A Systematic Review of Performance Enhancement of Humanitarian Logistics through Transparency: Current Status and Perspectives

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***Abstract*- The mechanism of how transparency can help to enhance the performance of humanitarian logistics (HL) following disaster relief operation (RO) needs to be explored. Thus, the main purposes of this paper are to systematically review the barriers to and benefits of transparency in the field of HL in order to improve the performance of HL, and also to highlight the role and unique attributes of transparency in the field of HL. A systematic literature review using the CIMO (context, intervention, mechanism, and outcomes) logic approach was adopted to perform the systematic analysis of the previous investigations relevant to the performance enhancement of HL. Most such previous research investigated transparency in the context of HL, with little examination of the outcomes of transparency in HL. Based upon this process, disaster risk can be reduced and managed through efficient HL. So far, the efficiency and performance of HL has been improved through coordination, collaboration and partnership. In the present study, recent developments corresponding to performance enhancement of HL through transparency are reviewed systematically, with a particular focus on the importance of transparency, what organizations can do to become more transparent and the challenges and potential benefits of transparency. The authors provide an in-depth understanding of the barriers and challenges to transparency faced in this field. Furthermore, the challenges in comparing with recent research are also discussed, along with future directions to improve the performance enhancement of HL through transparency. However, the poor performance of HL is one of the challenging issues associated with disaster risk management. This review article will be fruitful for novice researchers and practitioners in managing disaster risk through efficient HL and further advancement in the field of HL. Furthermore this article raises the awareness of the importance of carefully evaluating decisions related to the fair distribution of relief items.**

***Keywords*-** *Transparency; Humanitarian Logistics; Systematic Literature Review; CIMO; Humanitarian Relief Operation; Performance enhancement; Disaster Risk; Humanitarian supply chain*

1. Introduction

Disaster risk is a necessary reality in the modern world. In recent years, human suffering has increased due to increases in the intensity and frequency of natural and manmade disasters [1]-[3]. Natural disasters have caused much more damage to life and property than major wars. In the last few decades, more than 2 billion people in developing countries have been affected by climate-related hazards. In 2008, Myanmar Cyclone Nargis caused almost 140,000 casualties and another 2.4 million people were affected due to the lack of planning [4]. Over the four decades from 1970 to 2010, in South Asia countries alone, 980,000 people died, 2.4 million people were affected, 105 billion US$ worth of assets were damaged and about 1333 major disasters struck [2].

Global warming is a major threat to South Asian countries, especially Nepal, Pakistan, India etc. possibly even more affected. The Himalayas are melting rapidly [2], leading to major floods in 2014 and 2015 [5] and severe water shortages and cyclones expected in the future [2]. These increases in the frequency and intensity of disasters will bring huge social and economic hardships [6]. Both developed and developing countries are similarly vulnerable to natural and manmade disasters.

When any disaster occurs, the local community and military are the first responders. The major role played by the military is the sharing of information and resources, searching for missing victims and providing logistical support [4]. In response to calls for help from the host government, humanitarian organizations (HOs) such as nonmilitary organizations governmental and nongovernmental organizations (NGOs), United Nation organizations (UNO), local and international HOs (IHOs), civil societies, and many others with different objectives and purposes participate in RO [7]. They deliver aid in the form of money, medical teams, medicine, foods, water, sanitation, equipment, engineers, shelters, support personnel [8]-[9], relief packages and damage compensation [10]. Some HOs provide relief activities, or developmental activity or both [7] with limited resources [6]. The specific mission motivates donors to provide funds to the HOs for disaster risk reduction, RO and developmental activities [9].

Disasters cause causalities, disabilities and asset losses that create not only financial problems for victims, but also affect them psychologically and emotionally. People may think of their livelihoods, destroyed hard work, investment and goals. Such feelings may influence individuals and communities negatively such as looting, creating violence and politically instability. After a disaster

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strikes, victims look for lifesaving relief, which depends on various factors including time, location, type and intensity of the disaster and the needs of the victims [11]. When relief assistant is a matter of life or death for victims, some officials are only interested in money and are not interested in helping the afflicted. Even some governments hamper IHOs from work in order to receive bribes. Opportunistic governments take action, which affects the decision and performance of the logisticians [12]. During HL operations, looting, snatching, illegal appointments, the influence of local people and the distribution of unfair and low-quality product by relief providers are common phenomena [13]. Following a disaster, distributional unfairness can devastate vulnerable people [10]. In RO, the central position is occupied by HL [14], as the participation and cost of logistics accounts for almost 80% of the total RO cost. HL always has lower priority within HOs, despite being a factor that can determine the success or failure of humanitarian operations [9]. The basic goal of HL is to deliver the right supply, at the right time and quantity, to the right location [7]. Effective HL can not only decrease risk, cost and timelines, but can also save lives and reduce suffering. Hence, HL must be fast, fair and safe [14].

Disaster risks, issues and challenges have been discussed and attempted solutions have been proposed through various angles. However, this article provides a unique overview from a different perspective, i.e., the enhancement of HL performance through transparency. The interrelationships among the hindrances to transparency in HL need to be understood. This article raises the awareness of the importance of carefully evaluating decisions related to the fair distribution of relief items, while also highlighting the urgency, complexity, uncertainty, government and local interference, wide spread of corruption, security, safety and other relevant issues. This article makes three distinct contributions. First, we thoroughly examine the literature regarding the impact of transparency on HL performance by applying the CIMO-logic proposed by [15], which enabled us to find and group the challenges to transparency in HL. To the best of our knowledge, CIMO-logic has not used in the relationship of transparency in the HL field. Second, the findings from the review are beneficial for all stakeholders, especially donors, HOs and governments as they are persistently seeking strategies to help victims, and also contribute to understanding the politics in HL. Third, the structure of this systematic review reveals research gaps and promising areas for further research.

The rest of this article is organized as follows. Part two discusses the search methodology and study scope. Part three examines the thematic findings by applying CIMO logic. Part four systematically discusses and groups the challenges to transparency in HL. Part five discusses the contribution and scope for future research. Finally, part six presents the study conclusions.

2. Methodology and Scope of the Study

This section discusses the methodology and boundaries of this systematic review. According to [16] the basic functions fulfilled by a literature review are to identify and summarize the basic themes and issues of the research topic and provide future research directions based on the study. Second, the literature is usually less systematically described in the empirical research process, which necessitates a more systematic, reproducible and rigorous literature review; hence, the literature review is considered a useful tool for research. Third, according to [17], a systematic review enhances the quality of the review process by synthesizing it in a transparent, systematic and reproducible way. Finally, systematic reviews allow us to draw conclusions, at varying levels of certainty, consistency and confidence, about what is known and what is not known about the answer to the research question(s), provide transparency to the process of review, and reduce the effects of author biases [17].

The systematic literature review methodology applied to this study, CIMO logic, is summarized as follows.

i. The needs and general goals of the review were established. The present state of the HL literature, with many different contributions, necessitates a detailed reflection of the research done on HL.
ii. With this general intention, search engines relevant to five databases (Science Direct, Emerald, Springer, Wiley and Taylor and Francis) are selected.
iii. Based on our expertise and knowledge in the field, and also a review of 20 famous references in the literature, a set of key words was selected as detailed in figure 1.
iv. To determine know the trends, position and current status of the research in the specific field of transparency in HL, focus was given to the number of publications per year and per journal, and classified in term of phases of disasters, onset of disasters, causes of disasters, and the methodology used in the reviewed literature.
v. The large number of search results and the variety of contributions required that boundaries were established to narrow the number of studies. Various inclusion and exclusion criteria were used. Prior to presenting the selection criteria, it is important to mention that this review does not intend to be a thorough bibliographic study, but rather an application of a systematic review method to a particular field of HL in order to gain practical results and insights. The inclusion and exclusion criteria used to limit the results of search were as follows:

2.1. Systematic Review Techniques

This study used the systematic literature review methodology CIMO proposed by [15] and also adopted by [9]-[18]. [15] suggested using CIMO logic in order to specify the literature review systematically. Within a specific context (C) of CIMO, an intervention (I) is used to make mechanisms (M) in order to deliver

anticipated outcomes (O). For this study, the development of CIMO proceeded as follows:

i. Context: context refers to which organizations/problems/systems are being studied [19]. In this review, the context is HL.
ii. Intervention: intervention refers to the action or event to the effects of which are being studied [9]. The specific intervention in this review is the role of transparency in HL. It is proposed that HL performance can be enhanced through transparency.
iii. Mechanism: mechanism refers to the process that analyzes why a particular intervention will lead to specific outcomes. In other words, a mechanism explains the relationships between intervention and outcome [19]. The mechanism in this review is composed of the evidence brought about by transparency in the context of managing HL. For strong evidence, some of the case studies have been included. The discussion examines how to improve HL performance through transparency.
iv. Outcomes: outcomes refer to the influences or results of an intervention brought about by the application of a particular mechanism [9]-[19]. In this review, the focus is on the outcomes of transparency in HL.

The article used CIMO logic to identify the present status of research of transparency in HL, the enhancement of performance, the challenges to transparency in HL, and the usefulness of the transparency in HL performance. The research question was how mechanisms of transparency affect the outcomes of HL.

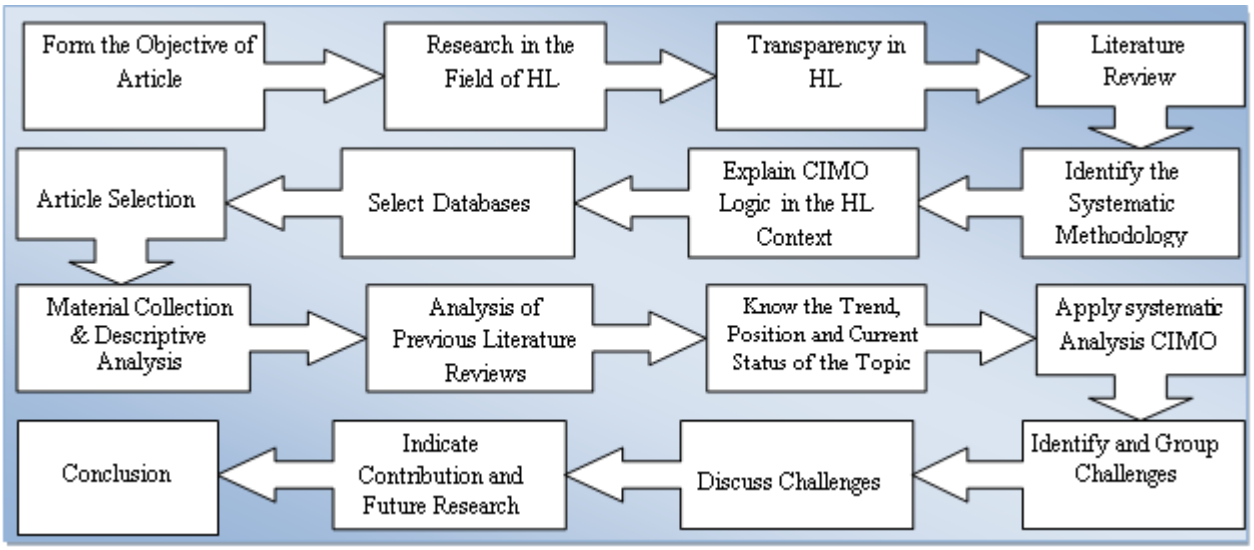

Figure 1. Research Process Chart

2.2. Selection of databases

The search started in May 2017, using the databases of Science Direct, Emerald, Springer, Wiley and Taylor and Francis. These databases are large in terms of their collection of published articles with multiple subjects, including social sciences. In addition, we collected 67 articles from Transparency International, which is a global anti-corruption coalition. Nearly one-third (31.9%) of the 1260/6546 collected articles were from the Journal of Humanitarian Logistics Supply Chain Management (JHLSCM) and International Journal of Disaster Risk Reduction (IJDRR). The remainders of the articles were chosen from the 26 journals listed in figure 2.

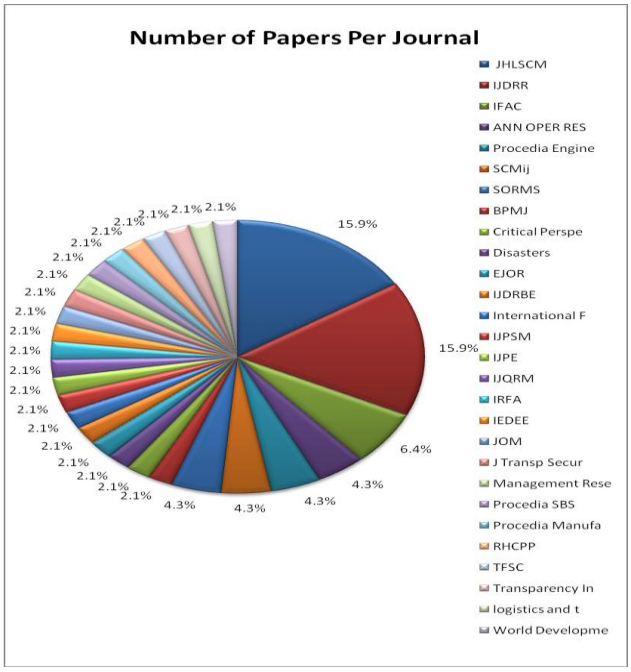

Figure 2. Sorting of articles in the annotated bibliography by journal of publication

2.3. Time horizon and selection of articles

Some studies that researched HL and related areas received more attention after the 2004 Indian Ocean Tsunami [20]. However, to enhance the probability of finding related articles for this study, the time horizon of the search was not limited to 2004 and/or later.

The hybrid identification method was used. First, the databases search was conducted. Inspired from the key words and Boolean used in the previous literature reviews (Logistic* OR Supply Chain*) OR (Humanitarian OR Relief) AND (Transparency * OR Transparent*) were used, as shown in table 2, and as also applied by [21]. This search was limited only to peer-reviewed publications while books sections, conference papers, reports and practitioner journals were excluded, as listed in Table 2, and the inclusion of these types of references was suggested for future study.

Table 1. Keywords Search

Focus Category					
AND, OR					
1	2	3	4	5	6
Humanitarian Logistics	Disaster Logistics	Relief Logistics	Transparency and Humanitarian Logistics	Transparency and Disaster Logistics	Transparency And Relief Logistics
Humanitarian supply chain*; humanitarian* supply*; humanitarian* logistic*	Disaster*; humanitarian crisis; humanitarian operation;	response* relief*; recovery*; prep*; mitigation*; community* resilience; vulnerability*	Transparency or Transparent and HL	Transparency or Transparent and disaster logistics	Transparency, Transparent And Relief Logistics

2.4. Material collection

The initial pool of articles obtained from all databases was 6546. The sample was consolidated by manually eliminating the duplicate and unrelated articles. The keyword searches collated 1193 articles, as listed in figure 3.

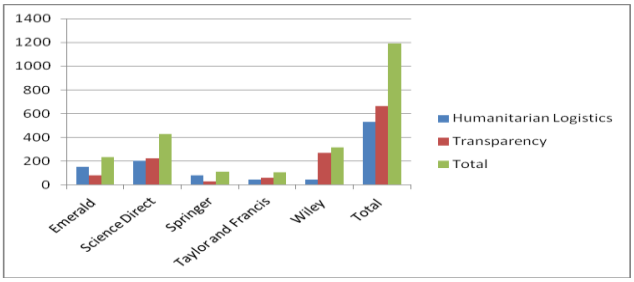

Figure 3. Results of search strings per database

The two sets of key words, Transparency and Humanitarian Logistics or Transparency and disaster logistics, were not available for searching in the all selected databases papers. Furthermore, to widen the research search, additional sources were consulted: first, a previous search in the references of the prior databases of famous articles and second, a Google search of combined words found some published and unpublished work in the website of transparency international https://www.transparency.org/. As shown in figure 4.

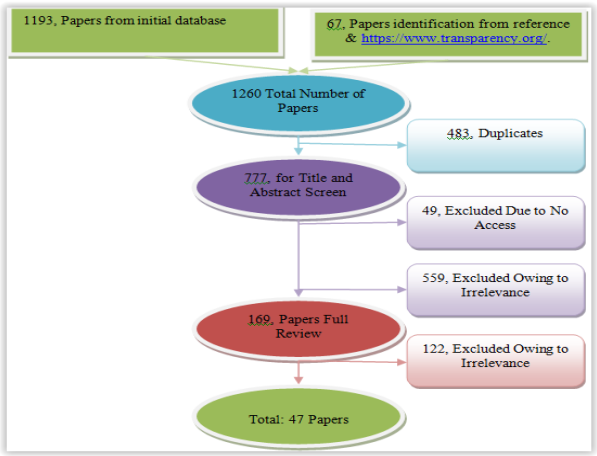

Figure 4. Inclusion and Exclusion Flow Diagram

Finally, 1260 articles were extracted for this review. This comparatively small sample was expected because the research topic has only recently evolved. After excluding 483 duplicate articles, 777 remained for title and abstract screening. Moreover, 49 of the articles were not accessible at the Yeungnam University library. While this may be a study limitation, we considered the final sample size acceptable for the proposed study analysis and outcomes. After the abstracts were read, as suggested by [16], 559 irrelevant papers were discarded from selection. Additionally, research papers that deal some irrelevant issues were excluded. The remaining 169 papers were read, analyzed and once again compared to our inclusion/exclusion criteria, as shown in table 2. This lead to the final set of 47 reviewed papers, as shown in figure 4. These exclusion criteria were also adopted in the literature review by [21].

Table 2. Inclusion and exclusion criteria

Criterion	Rational	Included	Excluded
Publication type	Screening for publication type will ensure the credibility and reliability of sources.	Scholarly journals	Books, Book Chapters, Book Sections, Inaccessible & Practitioners Papers Conference proceedings, unless a full-paper peer review had taken place and was available Governmental and Military Reports Editorials and opinions Reports Papers on crisis management or Business Continuity Plan
Peer review	Peer-reviewed documents examined for quality and credibility are more likely to be used by academics and practitioners.	Peer reviewed	Non-peer reviewed Theses Practitioner documents
Quality of journal	Used the database of Elsevier, Emerald, Springer, Wiley and Taylor and Francis. These databases are the large in terms of the collection of published articles with multiple subjects, including social sciences.	Journals addressing community involvement or participation in HL or supply chain (SC) activities after a disaster	Non-journal articles Non-scholarly journals Non-peer reviewed journals
Language	Papers written in English are only reviewed owing to the language limitations of the authors.	Papers written or translated into English	All other languages
Time Frame	No time frame was specified	N/A	N/A
Content	All HOs, Community involvement or participation in HL or SC activities after a disaster	Examples of HOs, community participation in all disaster phases, CBOs, ad hoc network formation by communities	Articles beyond the scope of this research: commercial logistics and SC; HO-centric research—that is, performance, optimization, external training; program or project delivery; war and conflict settings; general healthcare.

2.5. Descriptive analysis

During this step, the literature was analyzed to determine the trend, position, and current status of the subject. This analysis was concentrated on the number of articles per year, per journals, per region and explicit indication transparency concept. These criterions were also adopted in the literature reviews by [20]-[22]. The basic purpose of these analyses is to arrange the study in the dynamic

perspective of the existing literature's body. For the demographic criterion of the number of articles, priority was given to the country from where the authors have taken the data and then to the first author where he belongs to.

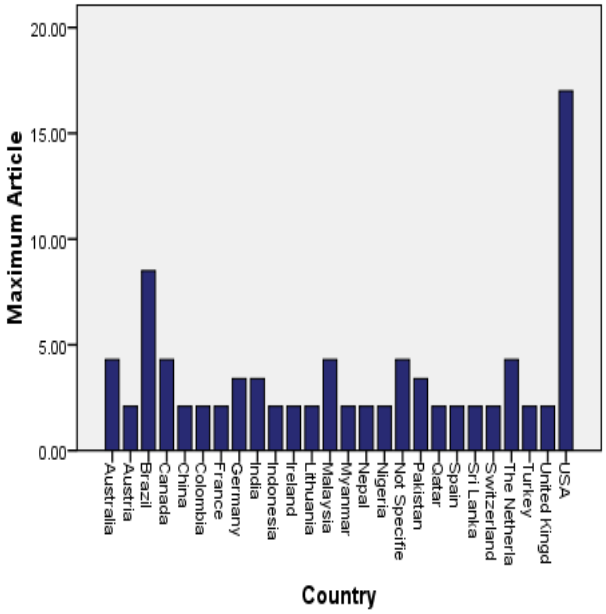

Figure 5. Publications in the annotated bibliography sorted according to the country or country of affiliation of the first author

Of the 47 papers, eight were from the United State, three from each of Brazil, Germany, Pakistan and India, two from Australia, Canada, Malaysia and the Netherlands, seventeen from individual countries, and the remaining two were unspecified.

As shown in Figure 6, the publication year ranged from 2008 to 2017, with 77.5% having been published in the last four years, which indicates the recent interest in the theme.

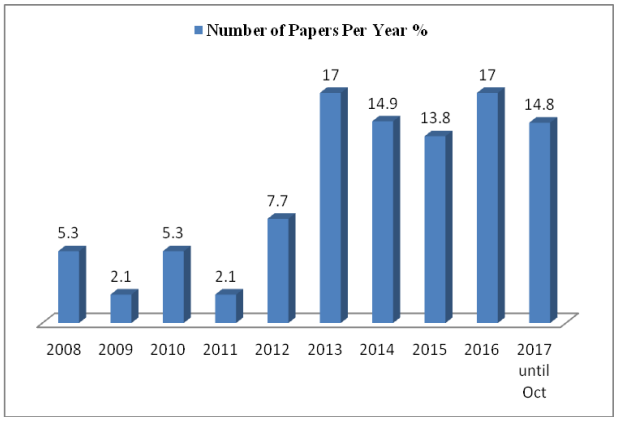

Figure 6. Publications in the annotated bibliography sorted according to the year of publication.

Of the 47 articles, 53% articles explicitly mentioned transparency or transparent concept, as shown in Figure 7. This criterion was also adopted by [23].

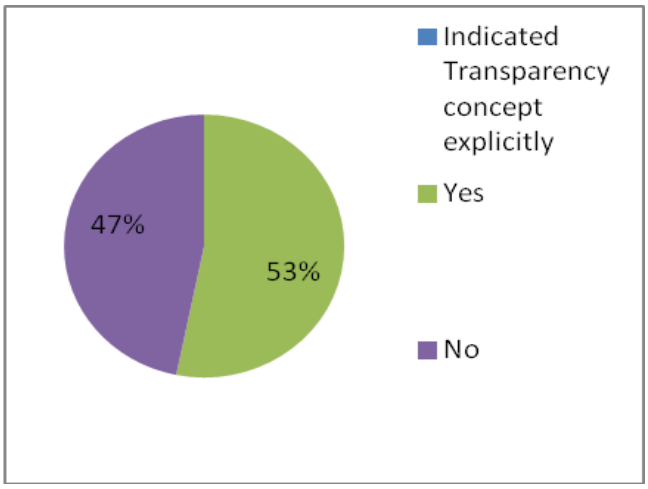

Figure 7. Explicit indication of the transparency concept

2.6. Category selection and Analysis

The structural dimensions and analytical categories of disaster risk were selected. This categorization was inspired from the existing literature, especially [20]-[22]-[24].

First, the review was categorized based on the operation context, which may be either disaster relief or continuous aid work developmental and rehabilitation phase of HL). Second, the division of the disaster: either sudden onset (tsunami, flood, earthquakes etc.) or slow onset (famine or droughts) to be categorized the response needed from HL. Third, the causes of the disasters were distinguished between natural (cyclones, flood, earthquake etc.) and manmade (war, terrorist attack etc.). Fourth, the disaster risk management phases were categorized as preparation and mitigation phase, response phase and reconstruction phase. Fifth, the methodologies were classified as simulation and modeling, conceptual research, review, case study and survey. Sixth, the previous literature review articles have been organized. Lastly, the classification of systematic review CIMO logic has been analyzed and the results are discussed in detail in the discussion section.

According to these criteria, Figure 8 indicates the term of operation context under the scope of the study: 23.4% of the papers explored disaster RO, 6.4% specifically worked on rehabilitation of the victims and 70.2% did not specify any specific RO and have explored both the areas. According to the speed of the disasters, 53.7% of the paper explored the sudden onset disasters, no paper specifically examined slow onset disasters, and 44.3% articles examined both. Comparing natural and manmade disaster, 38.3% of the papers explored natural disasters, only 4.3% identified manmade disasters, and 57.4% did not focus on any specific area and studied both. For the phases of disaster risk, 12.8% focused on the response phase, 10.6% on the phase of mitigation and preparation, 4.3% on the rehabilitation phase, and 74.4% did not focus on any specific phase and discussed all the disaster phases.

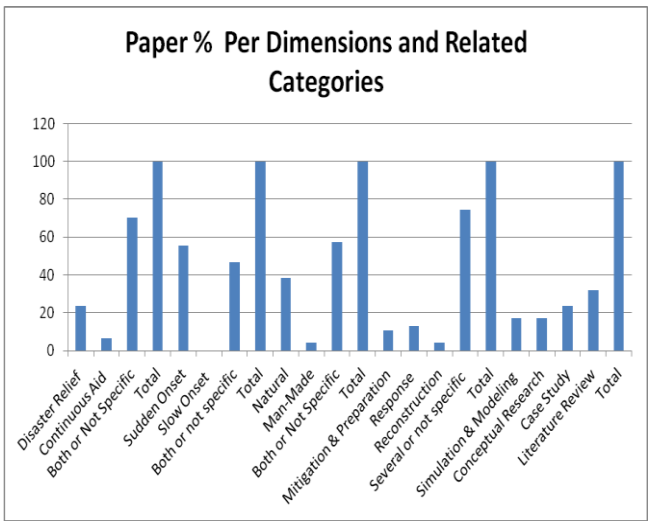

Figure 8. Structure Dimensions and related categories

As exhibited in Figure 8, the articles were divided into five categories on the bases of the adopted methodologies. On the topic of transparency in HL, 31.9% of the papers used the literature review method, 23.4% the case study method, 17% the simulation and modeling method, 17% the conceptual method, and 10.7% the survey method.

The field of HL has been broadly studied. Thirteen literature reviews have been published so far, which shed light on this topic. However, no literature review has focused specifically on transparency in HL, and all 13 have taken a different topic, perspective and approach for their review the literature. In order to present an overview of the research history in this research field, the authors present a meta-analysis of these reviews in Table 3, following the criterion proposed by [22] and also adopted by [16] in the review.

Table 3. Analysis of Previous Literature Reviews

Review papers	Scope	Aim of Research	Search Technique	No of paper cover (Duration)	Classification of Papers?	Data Analysis	Differentiation
[16]	Literature in disaster operations management	To create a framework for disaster HL	Keywords in databases citations from papers	174 papers until 2011	Yes	Structural dimensions and categories	Used a different methodology proposed by [25].
[18]	Disaster relief SC quality management (DRSCQM)	To develop a framework for DRSCQM	Not specify	50 papers No time limit	yes	Qualitative	Apply SIMO and Lean Six Sigma
[26]	Disaster operational management (DOM) researches trends	To identify current research trend in the area	Keywords in databases citations from papers	155 papers 2005–2010	Yes	Quantitative and qualitative	Since 2006 the first study surveyed OR/MS literature in DOM
[27]	Healthcare and Disaster SC	To cover health related issues of the victims	Keywords in databases citations from papers	53 Papers 2005 – 2014	Yes	Quantitative and qualitative	Classified the literature in three main themes
[28]	security for SC	To tag key security issues in HL and their solution	Not specify	Not specify	Yes	qualitative	Focus on security in manmade disaster
[21]	Community driven HL	To form ad hoc networks that to meet of disaster management needs	Keywords in databases citations from papers	23 Papers Not Specify	Yes	qualitative	unique characteristics, present alternatives to established humanitarian approaches to logistics
[29]	Multiple decision makers	Game theory application and HL	Not specify	Not specify	NO	Not specify	Not specify
[30]	Military in disaster relief	To know civil military collaboration in HL	Keywords in databases citations from papers	200 Papers 2006-2013	Yes	qualitative	Focus on phases of disaster and civil & Military
[20]	HL performance measurement	To link performance measurement to the phases of	Keywords in databases citations from papers	52 Papers 1970-2012	Yes	Qualitative	Applied a systematic literature review as outlined by [31]

		disaster					
[22]	HL trends and challenges	Trends and challenges in HL	Not specify	228 Papers 1980 - 2004	NO	Not specify	Not specify
[17]	Relief distribution networks	To review network location, transportation and routing problems in HL	Keywords in databases citations from papers	83 Papers 1991 - 2013	yes	Qualitative	Applied a scientific systematic literature review method to identify location related issues
[23]	Knowledge Management (KM) System in Disaster	To examine KM success factors in the disaster management context	Keywords in databases citations from papers	51 Papers 1993 - 2013	Yes	deductive or inductive	In this systematic review used either a deductive or inductive approach
[9]	Private business and HO partnership in logistics	partnership between HOs and Private firms	Keywords in databases citations from papers	36 Papers	Yes	Qualitative	Used systematic review (CIMO) to know partnership between firms

Table 3 shows the main characteristics of these 13 previous literature reviews. The number of papers included in these review articles ranges from 36 to 282, published between 2010 and 2017. The increased number of publications during the last few years necessitates a broad review on the topic concern. Nevertheless, this study does not include all the published papers in this field. It is the most expansive so far, as 47 papers from 28 journals were analyzed, mainly due to the ability to cover all available papers until October 2017 and to the strong growth in the number of publications over the last few years.

3. Thematic Findings

The findings from the literature are presented through the application of a systematic review utilizing CIMO-logic. First, this article examined and presents the first part of the methodology that applies the aforementioned study context, i.e., the transparency in HL. Second, the interventions, i.e., the role of transparency in HL, are addressed. Third, evidence is presented on the performance outcomes of transparency. Finally, the mechanisms through which transparency affects performance outcomes are explored.

Table 4. Confined Overview of Articles

Number	Articles	The HL Context Related to Transparency	The Role of Transparency in HL	The Mechanisms of Transparency in HL	The Expected Outcomes of Transparency in HL	Effectiveness
1	[1]	√				Low
2	[2]	√	√	√		High
3	[4]	√				Low
4	[7]	√	√			High
5	[9]	√	√	√		High
6	[10]	√		√		High
7	[11]	√				Low
8	[12]	√				High
9	[16]	√				High
10	[17]	√				Moderate
11	[18]	√	√			Moderate
12	[20]	√	√		√	High
13	[21]	√			√	High
14	[22]	√				High
15	[32]	√				Low
16	[33]	√	√			High
17	[34]	√				Low
18	[35]	√				Moderate
19	[36]	√			√	High
20	[37]		√			High
21	[38]	√	√			High
22	[39]			√		Moderate
23	[40]	√	√			High
24	[41]	√	√			High
25	[42]	√	√	√	√	High
26	[43]	√	√	√		Moderate
27	[44]	√				Low
28	[29]	√	√			Moderate
29	[45]	√	√	√		High
30	[46]	√	√		√	Moderate
31	[47]	√				Moderate
32	[48]	√				High
33	[49]	√	√	√	√	High
34	[50]	√		√		Low
35	[23]	√				Moderate
36	[51]	√				High
37	[52]	√	√			Moderate
38	[53]	√	√	√	√	Moderate
39	[27]	√				Low
40	[54]		√			High
41	[55]		√			High
42	[26]	√				Low
43	[56]	√	√			High
44	[28]	√	√		√	High
45	[57]	√				Moderate
46	[58]	√				Low
47	[30]	√	√			Moderate

3.1. The humanitarian logistics (HL) context

The 43 articles in the relevant context that discussed HL were divided into three categories: high, low and moderate effectiveness. High effectiveness articles (49% of the 43) shed light on the transparency in HL context in detail, moderate effectiveness articles (28%) gave little detail and low effectiveness articles (23%) only discussed briefly. A disaster is a sudden devastating event that seriously disrupts the functioning of a population and leads to humane, economic, materials and environmental losses that are beyond the population's ability to control by applying its own resources [26]-[59]. Helping people during this difficult time of disaster requires instant action [49] that may involve cooperation among many actors like NGOs, local, state and agencies of federal government, faith-based organizations and private-based firms (local grocers) [47]. In RO the most important, critical and expensive factor is HL, which contributes almost 80% of the RO cost and can determine its success or failure [9]-[11]-[60]-[35]. HL is the process of planning, implementing & controlling [61] in the cost effective and efficient flow of materials, goods (right product) and relevant information from the origin point to the consumption for meeting the beneficiaries' requirements (at the right place) [22]-[51] (supply to right people and at right time) [9]-[29]-[38]-[11] to save lives, livelihood improvement and protection of infrastructure and assets [5]. This help may be needed for years after a disaster strikes [62].

Disaster victims immediately need lifesaving relief, in which case the main goal of HOs is to save lives and help people [53]. At the same time, some factors within the scope of this review affecting HL include high uncertainty [11], unpredictability, timing and promising of the donation funds, shortage of funds, spending of available funds in a short time period [16]-[27]-[11], urgency, lack of monitoring [22] transparency, accountability & trust [35]-[41] donor's behaviors, [6]-[35], multiple stakeholders, lack of expert logisticians, logistics insufficiencies [35], technology [60] governmental trends toward humanitarian operation, country corruption level and security situation [16]-[27]. The impact and risk can be reduced depending on the ability of the organizations and through an efficient HL [51]-[16]-[27].

Even when relief assistant is a matter of life or death for victims, some officials may only be interested in money and not in helping the victims [12]. During HL, looting, snatching, the influence of local people and distribution of unfair and low-quality products by relief providers are common phenomena [13]. In addition to fraud in financial practice, other kinds of corruption observed during HL include kickbacks, falsified expense reports, sexual exploitation, nepotism, favoritism, selection for jobs not on merit, abuse of right to force or intimidate of HL staff or goods recipients for personal, political or social gain, favoring a particular group and covering of non-target groups. The corruption trend is more in headquarters than in field visits and ranges from bank accounts, payroll, exchange rate, collusion and receipts falsification [42]. Approximately 80% of logistics cost in HL is in the form of transportation and procurement [20]. Corruption in transportation includes vehicles personal usage, vehicles being hired out, fuel siphoned, falsified records, collusion with fuel providers and unnecessary repairs and/or overpayment for repairs [42]. Some governments are very corrupt with key actors only being interested in money. In some countries low regulation speeds the clearance times, but subsequent bribe requests slow down the field work [12]. Due to strong funding competition, mostly HOs mostly concentrate on fundraising and not on spending funds efficiently [41]. Calls for higher transparency and lack of monitoring create further problems [21].

The key component of success in HL is the capture of accurate information effectively and efficiently, which is crucial not only for the efficiency and performance of HL but also for donors to develop policies related to the release of funds [20]. Donors not only provide funds but also incentivize HOs and pressure them with respect to accountability and transparency [41] to cover more beneficiaries with appropriate cost, in short time, effectively and efficiently [22]; otherwise, donations may cease. On the other hand, the expectations of donors regarding the spending of the donation funds vary worldwide [51].

The effectiveness of HL is analyzed by comparing each player's centrality in the relief network and its perceived efficiency in terms of the contribution in the relief network [4]. Performance in HL could be measured in terms of reductions in lives lost and human suffering [6]-[8] and create mutual trust [34]-[35]. The fair sharing of available resources [17]-[34] security and transparency [28], monitoring, and expert logisticians [30], the identification of priorities, and the use of advance technology and neutral language lead to fast, fair and safe HL, which further have a positive effect on donors funding and image building of the HOs [7]-[40]-[41]-[43]-[52]-[16]-[27]-[30]-[35]-[63]. The increasing number and magnitude of disasters, the shortage of resources, the funding competition and the requirement for accountability combine to raise the importance of effective, efficient and transparent HL [38].

3.2. The role of transparency in humanitarian logistics (HL)

Many researchers have discussed transparency in HL. The 29 related articles listed in Table 4 were divided into three categories: high, low and moderate effectiveness. High effectiveness articles (53% of the 29) discussed in detail the intervention of transparency in HL, moderate effectiveness articles (25%) gave little detail and low effectiveness articles (22%) only discussed briefly. Transparency in various circles has become a buzzword. Greater transparency is the disclosure of all relevant information to stakeholders without any discrimination and cost [46]. To ensure transparency, merely disclosure of information is insufficient, and monitoring of transparency must be developed [55].

The consensus definition of transparency is public common shared knowledge (reliable and relevant information), performance and policies [37]-[64]. The interest in transparency has arisen as a means to reduce corruption but this is not a proper definition of transparency and anyhow the growth of transparency combats corruption [55]. In HL, transparency is the extent of information available to victims to trace the surrounding regarding the supply chain of aid items from donors to HOs and to beneficiaries. In other words, transparency in HL can be defined as the fair and open distribution of aid among the victims without any discrimination and in a non-political and non-corruptive environment [54].

Lack of transparency promotes incompetency, nepotism, local involvement and different kinds of corruption [53]. Low level of transparency and monitoring causes bribes to the traditional leader or to the local community to remain quiet about poor quality construction and/or bribes by victims in the allocation of houses [42]. Most importantly, logistical insufficiencies lead to poor distribution and misallocation of the donors funds [49]. Following a disaster, unfairness in distribution devastates vulnerable people [10] and affects a substantial part of the population affected by disaster [45]. Nevertheless, economic constraint, due to bad governance, rampant corruption, lack of political commitment and overambitious plans, leads to a low level of fair distribution. Every international and local HO wants to help disaster victims but unwillingness emerges due to a number of reasons including corruption and political influence [2].

Globally, profit and nonprofit organizations and firms are under increasing pressure to be more transparent [46] and accountable [55]. The level of transparency is difficult to measure, and behind the scene [55]. Generally, corruption prevention during RO is perceived as just another routine part of doing business. Corruption during RO response may lead to failure in the HL mission, create security risks, degrade the image of the organization especially, and damage the staff morale and organizational culture. As excessive focus on corruption during RO will slow down the HL response, priority should be given to the speed of logistic rather than to preventing corruption in the life saving phase of the operation. Better quality of programming, complaints handling mechanisms, regular monitoring of recipient satisfaction, accountability and transparency can mitigate the risk of corruption [42].

The donors want to have high visibility, transparency, and accountability [9], efficient allocation of their funds and an understanding of the virtual effect of their donation [29], and monitoring of the level to which their resources are spent [20]. The donors can be convinced through results, evaluation and measurement [49]. As the frequency and scale of disaster risk increase, competition for funding and accountability requires more effective, efficient and transparent RO. Fair supply distribution is in indicator of HL effectiveness. If the performance and utilization of resources is poor in any organization, the donors may discontinue funding [7]-[40]. The formulation of overambitious strategies to impress international donors and other stakeholders instead of victims leads to a lack of overall organizational performance. Even when funds from international donors are generously available, therefore, the strategy must be victim-oriented instead of donor-oriented [2].

Transparency is a very helpful mechanism in reducing volatility, uncertainty, and unpredictability in HL, in holding trust, reliability and reliance of the stakeholders in an organization, and in reducing alienation between them. Mostly transparent firms enhance performance, competition [37]-[55], efficient allocation of resources, lessened various financial scandals and crises around the world [46]-[56] advance deals, make a balance and remove misunderstanding between donors and HOs [56]. Effective HL can not only decrease cost and timelines but also can save lives and reduce suffering [14]-[18].

3.3. The mechanisms of Transparency in HL

The implication of transparency in HL was discussed in 9 articles, which were divided into high and moderate effectiveness. High effectiveness articles (67% of the 9) shed light on the implication of transparency in detail, and moderate effectiveness articles (33%) gave little detail, as exhibited in table 4. There are several ways in which transparency can be involved in the area of managing HL.

Owing to lack of transparency and monitoring of HOs, HL mostly covers those victims who can build a personal or organizational image instead of need-based victims. Agency staffs take benefits from lack of transparency and monitoring, seek bribes from beneficiaries, and provide goods for kickbacks, bribes and collusion [53]. Because of logistical insufficiencies, donors' funds were poorly distributed and misallocated in the 2010 flood in Pakistan [49]. In a more positive recent development, donors consistently insist on receiving detailed and transparent plans from HOs they fund, which encourages HOs to plan more strategically by fulfilling their objectives, impact, activities and output. This further improves the performance of the HOs and covers more beneficiaries at lower cost and within a shorter time instead of duplication of efforts or mismanagement of resources [30]. Some organizations unload trucks at night so that the public will not notice the warehouse [42].

Due to lack of transparency, locally influential people offer bribes and/or influence the relief providers to favor some specific groups and also control the list of beneficiaries. The elite's homes are used as a distribution hub for distributing relief items according to the elite's will rather than the needs of the victims [53]. During cash or aid distribution, the community committee adds the name of its own well-wishers to the recipient lists, which is an example of local abuse of power. However, in some cultures, favoritism and nepotism are considered a common expression of social reciprocity and solidarity and not of corruption. Following a disaster, the implementation of human rights and transparency is largely impossible owing to the internal political situation of certain countries, and therefore logisticians need to be aware of the potential

conflict between the government and disaster management authority because strict liability refer to no flexibility [50]. The present study found the following evidence from case studies about lack of transparency and evidence of corruption.

First, in November 2013, Super-Typhoon Haiyan (Yolanda) swept across a wide swath of the Philippines, killing about 6,000 people and displacing several million. The UN appealed for $776 million to help victims. However, finally only 60% of this amount was received and distributed, which raises the question of how the amount of funding was determined and whether the distribution was fair [43].

Second, following the earthquake of Haiti, the lack of public transparency, monitoring and accountability was highlighted when the American Red Cross received half a billion US dollars in donations, but built only 6 houses and falsely claimed to have built houses for 130,000 victims [43].

Third, in the initial stage of the response to the flood of 2010, the two basic actors were the military and the government of Pakistan. After identification of the urgent needs, the World Bank announced US$1 billion, the Asian Development Bank US$ 2 billion and Asia Pacific Disaster US$ 3Million for rehabilitation. Government, IHOs, NGOs and local organizations were on the ground, whereas the Pakistani army provided logistical support. Due to lack of transparency and monitoring, a large amount of funds and donated items were misallocated and poorly distributed [49].

Fourth, to help vulnerable people affected by the 2010 flood, the government of Pakistan initiated a program called Watan card program. The funds were allotted to the district government, along with some discretional power. Unfair distribution occurred due to many factors, including miscommunication between planners and implementers, limited capacity and political interference. As a result, only 43 out of 100 eligible households truly got Watan cards. Additionally, more funds were allocated regarding per victims to the district administration while less distribution occurred as per victims by district administration [10].

Fifth, a case study of the 2015 Nepal earthquake shows that the government of Nepal completely ignored the importance of the local NGOs in terms of getting funds and donations and monitoring expenses. Due to an authoritative government and lack of transparency, only 0.8% of the funds were given to Nepali organizations. This strongly indicates the inefficiency and lack of interest and trust of the government [39].

Sixth, in response to the Indian Ocean Tsunami on 26 December 2004, due to lack of transparency, the HOs suffered a major scandal of corruption as they possessed a huge amount of donated aid. Seventh, the sex-for-food scandal during aid distribution in 2002 in West Africa drew attention. Lastly, other recent examples of high profile corruption due to lack of transparency include the aid response to Hurricane Katrina, wars in Afghanistan and Iraq [42], war in Nepal, and the 2008 Wenchuan earthquake in China. The range of claims from unequal and unfair allotment of temporary houses and the political groups misappropriating relief funds [45] exhibit the diversity of contexts that risks of increased corruption not only in developing but also in developed countries [42]. The case studies present evidence of lack of transparency, monitoring, accountability, unfair relief distribution, inefficiency, political and local interference and wide spread of corruption.

3.4. The expected outcomes from transparency in HL

This study found only eight articles related to the expected outcomes of transparency in HL, as exhibited in Table 4. From the review of these articles, the effect of transparency on bank holding companies confirmed that transparency has a positive influence on profit efficiency [36]. The strategy of intermediate transparency instead of complete transparency can improve the outcomes of any organization [46]. The expected outcomes of transparency in HL are mostly related to the improvement of efficiency, logistical capabilities and performance measurement [36]. Transparency decreases vulnerabilities, decreases disaster risk, and enhances efficiency [28]. Transparency leads to trust and information sharing among disaster networks, and hampers different malpractices and corruption [21] Transparency enhances public trust and satisfaction of the donors and builds the image of the organization [20]. Lack of transparency can increase corruption and reduces the chances of getting funds from donors [51]. Lack of transparency creates principles agents problems (between donors and NGOs, and between elected officials and victims), reduces demands for accountability, increases inappropriate spending rather than focusing on the needs and priorities of the victims [56]. Lack of transparency also decreases the efficiency and effectiveness of the HL [55]. Transparency is necessary to develop effective and efficient performance and to remove the taboo of corruption in HL. To increase transparency requires the use of social auditing, self-regulation evaluation and accountability mechanisms [53]. Increased staff incentives, ethical training and effective and safe complaint mechanisms must be implemented for enhancement of transparency [42]. For fair distribution of the donated funds, the government should strengthen federal and provincial institutions through clearly monitoring guidelines and evaluating the flow and implementation of funds [49].

4. Challenges to Transparency in HL

The fundamental principle of transparency in HL is to ensure fast, fair and safe distribution of relief items. This review identifies several challenges to confirm transparency in HL. These challenges have been divided into four broad categories (organizational, local, financial and disaster) as listed in Tables 5 and 6.

Table 5. The citations and grouping of the identified challenges from the literature to transparency in HL

S/ Numbe	Group Criteri	Sub Criterion	References
1	Organizational Challenges	Lack of skill logistician	[48]-[35]-[30] [54]-[10]
2		Lack of monitoring and accountability	[27]-[55]-[17, 32]-[21]-[48]-[53]-[20]-[9]-[42]-[7]-[40]- [52]-[34]-[10]- [33]-[56]
3		Improper management of inventory	[11]
4		Short term relationship	[54]-[58]-[20]-[39]-[47]-[21]- [48]
5		Lack of performance measurement	[7]-[20]-[40] [30]-[43]-[52]- [4]
6		Lack of communicatio n	[30]-35]-[21]- [18]-[20]-[50] [10]-[57]
7		Donor management	[22]-[41]-[51]-[33]-[35]-[16] [30]-[20]-[9] [56]
8		The expectation of multiple stakeholders	[11-[18]-[37]- [41]-[35]-[23] [37]
9	Local Challenges	Local involvement	[42-45]-[49]- [12]-[10]-[2]
10		Lack of afflicts concern/ Lack of ethical framework	[12]-[16]-[42]- [53]-[42]-[43]- [51]-[10]-[54]- [2]-[39]-[49]-[45]-[46]
11		Political interference	[2]-[37]-[42]- [49]-[12]-[45] [10]
12		Inefficiency of the government	[10]-[39]-[42]- [12]-[45]-[2]
13		Wide spread of corruption	[45]-[16]-[46]-[56]-[21]-[42]- [12]-[10]-[2]
14		Unfair Regularity Measures	[20]-[50]-[12]-[7]-[10]-[2]-[54]
15		Security and Safety Issues	[28]-[35]-[48]- [16]-[28]-[30]- [32]-[1]-[42]
16		Improper routing	[30]-[43]-[32] [52]
17		Technological barriers	[35]-[44]-[32] [54]
18	Financial Challenges	Shortage of the resources	[49]-[11]-[29]- [38]-[35]-[48]- [16]-[30]-[20]
19		Competition for funding	[38]-[21]-[29]-[30]-[7]
20	Disaster Challenges	Urgency	[9]-[35]-[41]- [16]-[27]-[23]
21		Complexity	[26]-[36]-[41]- [48]-[16]-[27]- [23]-[55]
22		Uncertainty	[23]-[41]-[35]- [11]-[48]-[18]- [27]-[47]-[20]- [9]-[55]

4.1. Organizational Challenges

First, human resource is the essence of any organization. Unfortunately, employee turnover is a common phenomenon in RO. Lack of expert logisticians and temporary workers is a hurdle in the way of transparency. Second, HOs call for higher transparency but the lack of monitoring [21] and accountability further complicates the process of transparency. Most of the organizations disclose information and claim transparency but due to lack of monitoring in reality, they do not follow the process of transparency. Third, the inventory management of the organization is also very crucial. Due to inefficiency of the organization, lack of monitoring and transparency, some items, especially food, become out of date. Fourth, the study found that short-term relationships of the HOs in the disaster site and size of the organization (small & medium) have little fear for transparency; therefore it is a challenge to develop a perfectly transparent system across the supply chain within HOs. Fifth, performance in HL could be explained to reduce fatalities and human suffering, as from literature it is evident that some organizations attempt to build personal and organizational images and do not properly focus on helping the victims. Performance measurement is important for transparency. Lack of performance measurement of HL leads to lack of transparency and unfair distribution. Sixth, lack of communication and uncommon language are hurdles in the way of transparency in HL. The next challenges are donors' management and multiple stakeholders. Due to the worldwide spread, the expectations of donors regarding using donation fund are different [51]. On the one hand, donors pressure the HOs to be more transparent and on the other hand, the lack of monitoring from donors is a hurdle in the way of real transparency. To handle the pressure of donors, HOs try to gain media attention and favor specific group to avoid complaints. Therefore, the behaviors and mismanagement of donors and multiple stake holders further complicate the transparency process and promote corruption.

Table 6. Complete summary and grouping of the identified challenges from the literature to transparency in HL

Authors	Study Focus	Factors Involved	Main Points	Effectiveness
Organizational Challenges				
[48]	Required skills for logisticians	Lack of Skill Logistician	Unskilled logisticians hurdle in the way of transparency, security, safety and performance.	High
[27]	Healthcare HL	Lack of monitoring and accountability	HL focuses on the implementation of SC including the control and supervision of resources with the intention of achieving effectiveness and efficiency.	Low
[17]	Relief distribution networks	Lack of monitoring and accountability	The fair sharing of available resources among the victims is paramount important.	Moderate
[32]	Last Mile Distribution & Transportation	Lack of monitoring and accountability	To improve performance of HL total cost and time of travel should be minimized, and maximize fairness the minimum satisfaction service among points of demand.	Low
[55]	transparency in international trade	Lack of monitoring and accountability	Disclosure of information is not sufficient to ensure transparency but monitoring of transparency must be developed.	High
[21]	Collaborative Aid Networks	Lack of monitoring and accountability	Call for higher transparency of HL but lack of monitoring whether requirements of afflicts are being met or not create further problems.	High
[11]	Inventory Management	Inventory Management	Effective management is important for the achievement of the RO objectives, for collection of donation, dealing with stakeholders, for allocation of the resources and for managing the inventory.	Low
[54]	Transparency information	Short Term Relationship	The most important variables inhibitor to transparent HL found are the lack of ethical framework and the short-term prelateships.	High
[58]	To evaluate disaster risk perception	Short Term Relationship	Long-term communication and interactions between civil society and public institutions improves trust.	Low
[47]	Performance of HL	Short Term Relationship	The cost can be reduced and performance can be increased if the inventory can be managed properly and built trustable relationship with stakeholders.	Moderate
[20]	HL performance measurement	Lack of Performance measurement	Performance measurement system can increase transparency and accountability of HL.	High
[7]	Performance measurement	Lack of Performance measurement	As the frequency and scale of disasters increase, competition for funding and accountability require more effective, efficient and transparent relief operation.	High
[4]	Military role in disaster relief	Lack of Performance measurement	The effectiveness of HL is analyzed by comparing each player's centrality in the relief network and its perceived efficiency in from contribution in the Relief network.	Low
[40]	Key performance indicator	Lack of Performance measurement	Lack of performance measurement leads to unfair distribution of resources	High
[57]	Natural hazards on risk awareness	Lack of communication	To contribute to risk management, effective communication must be needed. In addition, suitable formats and trust in the communicators must be ensured.	Moderate

[30]	Military involvement in HL	Lack of communication	Nowadays, mostly military makes communication possible between players during HL which is very important for transparency.	Moderate
[22]	HL trends and challenges	Donors management	Donors put pressure on HOs to deliver relief in a cost effective way to beneficiaries.	High
[51]	Environmental disaster	Donors management	The most important aspect in HL is the proper and efficient utilization of resources; otherwise, the donors may stop donations.	High
[41]	funding systems	Donors management	Donors provide funds and incentives to HL and put pressure with respect to transparency.	High
[33]	HL challenges	Donors management	Pressure and demand from donors, about the impact and the provision of general information, for improving HL performance.	High
[37]	Business information transparency conception	Multiple stakeholders	Transparency plays a key role in holding trust, reliability and reliance of the stakeholders on an organization and reduces alienation between them.	High
[18]	Quality Management in Disaster Response	Multiple stakeholders	All the stakeholders have the right to know the goals of the disaster relief as articulated by the policy makers.	Moderate
Authors	**Study Focus**	**Factors Involved**	**Main Points**	**Effectiveness**
		Local Challenges		
[42]	Preventing corruption in Humanitarian assistant	Local involvement	During cash or aid distribution, the community committee adding the name of his or her own well-wishers to the recipient lists.	High
[45]	Fair division approach to HL	Local involvement	Oftentimes relief efforts have been proven unfair, with some groups of the population receiving more aid than others do.	High
[12]	Host government impact on HL	Lack of afflicts concern/Lack of ethical framework	When relief assistant is a matter of life or death for afflicts while some officials are only interested in money and not interested to help the afflicted.	
[16]	HL performance	Political interference	The external situation factors including government in term of corruption strongly affect the performance of HL.	High
[2]	Flood Mitigation in Pakistan	Political Interference	HL not only disclosed the inefficiency and political interference in the concerned departments of Disasters but also exposed wide spread corruption.	High
[10]	Natural Disaster in Rural Pakistan	Inefficiency of government	More funds were allocated regarding per victims to the district administration while less distribution occurred as per victims by district administration	High
[39]	Cluster and coordination Approach	Inefficiency of the government	Instead of to assign the authority to NGOs to access to the humanitarian fund the government has to show presence, handle, and manage the funding process by his own self.	Moderate
[53]	Humanitarian organization accountability	Wide spread of corruption	Incompetency, nepotism, local involvement, disrespect of the wider responsibility and different kinds of corruption are common in the field of humanitarian logistics.	High
[56]	Transparency, and Economic Growth	Wide spread of corruption	Lack of transparency can increase corruption and reduces the chances of getting funds from donors, reduced demands for accountability	High
[46]	Corporate Transparency	Wide spread of corruption	Transparency depends on the level of economy democratization, cultural, political and social system of any country.	Moderate
[50]	restructuring	Unfair	The best protection against breach of rights in HL	Low

	disaster management policy	Regulatory Measures	during reconstruction phase is to make sure that regulatory measures are enforced fairly by the HOs.	
[28]	Supply chain Security	Security and Safety Issues	Lack of HL security leads to vulnerabilities especially lack of transparency.	High
[1]	Disaster risk assessment	Security and Safety Issues	To work in efficient and coordinated manner, provide maximum relief and security to the victims.	Low
[43]	Public accountability and equity	Improper Routing	The two situations, routing and aid delivery are important to be measure for transparency.	Moderate
[52]	Development Indicator Tool	Improper Routing	Improper routing lead to security and transparency issues	Moderate
[44]	Mobile-based post-disaster management system	Technological barriers	Currently, mobile is one of the most essential technologies for the effective and efficient data collection, dissemination and sharing during disaster.	Low
[35]	Identification barriers in HL	Technological barriers	To improve the transparency of the current information systems, communication, mutual trust and coordination is very important.	Low
Authors	**Study Focus**	**Factors Involved**	**Main Points**	**Effectiveness**
			Financial Challenges	
[49]	Flood Pakistan	Shortage of the resources	Donors funds are often subject to misallocation and poorly distribution mainly owning to logistical insufficiencies	High
[35]	coordination barriers	Shortage of the resources	Lack of funds and the available fund must be spent in a very short time window lead to lack of transparency.	Moderate
[29]	humanitarian operations	Shortage of the resources	Lack of funding creates problems for HOs as well for beneficiaries and lead to lack of transparency.	Moderate
[38]	Trends and challenges in HL	Funding competition	Nowadays funding competition and requirement for accountability need effective, efficient and transparent HL.	High
Authors	**Study Focus**	**Factors Involved**	**Main Points**	**Effectiveness**
			Disaster Challenges	
[9]	Coordination and Partnership	Urgency	In HL, lead-time prediction is difficult and the available lead-time is always very short and lack of information direct to low level of transparency.	High
[26]	Disaster operational Management	Complexity	Diverse HL techniques can be applied to various phases of disaster for providing a scientific approach in the decision making process.	Low
[36]	transparency financial performance	Complexity	Efficiency leads to reduced complexity and create more transparent organization.	High
[23]	Knowledge management systems HL	Uncertainty	The dynamic and complex mode of disaster issues arises including fulfilling the expectation of multiple stakeholders, to know priorities and allocation of recourses.	Moderate

4.2. Local Challenges

On the one hand, the importance of the local situation cannot be ignored because in any disaster the local community is the first responder in the affected area. Due to knowledge about the area and culture, the performance of HL can be improved by hiring local staff, which further improves meaningful relationships between HOs and the local population, and creates trust, which is a bridge for long-term relationships among stakeholders. The distribution of food and water, information sharing, support for refugees and evacuation by local community are always appreciated [21]. Therefore, nobody can deny from the importance of local people. On the other hand, first, local involvement creates problem and hurdle in the way of

transparency. They offer bribes and also influence the relief providers to favor some specific groups and promote corruption. Second, the lack of concern for others and lack of ethical training hamper transparency during HL. Third, political interference is another big challenge in the way of transparency. Owing to a change in the mentality of voters, the political parties apply each and every approach and decrease transparency and increase corruption. Fourth, some governments do not take interest and demand bribes or even stop the HOs from working. This lack of government interest enhances corruption and discourages transparency. Fifth, another challenge in the way of transparency is the inefficiency of the government. For fair distribution of the donated funds, the government should strengthen federal and provincial institutions by clearly monitoring guidelines, and evaluating the flow and implementation of funds [49]. Sixth, the wide spread of corruption is another important challenge in the way of transparency. Lack of transparency and corruption mutually reinforce each other. Seventh, unfair regularity measures are a barrier in the way of transparency. Eighth, the basic goal of HL security measurement is to prevent and detect crime or to recover from a crime. HL crime includes smuggling, theft, counterfeiting, blackmailing, fraud and corruption. The main purpose of security is to reduce the likely of a terrorist attack by reducing the access of unauthorized persons to transport vehicles and making the logistics more transparent [28]. Security has moderate as well direct effect on transparency and performance. Lack of transparency may increase social protection problems and victims can protest, which further degrades the situation. Lack of security discourages transparency and leads to many challenges during RO. Lastly, disaster not only affects humans but also infrastructure and technology. Improper routing and lack of technology decrease transparency.

4.3. Financial Challenges

The most critical thing in HL is the uncertainty of finance for RO. Although donors undoubtedly provide funds to the organization for RO, uncertainty nevertheless occurs about the amount, time frame and the level of spending due to the expectations of the disperse donors worldwide and pressure from multiple stake holders. As the donors provide the funds to HOs, logistical insufficiency leads to lack of transparency. Shortage of the resources during RO is a common phenomenon, which leads to favoritism, nepotism, enhanced corruption and reduced transparency. Funding competition is barrier in the way of transparency. According to [41], due to strong funding competition, HOs mostly concentrate on fundraising and not on spending funds efficiently and transparently. Nevertheless, funding competition leads to lack of transparency.

4.4. Disaster Challenges

The urgency, complexity and uncertainty of disaster relief directly affect the process of transparency. These challenges are widely explained and discussed throughout the literature. The impact of these factors can be reduced depending on the ability and ethical framework of the organization.

5. Contribution and Scope for Future Research

This research has four valuable implications. First, the findings from the article are beneficial for all stakeholders of disaster risk management, especially for governments, donors and HOs as they are persistently seeking strategies to assist victims. They can better evaluate their competitiveness based on the factors in this study. Second, HL can increase their performance by overcoming the barriers to transparency for proper implementation in HL, and can provide fast, fair and safe relief at reasonable cost without any discrimination. Third, the review also contributes to understanding politics in HL. This approach hints at some of the important relationships between HL and transparency outcomes, casts light on the value of transparency in different regions and provides a basis for HOs to plan and vary their political engagement in diverse institutional environments. Lastly, the research methodology applied in the study opens new insight on the topic. In summary, during RO, transparency all the way from supply of funds by donors to the last-mile distribution by logicians is the basis for fast, fair and safe HL. This can increase trust and develop the image of the organization and of the affected country by eradicating corruption and by improving the speed and fairness of HL, which is the key to getting more funds and saving more lives.

The results of this study are not only valuable in terms of implications but also contribute to research field in the following six ways.

First, since the topic of transparency in HL is a relatively new topic, academics may benefit from the findings of this review and apply them in their future observations.

Second, this review reveals the scant research on transparency in HL. Although the topic is understudied, the researchers reached their objectives by applying the systematic review analysis of CIMO logic. The research methodology applied in this study opens new insight on the topic and contributes a new perspective to the existing literature. Nevertheless, this systematic approach has not fully elucidated the challenges of transparency in HL. Hence, future studies should use quantitative data to clarify statistically the gap in our research findings. Moreover, case studies based on surveys and interviews will better enlighten the existing state of HOs and donors behaviors.

Third, studies can be carried out to identify how to establish and enhance long-term relationships between donors and HOs in order to decrease uncertainty in terms of finance through transparency. Likewise, the challenges examined in this article provide interrelationships among the

identified variables of transparency; therefore, future research should apply a theoretical model approach to develop a numerical index for quantifying transparency in HL. Such a numerical index will be useful for benchmarking in HL.

Fourth, humanitarian help may be needed for years after a disaster strikes. For example, insufficient water sanitation and medical facilities may allow diseases to spread fast [62]. The literature in this study indicates that academia has focused on disaster relief and ongoing aid did not get proper attention. Therefore, future research must focus on continuous aid. As an extension of the present study, slow onset and manmade disasters attracted less interest than sudden onset and natural disasters; thus, further research should explore both of these. In addition, preparation, mitigation and rehabilitations phases may be studied further in this review context (see Figure 8).

Fifth, the challenges identified in this research require further validation. We identified three crucial components in the context of transparency in HL: public trust, monitoring and security. HOs take corruption-related issues more seriously than other issues in the field [42]. Public trust is undermined by corruption reports launched against HOs, which are very sensitive because most organizations raise funds from public appeals. Next, monitoring of transparency must be developed [55] because the mere disclosure of information is insufficient for HL performance. It is already reported that the call for higher transparency without monitoring creates problems [21]. Sixth, security measurement is needed to prevent, detect, or recover from an HL crime (smuggling, theft, counterfeiting, blackmailing, sabotage, terrorism, fraud or corruption). Corruption or lack of transparency during RO response may lead to security risks [42] and failure of the HL mission. For example, security can reduce terrorists' attacks by limiting unauthorized access to a vehicle. Transparency, trust and commitment between partner organizations depend on the security and culture of the organizations [28]. We found that transparency affects public trust because of its direct and/or indirect impact on HL performance. On one hand, lack of transparency is a kind of security risk and on the other hand, security also influences transparency. As mentioned by [21]-[55], without monitoring we may not reach the expected performance through transparency. Therefore, it is perceived that transparency, trust, security and monitoring combine in affecting the performance of HL, which needs to be examined further.

Finally, all international and local HOs want to help disaster victims but unwillingness emerges for a number of reasons, including corruption [45]-[16]-[46]-[56], the interference of government, as well as local and international politics in HL [2]. To attract donors, improve performance and remove the taboo of corruption, HL needs to become transparent and to hamper the local involvement. The impact and importance of the host government and locals have been studied thoroughly but very little focus has been directed at transparency and public trust in HL. Importantly, dimensions of transparency such as disclosure, clarity and accuracy and factors of transparency namely corporate governance, decision making and accountability are imperative in enhancing the transparency of HL. This will enhance performance, efficiency and effectiveness and also build public trust in the HL processes, which we intend to validate through theoretical model and through statistical study.

6. Conclusion

This review reveals a paucity of research on transparency in HL. Most researchers have investigated transparency in the context of HL but few have examined the outcomes of transparency in HL. Although the topic is understudied, the objectives of the present study were achieved by applying the systematic review analysis of CIMO logic to the identification and categorization of the challenges to transparency in HL. In disaster risk management, complexity, urgency and uncertainty directly affect the process of transparency in HL. The barriers to raising transparency in HL are governmental inefficiency, political behavior, multiple stakeholders, and local and official involvement. Donors not only provide the aid for the operation but also the incentives for HOs. Therefore, they pressure the HOs to become more transparent. However, due to lack of monitoring, the HOs try to gain media attention for image building and to favor influential locals or officials in order to avoid complaints. Nevertheless, this lack of focus on fair distribution and transparency promotes corruption. Moreover, the lack of skilled staffs, insufficient concern for the victims and weak ethical framework hamper the process of transparency. The review also found that lack of transparency and unfair distribution of relief aid occurs not only in developing countries but also in developed countries. This review proposes that transparency has both direct and indirect effects on HL performance. HL performance can be enhanced through increased transparency.

To improve performance and remove the taboo of corruption, HL needs to become transparent, which requires social auditing, self-regulation evaluation and accountability mechanisms. Increased staff incentives, ethical training and effective and safe complaint mechanisms must be implemented for enhancing transparency. Furthermore, governments should strengthen federal and provincial institutions by clearly monitoring guidelines, and evaluating the flow and implementation of funds. In addition, allocation and routing in HL must be focused on quickly and sufficiently distributing the resources to cover all beneficiaries, especially last-mile distribution and mountainous areas, in a transparent manner. Donors release funds for victims, not for HOs. Therefore, governments should act to facilitate, coordinate and monitor national HOs and IHOs. Mechanisms for urgently transferring funds from donors to HOs must be developed for quick response. Logistics software should be used for monitoring, tracking and reporting purposes for improving performance. National disaster management authorities and government

representatives should work together to improve transparency and reduce disaster risk.

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References

[1]. Maikhuri, R., et al., *Socio-ecological vulnerability: Assessment and coping strategy to environmental disaster in Kedarnath valley, Uttarakhand, Indian Himalayan Region.* International Journal of Disaster Risk Reduction, 2017.

[2]. Ahmeda, Z., *Disaster risks and disaster management policies and practices in Pakistan: Acritical analysis of Disaster Management Act 2010 of Pakistan.* International Journal of Disaster risk management. Queen Mary, University of London, UK, 2013.

[3]. Anparasan, A. and M. Lejeune, *Analyzing the response to epidemics: concept of evidence-based Haddon matrix.* Journal of Humanitarian Logistics and Supply Chain Management, 2017. **7**(3): p. 266-283.

[4]. Zaw, T.N. and S. Lim, *The military's role in disaster management and response during the 2015 Myanmar floods: A social network approach.* International Journal of Disaster Risk Reduction, 2017.

[5]. Cheema, A.R., A. Mehmood, and M. Imran, *Learning from the past: Analysis of disaster management structures, policies and institutions in Pakistan.* Disaster Prevention and Management, 2016. **25**(4): p. 449-463.

[6]. Apte, A., P. Gonçalves, and K. Yoho, *Capabilities and competencies in humanitarian operations.* Journal of Humanitarian Logistics and Supply Chain Management, 2016. **6**(2): p. 240-258.

[7]. Beamon, B.M. and B. Balcik, *Performance measurement in humanitarian relief chains.* International Journal of Public Sector Management, 2008. **21**(1): p. 4-25.

[8]. Day, J.M., et al., *Humanitarian and disaster relief supply chains: a matter of life and death.* Journal of Supply Chain Management, 2012. **48**(2): p. 21-36.

[9]. Nurmala, N., et al., *Humanitarian–business partnerships in managing humanitarian logistics.* Supply Chain Management: An International Journal, 2017. **22**(1): p. 82-94.

[10]. Kosec, K. and C.H. Mo, *Aspirations and the role of social protection: Evidence from a natural disaster in rural Pakistan.* World Development, 2017.

[11]. Balcik, B., C.D.C. Bozkir, and O.E. Kundakcioglu, *A literature review on inventory management in humanitarian supply chains.* Surveys in Operations Research and Management Science, 2016.

[12]. Dube, N., et al., *Host government impact on the logistics performance of international humanitarian organisations.* Journal of Operations Management, 2016. **47**: p. 44-57.

[13]. Ghumro, A.H., *Transparent relief.* Dawn.com, 2015.

[14]. Vitoriano, B., et al., *A multi-criteria optimization model for humanitarian aid distribution.* Journal of Global Optimization, 2011. **51**(2): p. 189-208.

[15]. Denyer, D. and D. Tranfield, *Producing a systematic review.* 2009.

[16]. Kunz, N. and G. Reiner, *A meta-analysis of humanitarian logistics research.* Journal of Humanitarian Logistics and Supply Chain Management, 2012. **2**(2): p. 116-147.

[17]. Anaya-Arenas, A.M., J. Renaud, and A. Ruiz, *Relief distribution networks: a systematic review.* Annals of Operations Research, 2014. **223**(1): p. 53-79.

[18]. N. Madu, C. and C.-H. Kuei, *Disaster relief supply chain quality management (DRSCQM).* International Journal of Quality & Reliability Management, 2014. **31**(9): p. 1052-1067.

[19]. Colicchia, C. and F. Strozzi, *Supply chain risk management: a new methodology for a systematic literature review.* Supply Chain Management: An International Journal, 2012. **17**(4): p. 403-418.

[20]. Abidi, H., S. de Leeuw, and M. Klumpp, *Humanitarian supply chain performance management: a systematic literature review.* Supply Chain Management: An International Journal, 2014. **19**(5/6): p. 592-608.

[21]. Bealt, J. and S.A. Mansouri, *From disaster to development: a systematic review of community- driven humanitarian logistics.* Disasters, 2017.

[22]. Leiras, A., et al., *Literature review of humanitarian logistics research: trends and challenges.* Journal of Humanitarian Logistics and Supply Chain Management, 2014. **4**(1): p. 95-130.

[23]. Dorasamy, M., M. Raman, and M. Kaliannan, *Knowledge management systems in support of disasters management: A two decade review.* Technological Forecasting and Social Change, 2013. **80**(9): p. 1834-1853.

[24]. Banomyong, R. and P. Julagasigorn, *The potential role of philanthropy in humanitarian supply chains delivery: the case of Thailand.* Journal of Humanitarian Logistics and Supply Chain Management, 2017. **7**(3): p. 284-303.

[25]. Seuring, S., et al., *Is there a right research design for your supply chain study.* Research Methodologies in Supply Chain Management, 2005: p. 1-12.

[26]. Galindo, G. and R. Batta, *Review of recent developments in OR/MS research in disaster*

operations management. European Journal of Operational Research, 2013. **230**(2): p. 201-211.
[27]. Syahrir, I. and I. Vanany, *Healthcare and disaster supply chain: literature review and future research.* Procedia Manufacturing, 2015. **4**: p. 2-9.
[28]. Gould, J.E., C. Macharis, and H.-D. Haasis, *Emergence of security in supply chain management literature.* Journal of Transportation Security, 2010. **3**(4): p. 287-302.
[29]. Muggy, L. and J. L. Heier Stamm, *Game theory applications in humanitarian operations: a review.* Journal of Humanitarian Logistics and Supply Chain Management, 2014. **4**(1): p. 4-23.
[30]. Heaslip, G. and E. Barber, *Using the military in disaster relief: systemising challenges and opportunities.* Journal of Humanitarian Logistics and Supply Chain Management, 2014. **4**(1): p. 60-81.
[31]. Tranfield, D., D. Denyer, and P. Smart, *Towards a methodology for developing evidence- informed management knowledge by means of systematic review.* British journal of management, 2003. **14**(3): p. 207-222.
[32]. Huang, M., K. Smilowitz, and B. Balcik, *Models for relief routing: Equity, efficiency and efficacy.* Transportation research part E: logistics and transportation review, 2012. **48**(1): p. 2-18.
[33]. Agostinho, C.F., *Humanitarian Logistics: How to help even more?* IFAC Proceedings Volumes, 2013. **46**(24): p. 206-210.
[34]. Kabra, G. and A. Ramesh, *Information technology, mutual trust, flexibility, agility, adaptability: Understanding their linkages and impact on humanitarian supply chain management performance.* Risk, Hazards & Crisis in Public Policy, 2016. **7**(2): p. 79-103.
[35]. Kabra, G., A. Ramesh, and K. Arshinder, *Identification and prioritization of coordination barriers in humanitarian supply chain management.* International Journal of Disaster Risk Reduction, 2015. **13**: p. 128-138.
[36]. Akhigbe, A., J.E. McNulty, and B.A. Stevenson, *How does transparency affect bank financial performance?* International Review of Financial Analysis, 2013. **29**: p. 24-30.
[37]. Kundeliene, K. and S. Leitoniene, *Business Information Transparency: Causes and Evaluation Possibilities.* Procedia-Social and Behavioral Sciences, 2015. **213**: p. 340-344.
[38]. Larrea, O., *Key performance indicators in humanitarian logistics in Colombia.* IFAC Proceedings Volumes, 2013. **46**(24): p. 211-216.
[39]. Bisri, M.B.F. and S. Beniya, *Analyzing the National Disaster Response Framework and Inter-Organizational Network of the 2015 Nepal/Gorkha Earthquake.* Procedia Engineering, 2016. **159**: p. 19-26.
[40]. Lu, Q., M. Goh, and R. De Souza, *A SCOR framework to measure logistics performance of humanitarian organizations.* Journal of Humanitarian Logistics and Supply Chain Management, 2016. **6**(2): p. 222-239.
[41]. Burkart, C., M. Besiou, and T. Wakolbinger, *The funding—Humanitarian supply chain interface.* Surveys in Operations Research and Management Science, 2016. **21**(2): p. 31-45.
[42]. Maxwell, D., et al., *Preventing Corruption in Humanitarian Assistance.* Berlin: Transparency International/Feinstein International Center research report, 2008.
[43]. Carlson, C.E., et al., *Introducing PEARL: A Gini-like index and reporting tool for public accountability and equity in disaster response.* Journal of Humanitarian Logistics and Supply Chain Management, 2016. **6**(2): p. 202-221.
[44]. He, Y., D. Zhang, and Y. Fang, *Development of a mobile post-disaster management system using free and open source technologies.* International Journal of Disaster Risk Reduction, 2017.
[45]. Chapman, A.G. and J.E. Mitchell, *A fair division approach to humanitarian logistics inspired by conditional value-at-risk.* Annals of Operations Research, 2016: p. 1-19.
[46]. Choi, J.J. and H. Sami, *Corporate transparency from the global perspective: a conceptual overview*, in *Transparency and Governance in a Global World*. 2012, Emerald Group Publishing Limited. p. 3-7.
[47]. Davis, L.B., et al., *Inventory planning and coordination in disaster relief efforts.* International Journal of Production Economics, 2013. **141**(2): p. 561-573.
[48]. Rajakaruna, S., et al., *Identifying Key Skill Sets in Humanitarian Logistics: Developing a Model for Sri Lanka*. International Journal of Disaster Risk Reduction, 2017.
[49]. Deen, S., *Pakistan 2010 floods. Policy gaps in disaster preparedness and response.* International journal of disaster risk reduction, 2015. **12**: p. 341-349.
[50]. Roosli, R. and P. O'Keefe, *Post-disaster housing and management in Malaysia: a literature review.* International Journal of Disaster Resilience in the Built Environment, 2013. **4**(2): p. 168-181.
[51]. Scarpin, M.R.S. and R. de Oliveira Silva, *Humanitarian logistics: empirical evidences from a natural disaster*. Procedia Engineering, 2014. **78**: p. 102-111.
[52]. Schulz, S.F. and I. Heigh, *Logistics performance management in action within a humanitarian organization.* Management Research News, 2009. **32**(11): p. 1038-1049.
[53]. Everett, J. and C. Friesen, *Humanitarian accountability and performance in the Théâtre de l'Absurde.* Critical Perspectives on Accounting, 2010. **21**(6): p. 468-485.
[54]. Faisal, M.N., *A study of inhibitors to transparency in red meat supply chains in Gulf cooperation*

council (GCC) countries. Business Process Management Journal, 2015. **21**(6): p. 1299-1318.
[55]. Turnes, P.B. and R. Ernst, *A framework for transparency in international trade.* Investigaciones Europeas de Dirección y Economía de la Empresa, 2015. **21**(1): p. 1-8.
[56]. Williams, A., *Shining a light on the resource curse: An empirical analysis of the relationship between natural resources, transparency, and economic growth.* World Development, 2011. **39**(4): p. 490-505.
[57]. Charrière, M.K., et al., *The impact of an exhibition on risk awareness of the general public in mountainous areas.* International Journal of Disaster Risk Reduction, 2017.
[58]. Ardaya, A.B., M. Evers, and L. Ribbe, *What influences disaster risk perception? Intervention measures, flood and landslide risk perception of the population living in flood risk areas in Rio de Janeiro state, Brazil.* International Journal of Disaster Risk Reduction, 2017. **25**: p. 227-237.
[59]. Ibrahim, S.E. and R. El Ebrashi, *How social entrepreneurship can be useful in long-term recovery following disasters.* Journal of Humanitarian Logistics and Supply Chain Management, 2017. **7**(3): p. 324-349.
[60]. van der Laan, E., et al., *Demand forecasting and order planning for humanitarian logistics: An empirical assessment.* Journal of Operations Management, 2016. **45**: p. 114-122.
[61]. Khan, M. and J.H. Bae, *The Environmental Perspectives of Apple Fruit Supply Chain Management in Chitral, Northern Pakistan.* International Journal of Supply Chain Management, 2017. **6**(4): p. 1-16.
[62]. Bastian, N.D., et al., *Multi-criteria logistics modeling for military humanitarian assistance and disaster relief aerial delivery operations.* Optimization Letters, 2016. **10**(5): p. 921-953.
[63]. Gavidia, J.V., *A model for enterprise resource planning in emergency humanitarian logistics.* Journal of Humanitarian Logistics and Supply Chain Management, 2017. **7**(3): p. 246-265.
[64]. Williams, C.C., *Trust diffusion: The effect of interpersonal trust on structure, function, and organizational transparency.* Business & Society, 2005. **44**(3): p. 357-368.