procurement for disaster operations has a huge opportunity for corruption and an increase in transaction costs in the entire process (Atkinson and Sapat 2012). Therefore, it will be interesting to record the loopholes in the current mechanism of emergency procurement and insulate it with an appropriate legal framework. Further, its effect on the performance of provided humanitarian aid and the level of satisfaction of affected populations can be studied</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Agency theory	Swanson et al. (2017), Prozman et al. (2016), Bendickson et al. (2016), Curmin et al. (2015), Fayezi et al. (2012, Zu and Kaymak (2012, and Eisenhardt (1989)	<p>(1) Out of two parties one (principal) delegates the work/verdict to the other (agent) party</p> <p>(2) (i) Potential conflict can exist between two parties</p> <p>(ii) Each party has its own agenda</p> <p>(iii) Asymmetric information exists between the principal and agent</p> <p>(iv) Agents are usually more risk averse compared to the principal</p> <p>(v) Effectiveness is defined by achieved efficiency</p>	<p>(1) Humanitarian operations distribution echoes the agency system, in which the government quick response system acts as principal and other volunteers as agents (Diedrichs et al. 2016)</p> <p>(2) Most disaster recovery projects are pursued sincerely for a certain period of time post-disaster and then people are left on their own to progress and connect to the original economy. In this case, government officials act a principal and affected people as agents. Hence, there is scope to examine the inline agreement between agents and principals after 2 to 5 years to measure the effectiveness of the HODRM</p> <p>(3) The CSR arm of the corporate works as principal and exert the influence through NGOs in the disaster-hit areas. Therefore, the effectiveness of CSR programs in response to disaster relief can be explored under the dynamics of uncertainty (Hegelsteen and Becker 2019)</p>

Table 3 (continued)

Theory	Key articles	Key aspects of the theory	Research gaps and future research directions
Stakeholder theory	Mojtahedi and Oo (2017), Fontainha et al. (2017), McKnight and Limmenluecke (2016), Madsen and Rodgers (2015), Fawcett and Fawcett (2013), Palttala et al. (2012), Freeman (2010), Friedman and Miles (2002), and Freeman and McVea (2001)	<p>(1) The theory argues that the activities of a business should create value for all associated with and impacted by business activities</p> <p>(2) (i) Each stakeholder should have some advantage from the actions taken within organizations</p> <p>(ii) Each stakeholder needs to put effort into the long-term survival of the firm, including top management</p> <p>(iii) There need to be clear rules on who will be, and who cannot be, part of the stakeholder team</p> <p>(iv) The rules that govern the relationship between stakeholders and firm can be amended through unanimous consent</p>	<p>(1) Disaster affects everyone ranging from children to senior citizens. Both children and people 65+ need special attention in terms of healthcare and other daily life requirements (Sloand et al. 2012). Future studies can be conducted to identify post-disaster basic requirements for children, the working population and senior citizens in terms of infrastructure and healthcare and what role different players, ranging from government to private actors, can play in a given timespan</p> <p>(2) Stakeholders' attitudes toward supporting disaster-hit areas with the help of critical services such as distribution of safe drinking water and availability of basic medicines can play a major role in stabilizing the affected people (Reale and Handmer 2011; Han et al. 2011). Hence, the stakeholder perception of the importance of services will also play a crucial role in defining the plan</p> <p>(3) Governance during disaster and post-disaster play a key role in disseminating critical information that needs to consider all stakeholders including military personnel and volunteers and their belief systems (Papadopoulos et al. 2017; Ahrens and Rudolph 2006)</p>

3.1 Implications for research

The results emphasize the second and third objectives of the present research. We have described and highlighted research gaps, along with the scope for prospective research, on the basis of different grounded theories. We refer to the studies of Gupta et al. (2020), Dubey et al. (2017), Arumugam et al. (2014), and Bharosa et al. (2010) for identifying grounded theories associated with quality management in HODRM. We have assessed each grounded theory as a source of a short synopsis, potential research questions, and further directions for research in this area. Table 3 presents this in tabular form to provide a quicker and better understanding.

3.2 Implications for practice

The performance of a humanitarian program depends on factors such as the degree of preparedness of not only the task forces but also the local communities (Behl and Dutta, 2019a, b; Das 2018; Onuma et al. 2017). Community members can help in reducing the impact of disasters. For instance, local communities can provide quick response to acquire tangible facilities locally, such as food and blankets (Chamlee-Wright and Storr 2009). Hence, the quality of activities carried out in terms of rate of response, necessary items, security measures followed, and density of coverage in the affected area depends on the extent to which each stakeholder remains on the same page through cooperation, coordination, and collaboration (3Cs) (Aerts et al. 2018; De Camargo et al. 2019; Moshtari 2016). These 3Cs are critical for aid by agencies targeting efficient processes in local procurement, transportation, and the supply chain. In the immediate response phase, teams of NGOs practice the 3Cs to assess the needs of beneficiaries. Then, entire HODRM supply chains follow through with local procurement and distribution. Regarding transportation within HODRM supply chains, the number of delivery trucks, different routes dimensions, and the capacity of trucks and their scheduling also need to closely follow the 3Cs among different stakeholders. Finally, warehousing, for example, the number of distribution centers and temporary camps and shelters, also requires consideration of the 3Cs among the different agents involved (Roh et al. 2013).

We are witnessing more and more disaster events, and this trend presents an immediate challenge to professionals about the most effective ways in which they can prepare their teams to tackle situations effectively. Supporting NGOs and government agencies can also play an important role in infusing quality parameters in information sharing with victims and seeking their feedback to continuously improve the assistance (Reuter and Kaufhold 2018). Practical learning from different incidents can be helpful for coming up with strategies and future plans that are more robust and effective. Such experience may not be one hundred per cent applicable, but it should provide some clues about future disasters. Challenges including price control of commodities, identity protection, and financial service assistance are key aspects that need to be considered while designing an effective and resilient response plan to disasters (Gomber et al. 2018; Kratcoski 2018). Furthermore, our study offers clues to professionals about how to design rescue services in order to handle sensitive groups on the basis of cultural diversity and mental health. The design of robust shelter infrastructure, privacy, and an adequate transportation network for such situations are additional key elements that need to be considered by decision makers in disasters (Krausmann et al. 2019).

4 Conclusion

In this study, we have presented a systematic literature review regarding quality management aspects in the field of HODRM. We identified articles from the Scopus database through a structured process and finalized them for review. We classified the data into different categories to identify trends according to different aspects (see Appendices A through D) and presented our general findings in Figs. 2, 3, and 4. As a field, HODRM seeks the involvement of multiple agencies and multi-layer cooperation, coordination, and collaboration; it was therefore necessary to view the extant literature from different views and thereby fulfil the first objective of the study. Firms operating in the HODRM ecosystem are interdependent for their actions and must utilize resources (resource dependence theory) in such a way that quality management objectives in such operations are always visible. The firms need to have contingency planning in case the scenario or scale of disruption changes, and this planning needs close coordination among the leadership and core team in order to promote quality management practices in HODRM. In on-the-ground handling, the culture and attitude of local and affected people (behavioral theory) play a significant role, since they can influence the speed of facilitation, which is one dimension of quality management in HODRM. The success of HODRM in a disaster event mainly depends upon the processing capabilities of the system in which multi-dimensional information is flowing most of the time (information processing theory). Multi-dimensional information flow is due to multiple stakeholders, and it offers different type of isomorphism in HODRM events and poses a challenge to quality operations (stakeholder and institutional theory). Moreover, social networks can also be decoded for identifying both the pattern and level of information exchange among different actors in a system to ensure quality aspects (social network theory). Apart from information exchange, the hierarchy followed to disseminate the information and value of economic exchange also impacts on the perceived quality of HODRM (transaction cost economics). The quality of HODRM is also hampered because of internal conflicts among agencies where a principal–agent relationship exists (agency theory). These highlights concerning organizational theories and their alignment towards quality management in HODRM provide elements of the possible answers to the second objective of this paper.

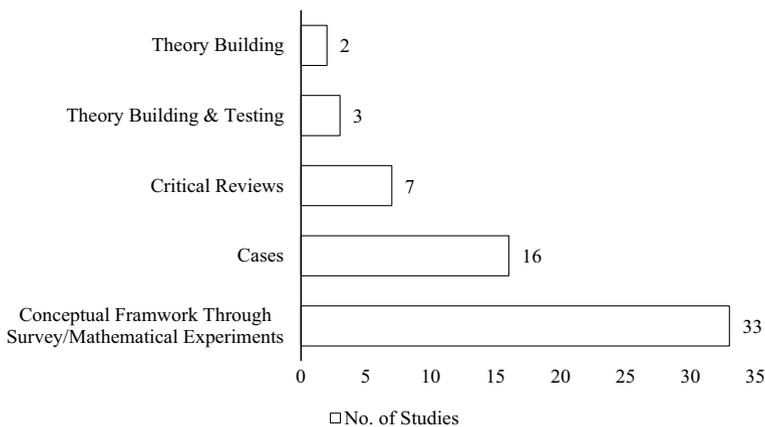


Fig. 4 Classification of the studies on the basis of approach

We have mapped the concepts delineated in the related articles to different organizational theories. This has helped us to identify possible research gaps and future research directions. We have further identified enablers through a structured process of thematic analysis for quality management in HODRM. We found that multiple enablers, ranging from the supporting policy framework to maintaining transparency through the quality of information and sharing—along with the rate of response and safety measures—define the quality of humanitarian operations. Moreover, we have identified existing challenges that need immediate action to extend the quality management aspects of humanitarian operations in disaster management. It was observed that there is a lacuna in the system of disaster management activities in terms of proactive identification of vulnerable communities and design of strategic programs, and in terms of the flow of funds through innovative platforms to achieve adequate distribution to the affected populations. Also, the way in which new technologies can be utilized to design various phases of emergency response, including resilient transportation network, remains an area of interest. Community protection, in terms of secure digital identity along with accurate land maps, needs to be stored and returned to affected populations during the recovery phase. This list of enablers and challenges fulfils the third research objective. Finally, the present study offers implications for research and practice. By considering these implications, professionals, researchers, individuals, volunteers, agencies, and government may find guidelines on how to address the abovementioned concerns for quality in humanitarian operations.

5 Limitations and scope for future research

In this study, we considered only research articles with DOI numbers and excluded books and conference papers. One further research direction could be to consider books and conferences in order to provide a different view. We chose the Scopus database instead of Web of Science, WorldCat, EbscoHost, or individual search engines such as Google Scholar. The Scopus database was chosen owing to its advantage of having a comprehensive database; this may have led to the exclusion of important articles not included in Scopus. Moreover, we searched for and extracted articles in August 2019. Cautiously, we covered articles only up to 2018 in Fig. 2, thus excluding articles from 2019 that are still in the process of publication and appearing in Scopus. The actual figures may have changed if we had considered 2019 in our search. Currently, the systematic literature review methodology is subjective (Tranfield et al. 2003) and there is the possibility that other studies in the future may come up with different key themes. Lastly, the identified enablers and challenges may be refined and verified with the help of empirical and case research methods for investigating ways of enhancing quality management in the field of HODRM.

Appendix A

Journal Title	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Applied Geography		1				1		2			4
European Journal of Operations Research				1	1			1		1	4

Journal Title	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Socio Economic Planning Sciences				2				1	1		4
Evaluation And Program Planning	1			1	1						3
International Journal of Physical Distribution And Logistics Management		2	1								3
Or Spectrum			1			2					3
Technological Forecasting and Social Change					2				1		3
Annals of Operations Research							1	1			2
Futures						1			1		2
International Journal of Production Economics				1				1			2
International Journal of Services technology and Management	2										2
Journal of Contingencies and Crisis Management				1					1		2
Journal of Humanitarian Logistics and Supply Chain Management									1	1	2
Cities									1		1
Decision Support Systems			1								1
Digital Policy Regulation and Governance										1	1
Disaster Prevention and Management									1		1
Disaster Prevention and Management An International Journal				1							1
Ecological Indicators									1		1
International Journal of Conflict Management									1		1
International Journal of Human Resource Management				1							1
International Journal of Organizational Analysis		1									1
International Journal of Quality and Reliability Management						1					1
International Journal of Systems Assurance Engineering and Management										1	1

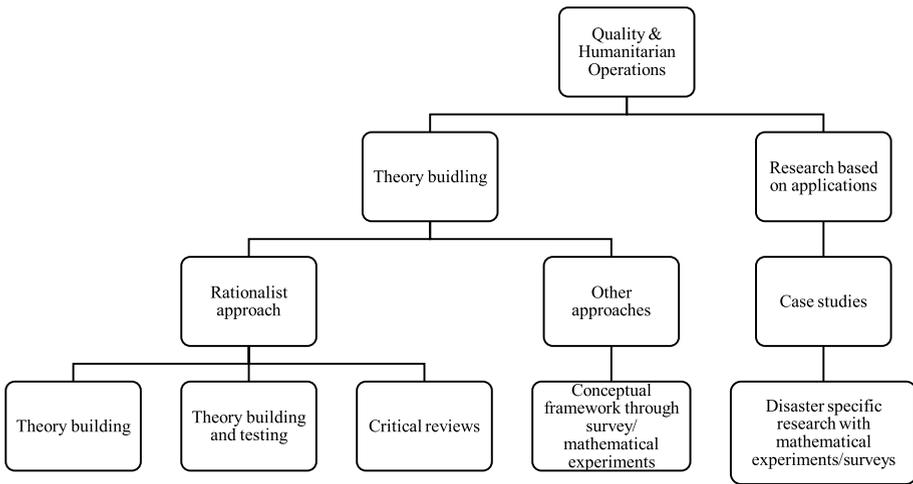
Journal Title	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
International Transactions in Operational Research				1							1
Journal Of Applied Statistics		1									1
Journal of Cleaner Production									1		1
Journal of Communication Management			1								1
Journal Of Multi Criteria Decision analysis									1		1
Journal of Risk Research	1										1
New Space								1			1
Probability In The Engineering And Informational Sciences								1			1
Production And Operations Management						1					1
Quality and Reliability Engineering International		1									1
Scientific Data										1	1
Smart Innovation Systems And Technologies									1		1
Transportation Research Part-E Logistics and Transportation Review									1		1
World Bank Economic Review									1		1
Total	4	5	5	9	4	6	1	8	14	5	61

Appendix B

See Table 4.

Table 4 Classification of literature (from Fig. 3). (Source Author’s compilation)

Theory building		Alternative methods		Research based on application	
Rationalist approach	Theory building & testing	Critical reviews	Conceptual framework through surveys/mathematical experiments	Disaster specific research with mathematical experiments/surveys	Cases
Herlin and Pazirandeh (2012), Nilsson et al. (2010)	Chen et al. (2017), Lee et al. (2011), Oosterhof et al. (2009)	Oloruntoba and Banomyong (2018), Estoque and Murayama (2017), Murthi and Rao (2016), Baum et al. (2015), Baizerman (2012), Nagurney and Qiang (2012), Van Der Laan et al. (2009)	Moreno et al. (2018), Qin et al. (2018), Yuan et al. (2018), Uhr (2017), Pérez-Galarce et al. (2017), Penadés et al. (2017), Tsukahara (2017), Marek et al. (2017), Aker (2017), Wu et al. (2017), Papadopoulos, et al. (2017), Haworth et al. (2016), Paul and MacDonald (2016b), Xiang and Zhuang (2016), Timotheou (2016), Ulkü et al. (2015), Najafi et al. (2014), Madu and Kuei (2014), Lue et al. (2014), Altay and Pal (2014), Goerigk and Grün (2014), Cohen et al. (2013), D’Ostie-Racine et al. (2013), Najj-Azimi et al. (2012), Merlot and De Cieri (2012), Berkoune et al. (2012), Palltala et al. (2012), Palltala and Vos (2011), McCoy and Brandeau (2011), Pazirandeh (2011), Liu et al. (2010), Wu et al. (2010), De Oliveira Mendes (2009)	Peltola and Hämäläinen (2018), Ortiz-Barrios et al. (2017), Balci (2017), Ludin and Arbon (2017), Tatham et al. (2017), Paul and MacDonald (2016a), Sahin et al. (2016), Hung et al. (2016), Contreras et al. (2013), Preece et al. (2013), McLay et al. (2012), Kusumasari and Alam (2012), Dunford and Li (2011), Nolz et al. (2010), Schulz and Blecken (2010), Banomyong et al. (2009)	



Appendix C

See Tables 5 and 6.

Table 5 Enablers of quality in HODRM. (Source Author's compilation)

Enablers	Measures	Supporting Literature
Policy framework	<ol style="list-style-type: none"> (1) Clear guidelines to stimulate interaction between different stakeholders (2) Guidelines to improve multi-agency coordination (3) Encourage adaptability, agility and alignment in value chain (4) Exchange of ideas among policy makers and humanitarian operation experts (5) Common platform to decision making and coordination 	<p>Oloruntoba and Banomyong (2018), Ludin and Arbon (2017), Hung et al. (2016), Madu and Kuei (2014), D'Ostie-Racine et al. (2013), McCoy and Brandeau (2011), Nolz et al. (2010), Schulz and Blecken (2010)</p>
Commitment from stakeholders	<ol style="list-style-type: none"> (1) Supporting behavior (2) Alignment between mandate, goals and coordination (3) Long term vision (4) Capacity building of humanitarian personnel (5) Utilizing the skills of affected people in the humanitarian operations (6) Cross-community involvement (7) Opinion of affected population on disaster recovery 	<p>Uhr (2017), Penadés et al. (2017), Marek et al. (2017), Aker (2017), Wu et al. (2017), Ludin and Arbon (2017), Chen et al. (2017), Ülki et al. (2015), Baum et al. (2015), Madu and Kuei (2014), Cohen et al. (2013), Palttala et al. (2012), Kusumasari and Alam (2012), Oosterhof et al. (2009)</p>
Transparency and information sharing	<ol style="list-style-type: none"> (1) Accountable activities (2) Flexible and agile flow of information (3) Information quality (4) Adequate information processing (5) Usage of web-based systems to generate swift trust among affected population and other actors (6) Adequate utilization of funds 	<p>Oloruntoba and Banomyong (2018), Qin et al. (2018), Yuan et al. (2018), Peltola and Hämäläinen (2018), Tsukahara (2017), Aker (2017), Papadopoulos et al. (2017), Ludin and Arbon (2017), Haworth et al. (2016), Murthi and Rao (2016), Lue et al. (2014), Altay and Pal (2014), Preece et al. (2013), Palttala et al. (2012), Palttala and Vos (2011), Lee et al. (2011), Schulz and Blecken (2010), Van Der Laan et al. (2009)</p>
Public–Private Partnership	<ol style="list-style-type: none"> (1) Development of volunteers (2) Regular training (3) Developing trustworthy environment (4) Involvement of NGOs and CSR arms of firms 	<p>Peltola and Hämäläinen (2018), Uhr (2017), Penadés et al. (2017), Papadopoulos et al. (2017), D'Ostie-Racine et al. (2013), Herlin and Pazirandeh (2012), Merlot and De Cieri (2012), Nagurney and Qiang (2012)</p>
Support from Government	<ol style="list-style-type: none"> (1) Provision of human resources (2) Aid to the affected population (3) Subsidy to the firms for distribution in affected areas 	<p>Oloruntoba and Banomyong (2018), Ludin and Arbon (2017), Chen et al. (2017), Madu and Kuei (2014), Merlot and De Cieri (2012), Kusumasari and Alam (2012), Dunford and Li (2011), Nilsson et al. (2010), Banomyong et al. (2009)</p>

Table 5 (continued)

Enablers	Measures	Supporting Literature
Strategic planning	<ol style="list-style-type: none"> (1) Planning for resilient supply chain (2) Strategic tie-up to fulfill the demand via different distribution channels (3) Disaster readiness (4) Fleet size and routing decisions (5) Long-term planning to establish and advance the affected society (6) Establishment of robust and flexible infrastructure (Soft and Hard) for future 	<p>Moreno et al. (2018), Oloruntoba and Banomyong (2018), Qin et al. (2018), Yuan et al. (2018), Pelola and Hämäläinen (2018), Uhr (2017), Ortiz-Barrios et al. (2017), Penadés et al. (2017), Tsukahara (2017), Balciik (2017), Marek et al. (2017), Tatham et al. (2017), Paul and MacDonald (2016a), Najafi et al. (2014), Madu and Kuei (2014), Goerigk and Grün (2014), Cohen et al. (2013), Contreras et al. (2013), Najj-Azimi et al. (2012), Berkoune et al. (2012), Palltala and Vos (2011), McCoy and Brandeau (2011), Nilsson et al. (2010), Nolz et al. (2010), De Oliveira Mendes (2009)</p>
Continuous improvement	<ol style="list-style-type: none"> (1) Continuous monitoring and evaluation on performance (2) Improving decision making process (3) Improvement of balance between demand and supply along with appropriate price boundary (4) Measuring the satisfaction level of victims 	<p>Moreno et al. (2018), Tsukahara (2017), Tatham et al. (2017), Paul and MacDonald (2016b), Timotheou (2016), Madu and Kuei (2014), Lue et al. (2014), Contreras et al. (2013), Najj-Azimi et al. (2012), Herlin and Pazirandeh (2012), Berkoune et al. (2012), Barzerman (2012), Wu et al. (2010)</p>
Relief Speed and Safety	<ol style="list-style-type: none"> (1) Rapid response (2) Effective reaction to situation (3) Ensuring the minimum risk in activities to public (4) Minimum risk to public and private infrastructure (5) Avoiding the destruction of natural resources (6) Rapid and adequate shelter and medical facilities 	<p>Oloruntoba and Banomyong (2018), Qin et al. (2018), Yuan et al. (2018), Uhr (2017), Ortiz-Barrios et al. (2017), Estoque and Murayama (2017), Sahin et al. (2016), Xiang and Zhuang (2016), Baum et al. (2015), Najafi et al. (2014), Altay and Pal (2014), McLay et al. (2012), Pazirandeh (2011), Liu et al. (2010), Wu et al. (2010), De Oliveira Mendes (2009)</p>

Table 6 Challenges for quality in HODRM. (Source Author’s compilation)

Challenges to	Measures	Supporting Literature
Access to financial services	<ol style="list-style-type: none"> (1) Acceptance of e-money (2) Cash assistance instead of in-kind items (3) Profile security (4) Internet provision 	<p>Moreno et al. (2018), Ludin and Arbon (2017), Aker (2017), D’Ostie-Racine et al. (2013), Palttala and Vos (2011), Merlot and De Cieri (2012), Kusumasarani and Alam (2012) Nagurney and Qiang (2012), Liu et al. (2010), Wu et al. (2010)</p>
Proactive identification	<ol style="list-style-type: none"> (1) Difficult to map exact location (2) Unknown scale (3) Cultural differences (4) No cooperation for preparedness 	<p>Oloruntoaba and Banomyong (2018), Papadopoulos et al. (2017), Estoque and Murayama (2017), Paul and MacDonald (2016a), Goerigk and Grtin (2014), Contreras et al. (2013), Berkoune et al. (2012), De Oliveira Mendes (2009)</p>
Identity protection	<ol style="list-style-type: none"> (1) Location of land maps (2) Lack of digitization (3) Unaware from the benefits of identity 	<p>Oloruntoaba and Banomyong (2018), Peltola and Hämäläinen (2018), Baum et al. (2015), D’Ostie-Racine et al. (2013), Merlot and De Cieri (2012), Lee et al. (2011), Duntford and Li (2011), Nilsson et al. (2010), Van Der Laan et al. (2009)</p>
Enhancing the flow of aid	<ol style="list-style-type: none"> (1) Lack of innovative platforms (2) Focus on in-kind items (3) Division of funding lanes (4) Lack of transparency is fund utilization 	<p>Yuan et al. (2018), Uhr (2017), Tsukahara (2017), Ludin and Arbon (2017), Chen et al. (2017), Aker (2017), Hung et al. (2016), Baum et al. (2015), Altay and Pal (2014), Cohen et al. (2013), Palttala and Vos (2011), Nilsson et al. (2010), Banomyong et al. (2009), Van Der Laan et al. (2009)</p>
Direct communication	<ol style="list-style-type: none"> (1) Complex environment (2) Saving life is priority (3) Suspended Networks (4) Electricity not compatible with weather to broadcast 	<p>Oloruntoaba and Banomyong (2018), Peltola and Hämäläinen (2018), Uhr (2017), Estoque and Murayama (2017), Paul and MacDonald (2016b), Lue et al. (2014), Madu and Kuei (2014), Herlin and Pazirandeh (2012), Pazirandeh (2011), Wu et al. (2010), Banomyong et al. (2009)</p>
Special health facilities	<ol style="list-style-type: none"> (1) Lack of supporting infrastructure (2) Extreme weather condition (3) Funds 	<p>Peltola and Hämäläinen (2018), Chen et al. (2017), Uhr (2017), Tsukahara (2017), Marek et al. (2017), Ülkü et al. (2015), Najafi et al. (2014), Herlin and Pazirandeh (2012), Palttala and Vos (2011), Wu et al. (2010), Nolz et al. (2010), De Oliveira Mendes (2009)</p>
Price control	<ol style="list-style-type: none"> (1) Monitoring (2) Supplies (3) Corruption (4) Suddenly increased demand (5) Opportunistic nature of situation 	<p>Hämäläinen (2018), Uhr (2017), D’Ostie-Racine et al. (2013), Preece et al. (2013), Madu and Kuei (2014), Cohen et al. (2013), Palttala et al. (2012), McCoy and Brandeau (2011), Nilsson et al. (2010), Banomyong et al. (2009)</p>

Appendix D

Table 7.

Table 7 Number of citations in the top 10 cited papers. (Source Author’s compilation)

Publication year	Paper title	Authors	Journal title	<2015	2015	2016	2017	2018	2019	Total
2017	The role of Big Data in explaining disaster resilience in supply chains for sustainability	Papadopoulos T., Gunasekaran A., Dubey R., Altay N., Childe S.J., Fosso-Wamba S.	Journal of Cleaner Production	0	0	0	12	37	33	82
2010	Horizontal cooperation in disaster relief logistics: Benefits and impediments	Schulz S.F., Blecken A.	International Journal of Physical Distribution and Logistics Management	15	10	8	16	18	8	75
2012	Transportation in disaster response operations	Berkoune D., Renaud J., Rekiq M., Ruiz A.	Socio-Economic Planning Sciences	10	11	16	7	16	8	68
2012	Communication Gaps in Disaster Management: Perceptions by Experts from Governmental and Non-Governmental Organizations	Palttala P., Boano C., Lund R., Vos M.	Journal of Contingencies and Crisis Management	9	18	2	4	10	4	47
2011	Group value and intention to use - A study of multi-agency disaster management information systems for public safety	Lee J., Bharosa N., Yang J., Janssen M., Rao H.R.	Decision Support Systems	17	8	8	5	7	1	46
2009	Social vulnerability indexes as planning tools: Beyond the preparedness paradigm	De Oliveira Mendes J.M.	Journal of Risk Research	13	9	7	9	7	1	46
2014	Information diffusion among agents: Implications for humanitarian operations	Altay N., Pal R.	Production and Operations Management	0	2	12	11	9	11	45

Table 7 (continued)

Publication year	Paper title	Authors	Journal title	<2015	2015	2016	2017	2018	2019	Total
2013	The conjoint community resiliency assessment measure as a baseline for profiling and predicting community resilience for emergencies	Cohen O., Leykin D., Lahad M., Goldberg A., Aharonson-Daniel L.	Technological Forecasting and Social Change	4	3	11	8	8	11	45
2012	A covering tour approach to the location of satellite distribution centers to supply humanitarian aid	Naji-Azimi Z., Renaud J., Ruiz A., Salari M.	European Journal of Operational Research	6	4	4	6	14	5	39
2011	Earthquake reconstruction in Wenchuan: Assessing the state overall plan and addressing the 'forgotten phase'	Dunford M., Li L.	Applied Geography	12	7	6	5	6	2	38
Total				86	72	74	83	132	84	531

Appendix E

Tables 8 and 9.

Table 8 Top 10 Institutions with regard to number of papers

Name of the Institution	Country	No. of papers
Lunds Universitet	Sweden	3
Nanyang Technological University	Singapore	2
Delft University of Technology	Netherlands	2
Thammasat University	Thailand	2
Tianjin University	China	2
Monash University	Australia	2
Kennesaw State University	U.S.	2
DePaul University	U.S.	2
University at Buffalo, State University of New York	U.S.	2
University of Jyvaskyla	Finland	2

Table 9 Top 10 countries with reference to number of papers

United States	6
Australia	3
China	3
Finland	3
Sweden	3
United Kingdom	3
Netherlands	2
Singapore	2
Thailand	2
France	1

References

- Abidi, H., de Leeuw, S., & Klumpp, M. (2013). Measuring success in humanitarian supply chains. *International Journal of Business and Management Innovation*, 2(8), 31–39.
- Admiraal, H., & Cornaro, A. (2019). Future cities, resilient cities—The role of underground space in achieving urban resilience. *Underground Space*. <https://doi.org/10.1016/j.undsp.2019.02.001>.
- Aerts, J. C., Botzen, W. J., Clarke, K. C., Cutter, S. L., Hall, J. W., Merz, B., et al. (2018). Integrating human behaviour dynamics into flood disaster risk assessment. *Nature Climate Change*, 8(3), 193–199.
- Ahrens, J., & Rudolph, P. M. (2006). The importance of governance in risk reduction and disaster management. *Journal of Contingencies and Crisis Management*, 14(4), 207–220.
- Aitsi-Selmi, A., Egawa, S., Sasaki, H., Wannous, C., & Murray, V. (2015). The Sendai framework for disaster risk reduction: Renewing the global commitment to people's resilience, health, and well-being. *International Journal of Disaster Risk Science*, 6(2), 164–176.
- Aitsi-Selmi, A., & Murray, V. (2016). Protecting the health and well-being of populations from disasters: health and health care in The Sendai Framework for Disaster Risk Reduction 2015–2030. *Prehospital and Disaster Medicine*, 31(1), 74–78.
- Akbari, M. E., Farshad, A. A., & Asadi-Lari, M. (2004). The devastation of Bam: An overview of health issues 1 month after the earthquake. *Public Health*, 118(6), 403–408.

- Aker, J. C. (2017). Comparing cash and voucher transfers in a humanitarian context: Evidence from the Democratic Republic of Congo. *The World Bank Economic Review*, 31(1), 44–70.
- Akter, S., & Wamba, S. F. (2019). Big data and disaster management: A systematic review and agenda for future research. *Annals of Operations Research*, 283(1–2), 939–959.
- Al Thobaity, A., Plummer, V., & Williams, B. (2017). What are the most common domains of the core competencies of disaster nursing? A scoping review. *International Emergency Nursing*, 31, 64–71.
- Alam, F., Ofli, F., & Imran, M. (2019). Descriptive and visual summaries of disaster events using artificial intelligence techniques: Case studies of Hurricanes Harvey, Irma, and Maria. *Behaviour & Information Technology*. <https://doi.org/10.1080/0144929X.2019.1610908>.
- Albris, K., & Laut, K. C. (2019). Causing wrong while doing good: On the question of liability for volunteers in emergencies. *Environmental Hazards*. <https://doi.org/10.1080/17477891.2019.1651687>.
- Ali, H., Modi, P., & Mishra, V. (2019). Increased flood risk in Indian sub-continent under the warming climate. *Weather and Climate Extremes*. <https://doi.org/10.1016/j.wace.2019.100212>.
- Aliakbari, F., Hammad, K., Bahrami, M., & Aein, F. (2015). Ethical and legal challenges associated with disaster nursing. *Nursing Ethics*, 22(4), 493–503.
- Altay, N., & Green, W. G., III. (2006). OR/MS research in disaster operations management. *European Journal of Operational Research*, 175(1), 475–493.
- Altay, N., & Labonte, M. (2014). Challenges in humanitarian information management and exchange: Evidence from Haiti. *Disasters*, 38(s1), S50–S72.
- Altay, N., & Pal, R. (2014). Information diffusion among agents: Implications for humanitarian operations. *Production and Operations Management*, 23(6), 1015–1027.
- Altay, N., Prasad, S., & Sounderpandian, J. (2009). Strategic planning for disaster relief logistics: Lessons from supply chain management. *International Journal of Services Sciences*, 2(2), 142–161.
- Anusha, N., & Bharathi, B. (2019). Flood detection and flood mapping using multi-temporal synthetic aperture radar and optical data. *The Egyptian Journal of Remote Sensing and Space Science*. <https://doi.org/10.1016/j.ejrs.2019.01.001>.
- Appleby-Arnold, S., Brockdorff, N., Jakovljević, I., & Zdravković, S. (2018). Applying cultural values to encourage disaster preparedness: Lessons from a low-hazard country. *International Journal of Disaster Risk Reduction*, 31, 37–44.
- Aronsson-Storrier, M. (2017). Sanitation, human rights and disaster management. *Disaster Prevention and Management*, 26(5), 514–525.
- Arumugam, V., Antony, J., & Linderman, K. (2014). A multilevel framework of Six Sigma: A systematic review of the literature, possible extensions, and future research. *Quality Management Journal*, 21(4), 36–61.
- Atkinson, C. L., & Sapat, A. K. (2012). After Katrina: Comparisons of post-disaster public procurement approaches and outcomes in the New Orleans area. *Journal of Public Procurement*, 12(3), 356–385.
- Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1–13.
- Babiak, K., & Trendafilova, S. (2011). CSR and environmental responsibility: Motives and pressures to adopt green management practices. *Corporate Social Responsibility and Environmental Management*, 18(1), 11–24.
- Bae, Y., Joo, Y. M., & Won, S. Y. (2016). Decentralization and collaborative disaster governance: Evidence from South Korea. *Habitat International*, 52, 50–56.
- Baharmand, H., Comes, T., & Luras, M. (2019). Defining and measuring the network flexibility of humanitarian supply chains: Insights from the 2015 Nepal earthquake. *Annals of Operations Research*, 283(1), 961–1000.
- Baidya, A., & Bera, U. K. (2019). New model for addressing supply chain and transport safety for disaster relief operations. *Annals of Operations Research*, 283(1–2), 33–69.
- Baizerman, M. (2012). Introduction. *Evaluation and Program Planning*, 35(1), 139–147.
- Balcik, B. (2017). Site selection and vehicle routing for post-disaster rapid needs assessment. *Transportation Research Part E: Logistics and Transportation Review*, 101, 30–58.
- Banomyong, R., Beresford, A., & Pettit, S. (2009). Logistics relief response model: The case of Thailand's Tsunami affected area. *International Journal of Services, Technology and Management*, 12(4), 414–429.
- Banomyong, R., Varadejsatitwong, P., & Oloruntoba, R. (2019). A systematic review of humanitarian operations, humanitarian logistics and humanitarian supply chain performance literature 2005–2016. *Annals of Operations Research*, 283(1–2), 71–86.
- Barabadi, A., & Ayele, Y. Z. (2018). Post-disaster infrastructure recovery: Prediction of recovery rate using historical data. *Reliability Engineering & System Safety*, 169, 209–223.

- Bastian, N. D., Griffin, P. M., Spero, E., & Fulton, L. V. (2016). Multi-criteria logistics modeling for military humanitarian assistance and disaster relief aerial delivery operations. *Optimization Letters*, 10(5), 921–953.
- Baum, S. D., Denkenberger, D. C., & Haqq-Misra, J. (2015). Isolated refugees for surviving global catastrophes. *Futures*, 72, 45–56.
- Behl, A., & Dutta, P. (2019a). Humanitarian supply chain management: A thematic literature review and future directions of research. *Annals of Operations Research*, 283(1), 1001–1044.
- Behl, A., & Dutta, P. (2019b). Social and financial aid for disaster relief operations using CSR and crowd-funding. *Benchmarking: An International Journal*, 27(2), 732–759.
- Benali, N., Abdelkafi, I., & Feki, R. (2018). Natural-disaster shocks and government's behavior: Evidence from middle-income countries. *International Journal of Disaster Risk Reduction*, 27, 1–6.
- Bendickson, J., Muldoon, J., Liguori, E., & Davis, P. E. (2016). Agency theory: The times, they are a-changin'. *Management Decision*, 54(1), 174–193.
- Berkoune, D., Renaud, J., Rekik, M., & Ruiz, A. (2012). Transportation in disaster response operations. *Socio-Economic Planning Sciences*, 46(1), 23–32.
- Besiou, M., & Van Wassenhove, L. N. (2020). Humanitarian operations: A world of opportunity for relevant and impactful research. *Manufacturing & Service Operations Management*, 22(1), 135–145.
- Bharosa, N., Lee, J., & Janssen, M. (2010). Challenges and obstacles in sharing and coordinating information during multi-agency disaster response: Propositions from field exercises. *Information Systems Frontiers*, 12(1), 49–65.
- Bodin, Ö., & Nohrstedt, D. (2016). Formation and performance of collaborative disaster management networks: Evidence from a Swedish wildfire response. *Global Environmental Change*, 41, 183–194.
- Boin, A., Stern, E., & Sundelius, B. (2016). *The politics of crisis management: Public leadership under pressure*. Cambridge: Cambridge University Press.
- Borgatti, S. P., & Halgin, D. S. (2011). On network theory. *Organization Science*, 22(5), 1168–1181.
- Botzen, W. W., Deschenes, O., & Sanders, M. (2019). The economic impacts of natural disasters: A review of models and empirical studies. *Review of Environmental Economics and Policy*, 13(2), 167–188.
- Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. *European Journal of Operational Research*, 233(2), 299–312.
- Bronfman, N. C., Cisternas, P. C., Repetto, P. B., & Castañeda, J. V. (2019). Natural disaster preparedness in a multi-hazard environment: Characterizing the sociodemographic profile of those better (worse) prepared. *PLoS ONE*, 14(4), e0214249.
- Busch, N. E., & Givens, A. D. (2013). Achieving resilience in disaster management: The role of public-private partnerships. *Journal of Strategic Security*, 6(2), 1–19.
- Cancel, A. E., Cameron, G. T., Sallot, L. M., & Mitrook, M. A. (1997). It depends: A contingency theory of accommodation in public relations. *Journal of Public Relations Research*, 9(1), 31–63.
- Çankaya, E., Ekici, A., & Özener, O. Ö. (2019). Humanitarian relief supplies distribution: An application of inventory routing problem. *Annals of Operations Research*, 283(1–2), 119–141.
- Cardenas, V., Hochrainer, S., Mechler, R., Pflug, G., & Linnerooth-Bayer, J. (2007). Sovereign financial disaster risk management: The case of Mexico. *Environmental Hazards*, 7(1), 40–53.
- Carr, J., & Jensen, J. (2015). Explaining the pre-disaster integration of community emergency response teams (CERTs). *Natural Hazards*, 77(3), 1551–1571.
- Carter, C. R., Rogers, D. S., & Choi, T. Y. (2015). Toward the theory of the supply chain. *Journal of Supply Chain Management*, 51(2), 89–97.
- Cassar, A., Healy, A., & Von Kessler, C. (2017). Trust, risk, and time preferences after a natural disaster: Experimental evidence from Thailand. *World Development*, 94, 90–105.
- Cedergren, A., Hedtjärn Swaling, V., Hassel, H., Denward, C., Mossberg Sonnek, K., Albinsson, P. A., et al. (2019). Understanding practical challenges to risk and vulnerability assessments: The case of Swedish municipalities. *Journal of Risk Research*, 22(6), 782–795.
- Cegielski, C. G., Allison Jones-Farmer, L., Wu, Y., & Hazen, B. T. (2012). Adoption of cloud computing technologies in supply chains: An organizational information processing theory approach. *The International Journal of Logistics Management*, 23(2), 184–211.
- Chamlee-Wright, E., & Storr, V. H. (2009). Club goods and post-disaster community return. *Rationality and Society*, 21(4), 429–458.
- Chandana, S., & Leung, H. (2010). A system of systems approach to disaster management. *IEEE Communications Magazine*, 48(3), 138–145.

- Chen, J., Chen, T. H. Y., Vertinsky, I., Yumagulova, L., & Park, C. (2013). Public–private partnerships for the development of disaster resilient communities. *Journal of Contingencies and Crisis Management*, 21(3), 130–143.
- Chen, Y. R. R., Cheng, Y., Hung-Baesecke, C. J. F., & Jin, Y. (2019). Engaging International Publics via Mobile-Enhanced CSR (mCSR): A cross-national study on stakeholder reactions to corporate disaster relief efforts. *American Behavioral Scientist*, 63(12), 1603–1623.
- Chen, Y. F., Kang, Y., & Tjosvold, D. (2017). Constructive controversy and guanxi relationships for disaster recovery. *International Journal of Conflict Management*, 28(4), 410–436.
- Cheng, J. W., Mitomo, H., Otsuka, T., & Jeon, S. Y. (2015). The effects of ICT and mass media in post-disaster recovery—A two model case study of the Great East Japan Earthquake. *Telecommunications Policy*, 39(6), 515–532.
- Cid, V. H., Mitz, A. R., & Arnesen, S. J. (2018). Keeping communications flowing during large-scale disasters: Leveraging amateur radio innovations for disaster medicine. *Disaster Medicine and Public Health Preparedness*, 12(2), 257–264.
- Clarke, J. N. (2013). Transitional coordination in Sudan (2006–08): Lessons from the United Nations Resident Coordinator’s Office. *Disasters*, 37(3), 420–441.
- Clarke, M., Perreard, S., & Connors, P. (2019). Building a humanitarian sector career: Understanding the education vs experience tension. *Third World Quarterly*, 40(9), 1655–1669.
- Cohen, L. (2016). The outsourcing decision process in humanitarian supply chain management evaluated through the TCE and RBV principles. RIRL 2016 11ème Rencontres Internationales de la Recherche en Logistique et Supply Chain Management, Ecole Polytechnique Fédérale de Lausanne (EPFL) Sep 2016, Lausanne, Switzerland.
- Cohen, O., Leykin, D., Lahad, M., Goldberg, A., & Aharonson-Daniel, L. (2013). The conjoint community resiliency assessment measure as a baseline for profiling and predicting community resilience for emergencies. *Technological Forecasting and Social Change*, 80(9), 1732–1741.
- Collins, A. E. (2018). Advancing the disaster and development paradigm. *International Journal of Disaster Risk Science*, 9(4), 486–495.
- Comfort, L. K. (2007). Crisis management in hindsight: Cognition, communication, coordination, and control. *Public Administration Review*, 67, 189–197.
- Contreras, D., Blaschke, T., Kienberger, S., & Zeil, P. (2013). Spatial connectivity as a recovery process indicator: The L’Aquila earthquake. *Technological Forecasting and Social Change*, 80(9), 1782–1803.
- Cook, K. S., & Whitmeyer, J. M. (1992). Two approaches to social structure: Exchange theory and network analysis. *Annual Review of Sociology*, 18(1), 109–127.
- Cozzolino, A., Rossi, S., & Conforti, A. (2012). Agile and lean principles in the humanitarian supply chain: The case of the United Nations World Food Programme. *Journal of Humanitarian Logistics and Supply Chain Management*, 2(1), 16–33.
- Cozzolino, A., Wankowicz, E., & Massaroni, E. (2017). Logistics service providers’ engagement in disaster relief initiatives: An exploratory analysis. *International Journal of Quality and Service Sciences*, 9(3/4), 269–291.
- Craven, R. M. (2017). Managing anaesthetic provision for global disasters. *BJA: British Journal of Anaesthesia*, 119(Suppl_1), 126–134.
- Curnin, S., Owen, C., Paton, D., & Brooks, B. (2015). A theoretical framework for negotiating the path of emergency management multi-agency coordination. *Applied ergonomics*, 47, 300–307.
- D’Ostie-Racine, L., Dagenais, C., & Ridde, V. (2013). An evaluability assessment of a West Africa based non-governmental organization’s (NGO) progressive evaluation strategy. *Evaluation and Program Planning*, 36(1), 71–79.
- Daily Afrika. (2019). Southern Africa needs 1 billion dollars for Cyclone Idai reconstruction. Retrieved November 7th, 2019 from <https://www.dailyafrika.com/southern-africa-needs-over-a-billion-dollars-for-cyclone-idai-reconstruction/>.
- Drazin, R., & Van de Ven, A. H. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, 514–539.
- Das, R. (2018). Disaster preparedness for better response: Logistics perspectives. *International Journal of Disaster Risk Reduction*, 31, 153–159.
- Davis, L. B., Samanlıoğlu, F., Qu, X., & Root, S. (2013). Inventory planning and coordination in disaster relief efforts. *International Journal of Production Economics*, 141(2), 561–573.
- De Camargo, J. A., Mendonça, P. S. M., de Oliveira, J. H. C., Jabbour, C. J. C., & de Sousa Jabbour, A. B. L. (2019). Giving voice to the silent: A framework for understanding stakeholders’ participation in socially-oriented initiatives, community-based actions and humanitarian operations projects. *Annals of Operations Research*, 283(1–2), 143–158.

- de Oliveira Mendes, J. M. (2009). Social vulnerability indexes as planning tools: Beyond the preparedness paradigm. *Journal of Risk Research*, 12(1), 43–58.
- Derntl, M. (2014). Basics of research paper writing and publishing. *International Journal of Technology Enhanced Learning*, 6(2), 105–123.
- Dhyani, S., Lahoti, S., Khare, S., Pujari, P., & Verma, P. (2018). Ecosystem based Disaster Risk Reduction approaches (EbDRR) as a prerequisite for inclusive urban transformation of Nagpur City, India. *International Journal of Disaster Risk Reduction*, 32, 95–105.
- Diedrichs, D. R., Phelps, K., & Isihara, P. A. (2016). Quantifying communication effects in disaster response logistics: A multiple network system dynamics model. *Journal of Humanitarian Logistics and Supply Chain Management*, 6(1), 24–45.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147–160.
- Donaldson, L. (2001). *The Contingency Theory of Organizations*. Thousand Oaks: SAGE.
- Dubey, R., Altay, N., & Blome, C. (2019a). Swift trust and commitment: The missing links for humanitarian supply chain coordination? *Annals of Operations Research*, 283(1), 159–177.
- Dubey, R., & Gunasekaran, A. (2016). The sustainable humanitarian supply chain design: Agility, adaptability and alignment. *International Journal of Logistics Research and Applications*, 19(1), 62–82.
- Dubey, R., Gunasekaran, A., & Ali, S. S. (2015). Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for green supply chain. *International Journal of Production Economics*, 160, 120–132.
- Dubey, R., Gunasekaran, A., Childe, S. J., Papadopoulos, T., & Fosso Wamba, S. (2017). World class sustainable supply chain management: Critical review and further research directions. *The International Journal of Logistics Management*, 28(2), 332–362.
- Dubey, R., Gunasekaran, A., Childe, S. J., Papadopoulos, T., Luo, Z., Wamba, S. F., et al. (2019b). Can big data and predictive analytics improve social and environmental sustainability? *Technological Forecasting and Social Change*, 144, 534–545.
- Dubey, R., Gunasekaran, A., Childe, S. J., Roubaud, D., Wamba, S. F., Giannakis, M., et al. (2019c). Big data analytics and organizational culture as complements to swift trust and collaborative performance in the humanitarian supply chain. *International Journal of Production Economics*, 210, 120–136.
- Dubey, R., Gunasekaran, A., & Papadopoulos, T. (2019d). Disaster relief operations: Past, present and future. *Annals of Operations Research*, 283(1–2), 1–8.
- Dubey, R., Luo, Z., Gunasekaran, A., Akter, S., Hazen, B. T., & Douglas, M. A. (2018). Big data and predictive analytics in humanitarian supply chains: Enabling visibility and coordination in the presence of swift trust. *The International Journal of Logistics Management*, 29(2), 485–512.
- Duggal, G., Chakrabarti, J., George, M., & Bhatia, P. (2018). *History, geography, social and Political Life*. New Delhi: Madhubun Publications.
- Dunford, M., & Li, L. (2011). Earthquake reconstruction in Wenchuan: Assessing the state overall plan and addressing the ‘forgotten phase’. *Applied Geography*, 31(3), 998–1009.
- ECRI. (2020). Safety of extended use and reuse of N95 respirators. Retrieved April 4th, 2020 from https://www.elsevier.com/_data/assets/pdf_file/0006/997863/COVID-ECRI-N95-Respirators_2020-03.pdf.
- Edwards, F. L. (2009). Effective disaster response in cross border events. *Journal of Contingencies and Crisis Management*, 17(4), 255–265.
- Efendi, D., Agustiyara, & Putra, H. A. (2019). Natural disasters management and the challenge of governability in Indonesia. *Indian Journal of Public Administration*, 65(3), 627–645.
- Egelhoff, W. G., & Sen, F. (1992). An information-processing model of crisis management. *Management Communication Quarterly*, 5(4), 443–484.
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), 57–74.
- Ejeta, L. T., Ardalan, A., & Paton, D. (2015). Application of behavioral theories to disaster and emergency health preparedness: A systematic review. *PLoS Currents*, 7, 1–41.
- EM-DAT. (2020). EM-DAT: The OFDA/CRED International Disaster Database. www.emdat.be - UCLouvain - Brussels – Belgium. Retrieved March 21st, 2020 from <https://public.emdat.be/>.
- Erbeyoğlu, G., & Bilge, Ü. (2020). A robust disaster preparedness model for effective and fair disaster response. *European Journal of Operational Research*, 280(2), 479–494.
- Ergun, Ö., Gui, L., Heier Stamm, J. L., Keskinocak, P., & Swann, J. (2014). Improving humanitarian operations through technology-enabled collaboration. *Production and Operations Management*, 23(6), 1002–1014.
- Eriksson, K., & McConnell, A. (2011). Contingency planning for crisis management: Recipe for success or political fantasy? *Policy and Society*, 30(2), 89–99.

- Ersel, M. (2015). Water and sanitation standards in humanitarian action. *Turkish Journal of Emergency Medicine*, 15, 27–33.
- Estoque, R. C., & Murayama, Y. (2017). A worldwide country-based assessment of social-ecological status (c. 2010) using the social-ecological status index. *Ecological Indicators*, 72, 605–614.
- Fakhrudin, B. S., Reinen-Hamill, R., & Robertson, R. (2019). *Extent and evaluation of vulnerability for disaster risk reduction of urban Nuku'alofa*. Tonga: Progress in Disaster Science. <https://doi.org/10.1016/j.pdisas.2019.100017>.
- Fan, H., Li, G., Sun, H., & Cheng, T. C. E. (2017). An information processing perspective on supply chain risk management: Antecedents, mechanism, and consequences. *International Journal of Production Economics*, 185, 63–75.
- Fawcett, A. M., & Fawcett, S. E. (2013). Benchmarking the state of humanitarian aid and disaster relief: A systems design perspective and research agenda. *Benchmarking: An International Journal*, 20(5), 661–692.
- Fayezi, S., O'Loughlin, A., & Zutshi, A. (2012). Agency theory and supply chain management: A structured literature review. *Supply Chain Management: An International Journal*, 17(5), 556–570.
- Filo, K., Cuskelly, G., & Wicker, P. (2015). Resource utilisation and power relations of community sport clubs in the aftermath of natural disasters. *Sport Management Review*, 18(4), 555–569.
- Fontainha, T. C., Leiras, A., de Mello Bandeira, R. A., & Scavarda, L. F. (2017). Public-private-people relationship stakeholder model for disaster and humanitarian operations. *International Journal of Disaster Risk Reduction*, 22, 371–386.
- Formetta, G., & Feyen, L. (2019). Empirical evidence of declining global vulnerability to climate-related hazards. *Global Environmental Change*. <https://doi.org/10.1016/j.gloenvcha.2019.05.004>.
- Freeman, L. (2004). The development of social network analysis. *A Study in the Sociology of Science*. Vancouver, BC: Empirical Press.
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge: Cambridge University Press.
- Freeman, R. E., & McVea, J. (2001). A stakeholder approach to strategic management. *The Blackwell handbook of strategic management* (pp. 189–207). Oxford: Blackwell.
- Freitas, D. P., Borges, M. R., & Carvalho, P. V. R. D. (2019). A conceptual framework for developing solutions that organise social media information for emergency response teams. *Behaviour & Information Technology*. <https://doi.org/10.1080/0144929X.2019.1621933>.
- Friedman, A. L., & Miles, S. (2002). Developing stakeholder theory. *Journal of Management Studies*, 39(1), 1–21.
- Fuller, P. (2020). Disasters displace more people than conflict and violence. Retrieved March 22nd, 2020 from <https://www.undrr.org/>.
- Gaillard, J. C., & Mercer, J. (2013). From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography*, 37(1), 93–114.
- Gaillard, J. C., & Peek, L. (2019). Disaster-zone research needs a code of conduct. *Nature*, 545, 440–442.
- Galbraith, J. R. (1973). *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Galbusera, L., & Giannopoulos, G. (2018). On input-output economic models in disaster impact assessment. *International Journal of Disaster Risk Reduction*, 30, 186–198.
- Gao, Y. (2011). Philanthropic disaster relief giving as a response to institutional pressure: Evidence from China. *Journal of Business Research*, 64(12), 1377–1382.
- Gao, Y., & Hafsi, T. (2017). Political dependence, social scrutiny, and corporate philanthropy: Evidence from disaster relief. *Business Ethics: A European Review*, 26(2), 189–203.
- Glenn Richey, R., Jr. (2009). The supply chain crisis and disaster pyramid: A theoretical framework for understanding preparedness and recovery. *International Journal of Physical Distribution & Logistics Management*, 39(7), 619–628.
- Goerigk, M., & Grün, B. (2014). A robust bus evacuation model with delayed scenario information. *OR Spectrum*, 36(4), 923–948.
- Goldschmidt, K. H., & Kumar, S. (2016). Humanitarian operations and crisis/disaster management: A retrospective review of the literature and framework for development. *International Journal of Disaster Risk Reduction*, 20, 1–13.
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems*, 35(1), 220–265.
- González, D. P., Monsalve, M., Moris, R., & Herrera, C. (2018). Risk and Resilience Monitor: Development of multiscale and multilevel indicators for disaster risk management for the communes and urban areas of Chile. *Applied Geography*, 94, 262–271.

- Goswami, S., Chakraborty, S., Ghosh, S., Chakrabarti, A., & Chakraborty, B. (2018). A review on application of data mining techniques to combat natural disasters. *Ain Shams Engineering Journal*, 9(3), 365–378.
- Gotham, K. F., & Campanella, R. (2011). Coupled vulnerability and resilience: The dynamics of cross-scale interactions in post-Katrina New Orleans. *Ecology and Society*, 16(3), 12.
- Greer, A. (2012). Earthquake preparedness and response: Comparison of the United States and Japan. *Leadership and Management in Engineering*, 12(3), 111–125.
- Griffith, D. A., Boehmke, B., Bradley, R. V., Hazen, B. T., & Johnson, A. W. (2019). Embedded analytics: Improving decision support for humanitarian logistics operations. *Annals of Operations Research*, 283(1–2), 247–265.
- Gunasekaran, A., Dubey, R., Fosso Wamba, S., Papadopoulos, T., Hazen, B. T., & Ngai, E. W. (2018). Bridging humanitarian operations management and organisational theory. *International Journal of Production Research*, 56(21), 6735–6740.
- Gunasekaran, A., & Spalanzani, A. (2012). Sustainability of manufacturing and services: Investigations for research and applications. *International Journal of Production Economics*, 140(1), 35–47.
- Gupta, S., Altay, N., & Luo, Z. (2019). Big data in humanitarian supply chain management: A review and further research directions. *Annals of Operations Research*, 283(1), 1153–1173.
- Gupta, S., Modgil, S., & Gunasekaran, A. (2020). Big data in lean six sigma: A review and further research directions. *International Journal of Production Research*, 58(3), 947–969.
- Gupta, S., Starr, M. K., Farahani, R. Z., & Matinrad, N. (2016). Disaster management from a POM perspective: Mapping a new domain. *Production and Operations Management*, 25(10), 1611–1637.
- Hagelsteen, M., & Becker, P. (2019). Systemic problems of capacity development for disaster risk reduction in a complex, uncertain, dynamic, and ambiguous world. *International Journal of Disaster Risk Reduction*, 36, 101102.
- Hallwright, J., & Handmer, J. (2019). Accountability and transparency in disaster aid: Cyclone Pam in Vanuatu. *International Journal of Disaster Risk Reduction*, 36, 101104.
- Hamra, J., Hossain, L., & Owen, C. (2012). Social network analysis of learning teams during emergency events. In Respicio, A., & Burstein, F. (Eds.), *Fusing decision support systems into the fabric of the context* (pp. 267–278). Netherlands: IOS Press.
- Han, Z., Hu, X., & Nigg, J. (2011). How does disaster relief works affect the trust in local government? A study of the Wenchuan earthquake. *Risk, Hazards & Crisis in Public Policy*, 2(4), 1–20.
- Han, S., Huang, H., Luo, Z., & Foropon, C. (2019). Harnessing the power of crowdsourcing and Internet of Things in disaster response. *Annals of Operations Research*, 283(1–2), 1175–1190.
- Harries, T., & Penning-Rowsell, E. (2011). Victim pressure, institutional inertia and climate change adaptation: The case of flood risk. *Global Environmental Change*, 21(1), 188–197.
- Haworth, B., Whittaker, J., & Bruce, E. (2016). Assessing the application and value of participatory mapping for community bushfire preparation. *Applied Geography*, 76, 115–127.
- Hegde, V. S., Jayaraman, V., & Srivastava, S. K. (2009). India's EO infrastructure for disaster reduction: Lessons and perspectives. *Acta Astronautica*, 65(9–10), 1471–1478.
- Herlin, H., & Pazirandeh, A. (2012). Nonprofit organizations shaping the market of supplies. *International Journal of Production Economics*, 139(2), 411–421.
- Hermansson, H. (2019). Challenges to decentralization of disaster management in Turkey: The role of political-administrative context. *International Journal of Public Administration*, 42(5), 417–431.
- Hernantes, J., Marañón, P., Gimenez, R., Sarriegi, J. M., & Labaka, L. (2019). Towards resilient cities: A maturity model for operationalizing resilience. *Cities*, 84, 96–103.
- Hildebrand, D., DeMotta, Y., Sen, S., & Valenzuela, A. (2017). Consumer responses to corporate social responsibility (CSR) contribution type. *Journal of Consumer Research*, 44(4), 738–758.
- Hilhorst, D. (2002). Being good at doing good? Quality and accountability of humanitarian NGOs. *Disasters*, 26(3), 193–212.
- Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. *Journal of Management*, 35(6), 1404–1427.
- Himes-Cornell, A., Ormond, C., Hoelting, K., Ban, N. C., Zachary Koehn, J., Allison, E. H., et al. (2018). Factors affecting disaster preparedness, response, and recovery using the community capitals framework. *Coastal Management*, 46(5), 335–358.
- Hoelscher, K., Miklian, J., & Nygård, H. M. (2017). Conflict, peacekeeping, and humanitarian security: Understanding violent attacks against aid workers. *International Peacekeeping*, 24(4), 538–565.
- Hoeppe, P. (2016). Trends in weather related disasters—Consequences for insurers and society. *Weather and Climate Extremes*, 11, 70–79.
- Holmes, J. (2011). Humanitarian response in the 21st century. *The Brown Journal of World Affairs*, 17(2), 113–121.

- Hong, L., Fu, C., Wu, J., & Frias-Martinez, V. (2018). Information needs and communication gaps between citizens and local governments online during natural disasters. *Information Systems Frontiers*, 20(5), 1027–1039.
- Horita, F. E., de Albuquerque, J. P., & Marchezini, V. (2018). Understanding the decision-making process in disaster risk monitoring and early-warning: A case study within a control room in Brazil. *International Journal of Disaster Risk Reduction*, 28, 22–31.
- Houston, J. B., Hawthorne, J., Perreault, M. F., Park, E. H., Goldstein Hode, M., Halliwell, M. R., et al. (2015). Social media and disasters: A functional framework for social media use in disaster planning, response, and research. *Disasters*, 39(1), 1–22.
- Hung, K. C., Kalantari, M., & Rajabifard, A. (2016). Methods for assessing the credibility of volunteered geographic information in flood response: A case study in Brisbane, Australia. *Applied Geography*, 68, 37–47.
- Imperiale, A. J., & Vanclay, F. (2019). Command-and-control, emergency powers, and the failure to observe United Nations disaster management principles following the 2009 L'Aquila earthquake. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdr.2019.101099>.
- India Today. (2019). Nearly 150 killed, 1.15 crore affected as floods continue to wreak havoc in Assam and Bihar. Retrieved March 20th, 2020 from <https://www.indiatoday.in/india/story/monsoon-rain-assam-bihar-flood-1571452-2019-07-19>.
- Ivčević, A., Mazurek, H., Siame, L., Moussa, A. B., & Bellier, O. (2019). Indicators in risk management: Are they a user-friendly interface between natural hazards and societal responses? Challenges and opportunities after UN Sendai conference in 2015. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdr.2019.101301>.
- Izumi, T., Shaw, R., Djalante, R., Ishiwatari, M., & Komino, T. (2019). Disaster risk reduction and innovations. *Progress in Disaster Science*. <https://doi.org/10.1016/j.pdisas.2019.100033>.
- Jabbour, C. J. C., Sobreiro, V. A., de Sousa Jabbour, A. B. L., de Souza Campos, L. M., Mariano, E. B., & Renwick, D. W. S. (2019). An analysis of the literature on humanitarian logistics and supply chain management: Paving the way for future studies. *Annals of Operations Research*, 283(1–2), 289–307. <https://doi.org/10.1007/s10479-017-2536-x>.
- James, K. (2011). The organizational science of disaster/terrorism prevention and response: Theory-building toward the future of the field. *Journal of Organizational Behavior*, 32(7), 1013–1032.
- James, E. H., Wooten, L. P., & Dushek, K. (2011). Crisis management: Informing a new leadership research agenda. *Academy of Management Annals*, 5(1), 455–493.
- Jillson, I. A., Clarke, M., Allen, C., Waller, S., Koehlmoos, T., Mumford, W., et al. (2019). Improving the science and evidence base of disaster response: A policy research study. *BMC Health Services Research*, 19(1), 274.
- Jin, Y., Liu, B. F., & Austin, L. L. (2014). Examining the role of social media in effective crisis management: The effects of crisis origin, information form, and source on publics' crisis responses. *Communication Research*, 41(1), 74–94.
- Jones, S., Oven, K. J., Manyena, B., & Aryal, K. (2014). Governance struggles and policy processes in disaster risk reduction: A case study from Nepal. *Geoforum*, 57, 78–90.
- Kaku, K. (2019). Satellite remote sensing for disaster management support: A holistic and staged approach based on case studies in Sentinel Asia. *International Journal of Disaster Risk Reduction*, 33, 417–432.
- Kapucu, N. (2005). Interorganizational coordination in dynamic context: Networks in emergency response management. *Connections*, 26(2), 33–48.
- Kapucu, N. (2006). Interagency communication networks during emergencies: Boundary spanners in multiagency coordination. *The American Review of Public Administration*, 36(2), 207–225.
- Kapucu, N. (2012). Disaster resilience and adaptive capacity in Central Florida, US, and in Eastern Marmara Region, Turkey. *Journal of Comparative Policy Analysis: Research and Practice*, 14(3), 202–216.
- Kapucu, N., & Hu, Q. (2016). Understanding multiplexity of collaborative emergency management networks. *The American Review of Public Administration*, 46(4), 399–417.
- Kathleen Geale, S. (2012). The ethics of disaster management. *Disaster Prevention and Management: An International Journal*, 21(4), 445–462.
- Kaur, H., & Singh, S. P. (2019). Sustainable procurement and logistics for disaster resilient supply chain. *Annals of Operations Research*, 283(1), 309–354.
- Kim, J., & Hastak, M. (2018). Social network analysis: Characteristics of online social networks after a disaster. *International Journal of Information Management*, 38(1), 86–96.
- Klomp, J. (2019). Election or disaster support? *The Journal of Development Studies*, 56(1), 205–220.
- Klomp, J., & Hoogezand, B. (2018). Natural disasters and agricultural protection: A panel data analysis. *World Development*, 104, 404–417.

- Kovacic, Z., & Di Felice, L. J. (2019). Complexity, uncertainty and ambiguity: Implications for European Union energy governance. *Energy Research & Social Science*, 53, 159–169.
- Kovacs, G., & Moshtari, M. (2019). A roadmap for higher research quality in humanitarian operations: A methodological perspective. *European Journal of Operational Research*, 276(2), 395–408.
- Kovács, G., Tatham, P., & Larson, P. D. (2012). What skills are needed to be a humanitarian logistician? *Journal of Business Logistics*, 33(3), 245–258.
- Kratcoski, P. C. (2018). Fraud and Corruption in Times of Disaster. *Fraud and Corruption* (pp. 139–157). Cham: Springer.
- Krausmann, E., Girgin, S., & Necci, A. (2019). Natural hazard impacts on industry and critical infrastructure: Natech risk drivers and risk management performance indicators. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdr.2019.101163>.
- Kron, W. (2009). Flood insurance: From clients to global financial markets. *Journal of Flood Risk Management*, 2(1), 68–75.
- Kuligowski, E. (2013). Predicting human behavior during fires. *Fire Technology*, 49(1), 101–120.
- Kunz, N., & Gold, S. (2017). Sustainable humanitarian supply chain management—exploring new theory. *International Journal of Logistics Research and Applications*, 20(2), 85–104.
- Kunz, N., & Reiner, G. (2012). A meta-analysis of humanitarian logistics research. *Journal of Humanitarian Logistics and Supply Chain Management*, 2(2), 116–147.
- Kusumasari, B., & Alam, Q. (2012). Local wisdom-based disaster recovery model in Indonesia. *Disaster Prevention and Management: An International Journal*, 21(3), 351–369.
- Lafrenière, J., Sweetman, C., & Thylin, T. (2019). Introduction: Gender, humanitarian action and crisis response. *Gender and Development*. <https://doi.org/10.1080/13552074.2019.1634332>.
- Larson, P. D., & Foropon, C. (2018). Process improvement in humanitarian operations: An organisational theory perspective. *International Journal of Production Research*, 56(21), 6828–6841.
- Lassa, J. A., Surjan, A., Caballero-Anthony, M., & Fisher, R. (2019). Measuring political will: An index of commitment to disaster risk reduction. *International Journal of Disaster Risk Reduction*, 34, 64–74.
- Lavin, R. P., Schemmel-Rettenmeier, L., & Frommelt-Kuhle, M. (2012). Reconsidering “special needs” populations during a disaster. *Annual Review of Nursing Research*, 30(1), 125–147.
- Lee, J., Bharosa, N., Yang, J., Janssen, M., & Rao, H. R. (2011). Group value and intention to use—A study of multi-agency disaster management information systems for public safety. *Decision Support Systems*, 50(2), 404–414.
- Liu, B. F., Fraustino, J. D., & Jin, Y. (2016). Social media use during disasters: How information form and source influence intended behavioral responses. *Communication Research*, 43(5), 626–646.
- Liu, Y., He, Z., Shamsuzzaman, M., & Wu, Z. (2010). A combined control scheme for monitoring the frequency and size of an attribute event. *Journal of Applied Statistics*, 37(12), 1991–2013.
- Lu, Q., Wu, J., Goh, M., & De Souza, R. (2019). Agility and resource dependency in ramp-up process of humanitarian organizations. *The International Journal of Logistics Management*, 30(3), 845–862.
- Ludin, S. M., & Arbon, P. A. (2017). Improving community disaster resilience through scorecard self-testing. *Disaster Prevention and Management: An International Journal*, 26(1), 13–27.
- Lue, E., Wilson, J. P., & Curtis, A. (2014). Conducting disaster damage assessments with Spatial Video, experts, and citizens. *Applied Geography*, 52, 46–54.
- Lukasiewicz, A., Dovers, S., & Eburn, M. (2017). Shared responsibility: The who, what and how. *Environmental Hazards*, 16(4), 291–313.
- Lukosch, H., & Comes, T. (2019). Gaming as a research method in humanitarian logistics. *Journal of Humanitarian Logistics and Supply Chain Management*, 9(3), 352–370.
- Lynn, M., Lieberman, H., Lynn, L., Pust, G. D., Stahl, K., Yeh, D. D., et al. (Eds.). (2018). *Disasters and mass casualty incidents: The nuts and bolts of preparedness and response to protracted and sudden onset emergencies*. New York: Springer.
- Lyu, H. M., Shen, S. L., Zhou, A., & Yang, J. (2019). Perspectives for flood risk assessment and management for mega-city metro system. *Tunnelling and Underground Space Technology*, 84, 31–44.
- Ma, Z. J., Wang, K. M., & Dai, Y. (2019). An emergency blood allocation approach considering blood group compatibility in disaster relief operations. *International Journal of Disaster Risk Science*, 10(1), 74–88.
- Madsen, P. M., & Rodgers, Z. J. (2015). Looking good by doing good: The antecedents and consequences of stakeholder attention to corporate disaster relief. *Strategic Management Journal*, 36(5), 776–794.
- Madu, C. N., & Kuei, C. H. (2014). Disaster relief supply chain quality management (DRSCQM). *International Journal of Quality & Reliability Management*, 31(9), 1052–1067.
- Maghsoudi, A. (2016). Advances in theory and their empirical application in humanitarian supply chain management research. *International Journal of Strategic Change Management*, 7(1), 43–66.

- Maio, R., Ferreira, T. M., & Vicente, R. (2018). A critical discussion on the earthquake risk mitigation of urban cultural heritage assets. *International Journal of Disaster Risk Reduction*, 27, 239–247.
- Maldonado, E. A., Maitland, C. F., & Tapia, A. H. (2010). Collaborative systems development in disaster relief: The impact of multi-level governance. *Information Systems Frontiers*, 12(1), 9–27.
- Manikas, A., Boyd, L., Guan, J., & Hoskins, K. (2019). A review of operations management literature: A data-driven approach. *International Journal of Production Research*. <https://doi.org/10.1080/00207543.2019.1651459>.
- Marek, L., Campbell, M., & Bui, L. (2017). Shaking for innovation: The (re) building of a (smart) city in a post disaster environment. *Cities*, 63, 41–50.
- Martin, G. P., McKee, L., & Dixon-Woods, M. (2015). Beyond metrics? Utilizing ‘soft intelligence’ for healthcare quality and safety. *Social Science and Medicine*, 142, 19–26.
- Martinez, G., Armaroli, C., Costas, S., Harley, M. D., & Paolisso, M. (2018). Experiences and results from interdisciplinary collaboration: Utilizing qualitative information to formulate disaster risk reduction measures for coastal regions. *Coastal Engineering*, 134, 62–72.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and society*, 13(1), 1–16.
- McCabe, O. L., Perry, C., Azur, M., Taylor, H. G., Gwon, H., Mosley, A., et al. (2013). Guided preparedness planning with lay communities: Enhancing capacity of rural emergency response through a systems-based partnership. *Prehospital and Disaster Medicine*, 28(1), 8–15.
- McCoy, J. H., & Brandeau, M. L. (2011). Efficient stockpiling and shipping policies for humanitarian relief: UNHCR’s inventory challenge. *OR Spectrum*, 33(3), 673–698.
- McKnight, B., & Linnenluecke, M. K. (2016). How firm responses to natural disasters strengthen community resilience: A stakeholder-based perspective. *Organization & Environment*, 29(3), 290–307.
- McLay, L. A., Boone, E. L., & Brooks, J. P. (2012). Analyzing the volume and nature of emergency medical calls during severe weather events using regression methodologies. *Socio-Economic Planning Sciences*, 46(1), 55–66.
- Meesters, K., & Van de Walle, B. (2014). Serious gaming for user centered innovation and adoption of disaster response information systems. *International Journal of Information Systems for Crisis Response and Management*, 6(2), 1–15.
- Mei, E. T. W., Lavigne, F., Picquout, A., de Bézilal, E., Brunstein, D., Grancher, D., et al. (2013). Lessons learned from the 2010 evacuations at Merapi volcano. *Journal of Volcanology and Geothermal Research*, 261, 348–365.
- Melnyk, S. A., Narasimhan, R., & DeCampos, A. (2014). Supply chain design: Issues, challenges, frameworks and solutions. *International Journal of Production Research*, 52(7), 1887–1896.
- Merlot, E. S., & De Cieri, H. (2012). The challenges of the 2004 Indian Ocean tsunami for strategic international human resource management in multinational nonprofit enterprises. *The International Journal of Human Resource Management*, 23(7), 1303–1319.
- Michaud, J., Moss, K., Licina, D., Waldman, R., Kamradt-Scott, A., Bartee, M., et al. (2019). Militaries and global health: Peace, conflict, and disaster response. *The Lancet*, 393(10168), 276–286.
- Miller, D. S., Gonzalez, C., & Hutter, M. (2017). Phoenix tourism within dark tourism: Rebirth, rebuilding and rebranding of tourist destinations following disasters. *Worldwide Hospitality and Tourism Themes*, 9(2), 196–215.
- Mohammadfam, I., Bastani, S., Esaghi, M., Golmohamadi, R., & Saeed, A. (2015). Evaluation of coordination of emergency response team through the social network analysis. Case study: Oil and gas refinery. *Safety and Health at Work*, 6(1), 30–34.
- Mojtahedi, M., & Oo, B. L. (2017). Critical attributes for proactive engagement of stakeholders in disaster risk management. *International Journal of Disaster Risk Reduction*, 21, 35–43.
- Moreno, A., Alem, D., Ferreira, D., & Clark, A. (2018). An effective two-stage stochastic multi-trip location-transportation model with social concerns in relief supply chains. *European Journal of Operational Research*, 269(3), 1050–1071.
- Moreno, J., & Shaw, D. (2018). Women’s empowerment following disaster: A longitudinal study of social change. *Natural Hazards*, 92(1), 205–224.
- Moshtari, M. (2016). Inter-organizational fit, relationship management capability, and collaborative performance within a humanitarian setting. *Production and Operations Management*, 25(9), 1542–1557.
- Moshtari, M., & Gonçalves, P. (2017). Factors influencing interorganizational collaboration within a disaster relief context. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 28(4), 1673–1694.
- Muller, A., & Whiteman, G. (2009). Exploring the geography of corporate philanthropic disaster response: A study of Fortune Global 500 firms. *Journal of Business Ethics*, 84(4), 589–603.

- Murthi, K. R. S., & Rao, M. K. (2016). Privatizing space missions: The critical route to boost Indian space economy. *New Space*, 4(4), 237–242.
- Nagurney, A., & Qiang, Q. (2012). Fragile networks: Identifying vulnerabilities and synergies in an uncertain age. *International Transactions in Operational Research*, 19(1–2), 123–160.
- Najafi, M., Eshghi, K., & de Leeuw, S. (2014). A dynamic dispatching and routing model to plan/re-plan logistics activities in response to an earthquake. *OR Spectrum*, 36(2), 323–356.
- Naji-Azimi, Z., Renaud, J., Ruiz, A., & Salari, M. (2012). A covering tour approach to the location of satellite distribution centers to supply humanitarian aid. *European Journal of Operational Research*, 222(3), 596–605.
- Niles, M. T., Emery, B. F., Reagan, A. J., Dodds, P. S., & Danforth, C. M. (2019). Social media usage patterns during natural hazards. *PLoS ONE*, 14(2), e0210484.
- Nilsson, S., Sjöberg, M., & Larsson, G. (2010). A civil contingencies agency management system for disaster aid: A theoretical model. *International Journal of Organizational Analysis*, 18(4), 412–429.
- Nolte, I. M., Martin, E. C., & Boenigk, S. (2012). Cross-sectoral coordination of disaster relief. *Public Management Review*, 14(6), 707–730.
- Nolz, P. C., Doerner, K. F., & Hartl, R. F. (2010). Water distribution in disaster relief. *International Journal of Physical Distribution & Logistics Management*, 40(8/9), 693–708.
- Oloruntoba, R., & Banomyong, R. (2018). Humanitarian logistics research for the care of refugees and internally displaced persons: A new area of research and a research agenda. *Journal of Humanitarian Logistics and Supply Chain Management*, 8(3), 282–294.
- Oloruntoba, R., & Gray, R. (2006). Humanitarian aid: An agile supply chain? *Supply Chain Management: An International Journal*, 11(2), 115–120.
- Oloruntoba, R., Hossain, G. F., & Wagner, B. (2016). Theory in humanitarian operations research. *Annals of Operations Research*, 283(1–2), 543–560.
- Oloruntoba, R., & Kovács, G. (2015). A commentary on agility in humanitarian aid supply chains. *Supply Chain Management: An International Journal*, 20(6), 708–716.
- Onuma, H., Shin, K. J., & Managi, S. (2017). Household preparedness for natural disasters: Impact of disaster experience and implications for future disaster risks in Japan. *International Journal of Disaster Risk Reduction*, 21, 148–158.
- Oosterhof, L., Heuvelman, A., & Peters, O. (2009). Donation to disaster relief campaigns: Underlying social cognitive factors exposed. *Evaluation and Program Planning*, 32(2), 148–157.
- Opdyke, A., Javernick-Will, A., & Koschmann, M. (2019). Assessing the impact of household participation on satisfaction and safe design in humanitarian shelter projects. *Disasters*, 43(4), 926–953.
- Ophiyandri, T., Amaratunga, D., Pathirage, C., & Keraminiyage, K. (2013). Critical success factors for community-based post-disaster housing reconstruction projects in the pre-construction stage in Indonesia. *International Journal of Disaster Resilience in the Built Environment*, 4(2), 236–249.
- Ortiz-Barrios, M. A., Aleman-Romero, B. A., Rebolledo-Rudas, J., Maldonado-Mestre, H., Montes-Villa, L., De Felice, F., et al. (2017). The analytic decision-making preference model to evaluate the disaster readiness in emergency departments: The ADT model. *Journal of Multi-Criteria Decision Analysis*, 24(5–6), 204–226.
- Othman, S. H., Beydoun, G., & Sugumaran, V. (2014). Development and validation of a Disaster Management Metamodel (DMM). *Information Processing and Management*, 50(2), 235–271.
- Ozguven, E. E., & Ozbay, K. (2013). A secure and efficient inventory management system for disasters. *Transportation Research Part C: Emerging Technologies*, 29, 171–196.
- Paek, H. J., Hilyard, K., Freimuth, V., Barge, J. K., & Mindlin, M. (2010). Theory-based approaches to understanding public emergency preparedness: Implications for effective health and risk communication. *Journal of Health Communication*, 15(4), 428–444.
- Palttala, P., Boano, C., Lund, R., & Vos, M. (2012). Communication gaps in disaster management: Perceptions by experts from governmental and non-governmental organizations. *Journal of Contingencies and Crisis Management*, 20(1), 2–12.
- Palttala, P., & Vos, M. (2011). Testing a methodology to improve organizational learning about crisis communication by public organizations. *Journal of Communication Management*, 15(4), 314–331.
- Papadopoulos, T., Gunasekaran, A., Dubey, R., Altay, N., Childe, S. J., & Fosso-Wamba, S. (2017). The role of Big Data in explaining disaster resilience in supply chains for sustainability. *Journal of Cleaner Production*, 142, 1108–1118.
- Park, J., Seager, T. P., Rao, P. S. C., Convertino, M., & Linkov, I. (2013). Integrating risk and resilience approaches to catastrophe management in engineering systems. *Risk Analysis*, 33(3), 356–367.

- Pascapurnama, D. N., Murakami, A., Chagan-Yasutan, H., Hattori, T., Sasaki, H., & Egawa, S. (2018). Integrated health education in disaster risk reduction: Lesson learned from disease outbreak following natural disasters in Indonesia. *International Journal of Disaster Risk Reduction*, 29, 94–102.
- Paudel, J., & Ryu, H. (2018). Natural disasters and human capital: The case of Nepal's earthquake. *World Development*, 111, 1–12.
- Paul, J. A., & Bagchi, A. (2018). Does terrorism increase after a natural disaster? An analysis based upon property damage. *Defence and Peace Economics*, 29(4), 407–439.
- Paul, J. A., & MacDonald, L. (2016a). Location and capacity allocations decisions to mitigate the impacts of unexpected disasters. *European Journal of Operational Research*, 251(1), 252–263.
- Paul, J. A., & MacDonald, L. (2016b). Optimal location, capacity and timing of stockpiles for improved hurricane preparedness. *International Journal of Production Economics*, 174, 11–28.
- Pazirandeh, A. (2011). Sourcing in global health supply chains for developing countries: Literature review and a decision-making framework. *International Journal of Physical Distribution & Logistics Management*, 41(4), 364–384.
- Pazirandeh, A., & Maghsoudi, A. (2018). Improved coordination during disaster relief operations through sharing of resources. *Journal of the Operational Research Society*, 69(8), 1227–1241.
- Peltola, M., & Hämmäinen, H. (2018). Effect of population density and network availability on deployment of broadband PPDR mobile network service. *Digital Policy, Regulation and Governance*, 20(1), 78–96.
- Penadés, M. C., Núñez, A. G., & Canós, J. H. (2017). From planning to resilience: The role (and value) of the emergency plan. *Technological Forecasting and Social Change*, 121, 17–30.
- Peng, M., Peng, Y., & Chen, H. (2014). Post-seismic supply chain risk management: A system dynamics disruption analysis approach for inventory and logistics planning. *Computers & Operations Research*, 42, 14–24.
- Pérez-Galarce, F., Canales, L. J., Vergara, C., & Candia-Véjar, A. (2017). An optimization model for the location of disaster refugees. *Socio-Economic Planning Sciences*, 59, 56–66.
- Perry, M. (2007). Natural disaster management planning: A study of logistics managers responding to the tsunami. *International Journal of Physical Distribution & Logistics Management*, 37(5), 409–433.
- Petit, T. A. (1967). A behavioral theory of management. *Academy of Management Journal*, 10(4), 341–350.
- Petterson, M., Nanayakkara, L., Konchok, N., Norman, R., Wangchuk, S., & Linderoth, M. (2019). Inter-connected geoscience applied to disaster and risk: case study from SECMOL, Ladakh, N. India. *Disaster Prevention and Management*. <https://doi.org/10.1108/DPM-08-2019-0248>.
- Pfeffer, J., & Salancik, G. R. (1978). Social control of organizations. *The external control of organizations: A resource dependence perspective*. New York: Harper & Row.
- Pfeffer, J., & Salancik, G. R. (2003). *The external control of organizations: A resource dependence perspective*. Stanford: Stanford University Press.
- Pothiawala, S. (2015). Food and shelter standards in humanitarian action. *Turkish Journal of Emergency Medicine*, 15, 34–39.
- Prasad, S., Zakaria, R., & Altay, N. (2018). Big data in humanitarian supply chain networks: A resource dependence perspective. *Annals of Operations Research*, 270(1–2), 383–413.
- Preece, G., Shaw, D., & Hayashi, H. (2013). Using the viable system model (VSM) to structure information processing complexity in disaster response. *European Journal of Operational Research*, 224(1), 209–218.
- Prosman, E. J., Scholten, K., & Power, D. (2016). Dealing with defaulting suppliers using behavioral based governance methods: An agency theory perspective. *Supply Chain Management: An International Journal*, 21(4), 499–511.
- Puri, J., Aladysheva, A., Iversen, V., Ghorpade, Y., & Brück, T. (2017). Can rigorous impact evaluations improve humanitarian assistance? *Journal of Development Effectiveness*, 9(4), 519–542.
- Qin, L., Feng, S., & Zhu, H. (2018). Research on the technological architectural design of geological hazard monitoring and rescue-after-disaster system based on cloud computing and Internet of things. *International Journal of System Assurance Engineering and Management*, 9(3), 684–695.
- Rabta, B., Wankmüller, C., & Reiner, G. (2018). A drone fleet model for last-mile distribution in disaster relief operations. *International Journal of Disaster Risk Reduction*, 28, 107–112.
- Ragini, J. R., Anand, P. R., & Bhaskar, V. (2018). Big data analytics for disaster response and recovery through sentiment analysis. *International Journal of Information Management*, 42, 13–24.
- Raikes, J., & McBean, G. (2016). Responsibility and liability in emergency management to natural disasters: A Canadian example. *International Journal of Disaster Risk Reduction*, 16, 12–18.
- Rao, U., & Nair, V. (2019). Aadhaar: Governing with biometrics. *South Asia: Journal of South Asian Studies*, 42(3), 469–481.
- Reale, A., & Handmer, J. (2011). Land tenure, disasters and vulnerability. *Disasters*, 35(1), 160–182.

- Reuter, C., & Kaufhold, M. A. (2018). Fifteen years of social media in emergencies: A retrospective review and future directions for crisis informatics. *Journal of Contingencies and Crisis Management*, 26(1), 41–57.
- Rezaei Soufi, H., Torabi, S. A., & Sahebjamnia, N. (2019). Developing a novel quantitative framework for business continuity planning. *International Journal of Production Research*, 57(3), 779–800.
- Ritchie, B. W., & Jiang, Y. (2019). A review of research on tourism risk, crisis and disaster management: Launching the annals of tourism research curated collection on tourism risk, crisis and disaster management. *Annals of Tourism Research*, 79, 102812.
- Rodríguez-Espíndola, O., Albores, P., & Brewster, C. (2018). Disaster preparedness in humanitarian logistics: A collaborative approach for resource management in floods. *European Journal of Operational Research*, 264(3), 978–993.
- Roh, S. Y., Jang, H. M., & Han, C. H. (2013). Warehouse location decision factors in humanitarian relief logistics. *The Asian Journal of Shipping and Logistics*, 29(1), 103–120.
- Rose, A., & Kustra, T. (2013). Economic considerations in designing emergency management institutions and policies for transboundary disasters. *Public Management Review*, 15(3), 446–462.
- Rufat, S., Tate, E., Burton, C. G., & Maroof, A. S. (2015). Social vulnerability to floods: Review of case studies and implications for measurement. *International Journal of Disaster Risk Reduction*, 14, 470–486.
- Rukundo, P. M., Iversen, P. O., Oshaug, A., Omuajuanfo, L. R., Rukooko, B., Kikafunda, J., et al. (2014). Food as a human right during disasters in Uganda. *Food Policy*, 49, 312–322.
- Sabouhi, F., Bozorgi-Amiri, A., Moshref-Javadi, M., & Heydari, M. (2019). An integrated routing and scheduling model for evacuation and commodity distribution in large-scale disaster relief operations: A case study. *Annals of Operations Research*, 283(1–2), 643–677.
- Sahay, B. S., Menon, N. V. C., & Gupta, S. (2016). Humanitarian logistics and disaster management: The role of different stakeholders. *Managing humanitarian logistics* (pp. 3–21). New Delhi: Springer.
- Sahebjamnia, N., Torabi, S. A., & Mansouri, S. A. (2015). Integrated business continuity and disaster recovery planning: Towards organizational resilience. *European Journal of Operational Research*, 242(1), 261–273.
- Sahin, H., Kara, B. Y., & Karasan, O. E. (2016). Debris removal during disaster response: A case for Turkey. *Socio-Economic Planning Sciences*, 53, 49–59.
- Sakurai, M., & Murayama, Y. (2019). Information technologies and disaster management—Benefits and issues. *Progress in Disaster Science*. <https://doi.org/10.1016/j.pdisas.2019.100012>.
- Sanderson, D. (2019). Coordination in urban humanitarian response. *Progress in Disaster Science*. <https://doi.org/10.1016/j.pdisas.2019.100004>.
- Sankaranarayanan, K., Castañeda, J. A., & Villa, S. (2018). Future research in humanitarian operations: A behavioral operations perspective. *The Palgrave handbook of humanitarian logistics and supply chain management* (pp. 71–117). London: Palgrave Macmillan.
- Sapat, A., Esnard, A. M., & Kolpakov, A. (2019). Understanding collaboration in disaster assistance networks: Organizational homophily or resource dependency? *The American Review of Public Administration*, 49(8), 957–972.
- Sarkis, J., Zhu, Q., & Lai, K. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130(1), 1–15.
- Save the Children. (2018). I Kept Crying Because I Was So Afraid”: Marzela’s Story. Retrieved November 5th, 2019 from <https://www.savethechildren.org/us/about-us/why-save-the-children/story/sulawesi-indonesia-earthquake-tsunami-survivor-story>.
- Schniederjans, D. G., Curado, C., & Khalajhedayati, M. (2019). Supply chain digitisation trends: An integration of knowledge management. *International Journal of Production Economics*. <https://doi.org/10.1016/j.ijpe.2019.07.012>.
- Schulz, S. F., & Blecken, A. (2010). Horizontal cooperation in disaster relief logistics: Benefits and impediments. *International Journal of Physical Distribution & Logistics Management*, 40(8/9), 636–656.
- Scolobig, A., Prior, T., Schröter, D., Jörin, J., & Patt, A. (2015). Towards people-centred approaches for effective disaster risk management: Balancing rhetoric with reality. *International Journal of Disaster Risk Reduction*, 12, 202–212.
- Shah, A. A., Ye, J., Abid, M., Khan, J., & Amir, S. M. (2018). Flood hazards: Household vulnerability and resilience in disaster-prone districts of Khyber Pakhtunkhwa province, Pakistan. *Natural Hazards*, 93(1), 147–165.
- Shepard, J. M., & Hougland, J. G., Jr. (1978). Contingency theory: “complex man” or “complex organization”? *Academy of Management Review*, 3(3), 413–427.
- Shreve, C. M., & Kelman, I. (2014). Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction. *International Journal of Disaster Risk Reduction*, 10, 213–235.

- Singh, J. P., Dwivedi, Y. K., Rana, N. P., Kumar, A., & Kapoor, K. K. (2019). Event classification and location prediction from tweets during disasters. *Annals of Operations Research*, 283(1–2), 737–757.
- Sinha, A., Kumar, P., Rana, N. P., Islam, R., & Dwivedi, Y. K. (2017). Impact of internet of things (IoT) in disaster management: A task-technology fit perspective. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-017-2658-1>.
- Skipper, J. B., Craighead, C. W., Byrd, T. A., & Kelly Rainer, R. (2008). Towards a theoretical foundation of supply network interdependence and technology-enabled coordination strategies. *International Journal of Physical Distribution & Logistics Management*, 38(1), 39–56.
- Sloand, E., Ho, G., Klimmek, R., Pho, A., & Kub, J. (2012). Nursing children after a disaster: A qualitative study of nurse volunteers and children after the Haiti earthquake. *Journal for Specialists in Pediatric Nursing*, 17(3), 242–253.
- Solinska-Nowak, A., Magnuszewski, P., Curl, M., French, A., Keating, A., Mochizuki, J., et al. (2018). An overview of serious games for disaster risk management—Prospects and limitations for informing actions to arrest increasing risk. *International Journal of Disaster Risk Reduction*, 31, 1013–1029.
- Sousa, R., & Voss, C. A. (2008). Contingency research in operations management practices. *Journal of Operations Management*, 26(6), 697–713.
- Spiekermann, R., Kienberger, S., Norton, J., Briones, F., & Weichselgartner, J. (2015). The Disaster-Knowledge Matrix-Reframing and evaluating the knowledge challenges in disaster risk reduction. *International Journal of Disaster Risk Reduction*, 13, 96–108.
- Staupe-Delgado, R. (2019). Can community resettlement be considered a resilient move? Insights from a slow-onset disaster in the Colombian Andes. *The Journal of Development Studies*. <https://doi.org/10.1080/00220388.2019.1626836>.
- Stephenson, M., Jr. (2005). Making humanitarian relief networks more effective: Operational coordination, trust and sense making. *Disasters*, 29(4), 337–350.
- Sternberg, T., & Batbuyan, B. (2013). Integrating the Hyogo Framework into Mongolia's disaster risk reduction (DRR) policy and management. *International Journal of Disaster Risk Reduction*, 5, 1–9.
- Stinchcombe, A. (1987). *Constructing social theories*. Chicago, IL: University of Chicago Press.
- Sushil, (2019). Theory building using SAP-LAP linkages: An application in the context of disaster management. *Annals of Operations Research*, 283(1–2), 811–836.
- Suter, L., Birkland, T., & Larter, R. (2009). Disaster research and social network analysis: Examples of the scientific understanding of human dynamics at the National Science Foundation. *Population Research and Policy Review*, 28(1), 1–10.
- Swanson, D., Goel, L., Francisco, K., & Stock, J. (2017). Applying theories from other disciplines to logistics and supply chain management: A systematic literature review. *Transportation Journal*, 56(3), 299–356.
- Tacheva, Z., & Simpson, N. (2019). Social network analysis in humanitarian logistics research. *Journal of Humanitarian Logistics and Supply Chain Management*. <https://doi.org/10.1108/JHLSCM-06-2018-0047>.
- Tafti, M. T., & Tomlinson, R. (2019). Theorizing distributive justice and the practice of post-disaster housing recovery. *Environmental Hazards*, 18(1), 7–25.
- Tang, R., Wu, J., Ye, M., & Liu, W. (2019). Impact of economic development levels and disaster types on the short-term macroeconomic consequences of natural hazard-induced disasters in China. *International Journal of Disaster Risk Science*, 10(3), 371–385.
- Tatham, P., Ball, C., Wu, Y., & Diplas, P. (2017). Long-endurance remotely piloted aircraft systems (LERPAS) support for humanitarian logistic operations: The current position and the proposed way ahead. *Journal of Humanitarian Logistics and Supply Chain Management*, 7(1), 2–25.
- The Guardian. (2020). Coronavirus symptoms: What are they and should I see a doctor? Retrieved March 23rd, 2020 from <https://www.theguardian.com/world/2020/mar/23/coronavirus-symptoms-what-are-they-and-should-i-see-a-doctor-covid-19>.
- Thompson, K. (2018). Facing disasters together: How keeping animals safe benefits humans before, during and after natural disasters. *OIE Revue scientifique et technique-office international des epizooties (Special Issue on 'The Contribution of Animals to Human Welfare')*, 37(1), 223–230.
- Timms, P. (2018). Business continuity and disaster recovery—Advice for best practice. *Network Security*, 2018(11), 13–14.
- Timotheou, S. (2016). Fast Non-Negative Least-Squares Learning in the Random Neural Network. *Probability in the Engineering and Informational Sciences*, 30(3), 379–402.
- Toinpre, O., Mackee, J., & Gajendran, T. (2018). A framework for understanding the influence of isomorphic pressures on governance of disaster risks. *Procedia Engineering*, 212, 173–180.

- Tokman, M., & Beitelspacher, L. S. (2011). Supply chain networks and service-dominant logic: Suggestions for future research. *International Journal of Physical Distribution & Logistics Management*, 41(7), 717–726.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222.
- Tsukahara, T. (2017). Commentary: New Currents in Science: The Challenge of Quality, examining the discrepancies and incongruities between Japanese techno-scientific policy and the citizens' science movement in post-3/11 Japan. *Futures*, 91, 84–89.
- Twigg, J., & Mosel, I. (2017). Emergent groups and spontaneous volunteers in urban disaster response. *Environment and Urbanization*, 29(2), 443–458.
- Uhr, C. (2017). Leadership ideals as barriers for efficient collaboration during emergencies and disasters. *Journal of Contingencies and Crisis Management*, 25(4), 301–312.
- Ülkü, M. A., Bell, K. M., & Wilson, S. G. (2015). Modeling the impact of donor behavior on humanitarian aid operations. *Annals of Operations Research*, 230(1), 153–168.
- UNDRR. (2020). Disasters displace more people than conflict and violence. Retrieved March 23rd, 2020 from <https://www.undrr.org/>.
- Utz, S., Schultz, F., & Glocka, S. (2013). Crisis communication online: How medium, crisis type and emotions affected public reactions in the Fukushima Daiichi nuclear disaster. *Public Relations Review*, 39(1), 40–46.
- van der Laan, E., de Brito, M., van Fenema, P., & Vermaesen, S. C. (2009). Managing information cycles for intra-organisational coordination of humanitarian logistics. *International Journal of Services, Technology and Management*, 12(4), 362–390.
- Van Well, L., van der Keur, P., Harjanne, A., Pagneux, E., Perrels, A., & Henriksen, H. J. (2018). Resilience to natural hazards: An analysis of territorial governance in the Nordic countries. *International Journal of Disaster Risk Reduction*, 31, 1283–1294.
- Varda, D. M., Forgette, R., Banks, D., & Contractor, N. (2009). Social network methodology in the study of disasters: Issues and insights prompted by post-Katrina research. *Population Research and Policy Review*, 28(1), 11–29.
- Vasavada, T. (2013). Managing disaster networks in India. *Public Management Review*, 15(3), 363–382.
- Venkatesh, V. G., Zhang, A., Deakins, E., Luthra, S., & Mangla, S. (2019). A fuzzy AHP-TOPSIS approach to supply partner selection in continuous aid humanitarian supply chains. *Annals of Operations Research*, 283(1), 1517–1550.
- Vij, S., Biesbroek, R., Groot, A., Termeer, K., & Parajuli, B. P. (2019). Power interplay between actors: Using material and ideational resources to shape local adaptation plans of action (LAPAs) in Nepal. *Climate Policy*, 19(5), 571–584.
- Vishnu, C. L., Sajinkumar, K. S., Oommen, T., Coffman, R. A., Thrivikramji, K. P., Rani, V. R., et al. (2019). Satellite-based assessment of the August 2018 flood in parts of Kerala, India. *Geomatics, Natural Hazards and Risk*, 10(1), 758–767.
- Wagner, N., & Agrawal, V. (2014). An agent-based simulation system for concert venue crowd evacuation modeling in the presence of a fire disaster. *Expert Systems with Applications*, 41(6), 2807–2815.
- Walch, C. (2019). Adaptive governance in the developing world: disaster risk reduction in the State of Odisha, India. *Climate and Development*, 11(3), 238–252.
- Wamba, S. F., Edwards, A., & Akter, S. (2019). Social media adoption and use for improved emergency services operations: The case of the NSW SES. *Annals of Operations Research*, 283(1–2), 225–245.
- Watanabe, K., & Hayashi, T. (2015). PPP (Public-Private Partnership)-based business continuity of regional banking services for communities in wide-area disasters. In *International conference on critical information infrastructures security* (pp. 67–76). Springer, Cham.
- Weichselgartner, J., & Pigeon, P. (2015). The role of knowledge in disaster risk reduction. *International Journal of Disaster Risk Science*, 6(2), 107–116.
- White, C., Plotnick, L., Kushma, J., Hiltz, S. R., & Turoff, M. (2009). An online social network for emergency management. *International Journal of Emergency Management*, 6(3–4), 369–382.
- Whittaker, J., McLennan, B., & Handmer, J. (2015). A review of informal volunteerism in emergencies and disasters: Definition, opportunities and challenges. *International Journal of Disaster Risk Reduction*, 13, 358–368.
- Wilhite, D. A., Sivakumar, M. V., & Pulwarty, R. (2014). Managing drought risk in a changing climate: The role of national drought policy. *Weather and Climate Extremes*, 3, 4–13.
- Williamson, O. E. (1979). Transaction-cost economics: The governance of contractual relations. *The Journal of Law and Economics*, 22(2), 233–261.

- Williamson, O. E. (2008). Outsourcing: Transaction cost economics and supply chain management. *Journal of Supply Chain Management*, 44(2), 5–16.
- World Health Organization. (2020). Lockdown Not Enough, “Find, Isolate, Test, Treat”: WHO on Coronavirus. Retrieved April 3rd, 2020 from <https://www.ndtv.com/world-news/lockdown-not-enough-use-this-time-to-attack-coronavirus-who-chief-tedros-adhanom-ghebreyesus-2200827>.
- Wu, Z., Liu, Y., He, Z., & Khoo, M. B. (2010). A cumulative sum scheme for monitoring frequency and size of an event. *Quality and Reliability Engineering International*, 26(6), 541–554.
- Wu, L., Zhang, J., Lu, Q., & Rahman, A. S. (2017). Tourist adaptation behavior in response to climate disasters in Bangladesh. *Journal of Sustainable Tourism*, 25(2), 217–233.
- Xiang, Y., & Zhuang, J. (2016). A medical resource allocation model for serving emergency victims with deteriorating health conditions. *Annals of Operations Research*, 236(1), 177–196.
- Yadav, D. K., & Barve, A. (2015). Analysis of critical success factors of humanitarian supply chain: An application of Interpretive Structural Modeling. *International Journal of Disaster Risk Reduction*, 12, 213–225.
- Yahyaei, M., & Bozorgi-Amiri, A. (2018). Robust reliable humanitarian relief network design: An integration of shelter and supply facility location. *Annals of Operations Research*, 283(1), 897–916.
- Ye, Y., Jiao, W., & Yan, H. (2019). Managing relief inventories responding to natural disasters: Gaps between practice and literature. *Production and Operations Management*. <https://doi.org/10.1111/poms.13136>.
- Yuan, J., Chowdhury, P. K. R., McKee, J., Yang, H. L., Weaver, J., & Bhaduri, B. (2018). Exploiting deep learning and volunteered geographic information for mapping buildings in Kano, Nigeria. *Scientific data*, 5, 180217.
- Zhang, W., Wang, N., & Nicholson, C. (2017). Resilience-based post-disaster recovery strategies for road-bridge networks. *Structure and Infrastructure Engineering*, 13(11), 1404–1413.
- Zhou, L., Wu, X., Xu, Z., & Fujita, H. (2018). Emergency decision making for natural disasters: An overview. *International Journal of Disaster Risk Reduction*, 27, 567–576.
- Zu, X., & Kaynak, H. (2012). An agency theory perspective on supply chain quality management. *International Journal of Operations & Production Management*, 32(4), 423–446.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.