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## Stakeholder satisfaction in complex relationships during the disaster response: a structured review and a case study perspective

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### ABSTRACT

The disaster response currently involves an increasing number of different stakeholders, and understating their wants and needs is essential to managing them. Thus, the research goal of this paper is to identify and analyze the satisfactions of the main stakeholders involved in complex relationships during the disaster response process. First, this research applies a structured review that considers 72 papers gathered from the Scopus database and details the following: 28 wants and needs from the stakeholders and the identification of similarities related to (i) the complex and extensive flow of resources; (ii) the complementary coordination required to provide resources; (iii) the desire to be considered in the response plan; and (iv) the interdependency of the flow of resources and ideas, influences and interests. Then, these findings are discussed considering a real disaster response to landslides that occurred in 2011 and a corresponding simulation that was developed in 2017 in Brazil. The analysis addresses the Military's perspective and validates the findings while also adding new insights to the topic and two new wants and needs from the stakeholders. Finally, the paper discusses the implications of the findings for academics and practitioners overseeing collaborations in stakeholder management and presents a research agenda.

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### KEYWORDS

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## 1. Introduction

During a disaster response effort, organizations focus on operations that provide immediate assistance to maintain lives, improve health, and sustain the morale of the affected population (Eriksson 2009). During these disaster response operations, different stakeholders from public and private groups, as well as from society, interact to solve a wide range of interdisciplinary tasks (Leiras et al. 2014; Fontainha et al. 2017; Da Costa, Fontainha, and Leiras 2017; Melo et al. 2017; Lamenza, Fontainha, and Leiras 2019). Therefore, the increasing number of stakeholders from different organizational cultures and structures involved in the disaster response effort is considered a challenging issue that affects the results of the operation (Tatham, Spens, and Kovács 2017; Wagner and Thakur-Weigold 2018).

Coles, Zhang, and Zhuang (2016) attempt to address this challenge through research focussing on behavioural models of the different stakeholders involved during the disaster response effort. Bajracharya and Hastings (2015) also stress the need for understanding the divergent expectations among stakeholders regarding their management. Moreover, Zhang, Zou, and Kumaraswamy (2015) note that the relationship among stakeholders requires substantial bandwidth to manage and that research on this topic is necessary not only

for overcoming the obstacles faced during the disaster response effort but also to exploit each party's strengths and generate greater efficiencies and effectiveness in response operations. The synthesis of such perspectives is noted by Fontainha et al. (2017) in a research agenda for stakeholder management in disaster and humanitarian operations (DHO). The authors indicate the need for research addressing the stakeholders' wants and needs as well as the type of stakeholder considered in the stakeholders' relationships.

These challenges and the approach described in the disaster context are also addressed in the managerial research. Recent literature reviews (e.g. Fontainha et al. 2017; Behl and Dutta 2019) note that the DHO research is not discussed only in thematic journals anymore but is receiving attention from journals with a broader audience through special issues, including the Production and Planning Control journal (e.g. Heaslip 2018). Three relevant perspectives connecting the DHO and managerial research are as follows: stakeholder satisfaction; dyadic and complex relationships; and the flow of resources and the flow of ideas, influences, and interests (III) in such relationships.

First, the divergent expectation indicated by Bajracharya and Hastings (2015) and Fontainha et al. (2017) is also addressed by Neely, Adams, and Kennerley (2002, 2008) when they indicate the need for understanding the wants

and needs of all stakeholders interacting with a focal organization. For example, as reported by Liu et al. (2018), the performance and success of Public-Private-Partnerships need to consider the perspective of at least two main stakeholders simultaneously. Neely, Adams, and Kennerley (2002, 2008) defined this analysis as stakeholder satisfaction, which aims to ensure that the focal organization delivers the best possible result regarding the interest of all stakeholders involved.

Second, the discussion developed by Coles, Zhang, and Zhuang (2016), Zhang, Zou, and Kumaraswamy (2015), and Fontainha et al. (2017) regarding the specific relationships among different stakeholders is addressed in the managerial field from two perspectives, i.e. dyadic and complex relationships. A dyadic relationship is defined as the interaction between two stakeholders, and a complex relationship is defined as the interaction among three or more stakeholders in a network (Rowley 1997; Hillebrand, Driessen, and Koll 2015; Zhang, Zou, and Kumaraswamy 2015). The Stakeholder Theory supports this analysis, indicating the greater relevance of relationships involving more than two stakeholders due to the increased complexity involved versus the dyadic relationships (Rowley 1997; Frooman 1999; Friedman and Miles 2002; Rowley and Moldoveanu 2003; Friedman and Miles 2006; Chowdhury, Chen, and Tiong et al. 2011; Frandsen and Johansen 2015; Bai and Sarkis 2018).

Third, the discussion on the issues transacted in the stakeholders' relationship noted by Fontainha et al. (2017) is also included in the core Stakeholder Theory debate. This theory considers the difference between the flow of resources and the flow of ideas, influences, and interests (III). Frooman (1999) describes the flow of resources in complex relationships according to the direct input-output approach; thus, the financial, material, or informational resources move along the net of stakeholders. The flow of III is less evident in stakeholders' relationships than the flow of resources, as noted by Rowley and Moldoveanu (2003) and is described by Rowley (1997) as the influence over the stakeholders' behaviour according to a compatible or incompatible position with the organization.

Behl and Dutta (2019) stress that, despite the recent profusion of research in the Humanitarian Supply Chain (HSC) and the connection between managerial theories and the disaster response context, there is a lack of research exploring the discussion of theories in the HSC scope as well as the empirical testing of such theories in the HSC field. Thus, this paper aims to identify and analyze the wants and needs of all stakeholders (or the stakeholders' satisfaction factors) during the disaster response, focussing on the complex relationships and the differences between the flow of resources and the flow of III. Nevertheless, the scope of complex relationships is too broad since any combination of three stakeholders falls into this category. Therefore, considering the perspective described in Zhang, Zou, and Kumaraswamy (2015) and Fontainha et al. (2017), the present paper analyses the complex relationships that involve at least one stakeholder from each of the three stakeholder groups defined by Fontainha et al. (2017), which are as follows: public

(Government, Military, Legislative and regulatory), private (Direct supplier, Private sector, Media), and people (Donor, International aid network – e.g. United Nations and Red Cross/Red Crescent – Local aid network – e.g. local nongovernmental organizations (NGOs) and religious associations). It is also worth noting that in the stakeholder model developed by Fontainha et al. (2017), the Beneficiary is an independent stakeholder from previous groups, as it is the focus of the DHO.

Considering the recommendations of Behl and Dutta (2019) to expand and reinforce the findings of the research in the disaster and humanitarian fields, the present research applies two research methods, i.e. a structured review and a case study. First, the structured review is adopted due to its suitability for developing a holistic conceptualization and synthesis of a new or emerging topic (herein, stakeholder management in disaster response operations), providing results to reinterpret the previous research or a first step for further research on the topic (Hart 1998; Torraco 2005; Seuring and Gold 2012; Thomé, Scavarda, and Scavarda 2016). This paper contributes to the academic literature and practitioners engaged in disaster response in the form of the following three essential outcomes, as proposed by Torraco (2005): a taxonomy (identifying and classifying the existent knowledge about the stakeholders' satisfaction factors), the organization of the findings using a framework (in this case, the stakeholder model developed by Fontainha et al. 2017), and a research agenda.

Therefore, this structured review compliments and extends the existing research on stakeholder management in an HSC. Despite the continuous discussion of this topic in the humanitarian field, various literature reviews focussing on the HSC indicate the need for research according to different perspectives on the subject (Leiras et al. 2014; Jabbour et al. 2019; Behl and Dutta 2019). Among them, Leiras et al. (2014) identified a high predominance of research focussed on centralized coordination and multiple stakeholder perspectives in comparison to decentralized coordination and single stakeholder perspective. Jabbour et al. (2019) identified stakeholder coordination as one of the main issues in the HSC. Behl and Dutta (2019) underlined specific issues related to stakeholder management, such as the linkage between swift trust and commitment in an HSC (Dubey, Altay, and Blome 2019), and the role of information flow among stakeholders (Altay and Labonte 2014). Additionally, Fontainha et al. (2017) investigated the different nomenclatures defining the stakeholders involved in an HSC and, based on a literature review, proposed a framework to manage their relationship. Thus, exploring the stakeholders' wants and needs, as well as the differences between the flow of resources and the flow of III, offer a relevant perspective to understand the factors affecting the stakeholder relationship in an HSC. The present research complements the factors affecting the stakeholder commitment in an HSC besides the swift trust investigated by Dubey, Altay, and Blome (2019), brings other issues affecting the information flow discussed by Altay and Labonte (2014), and expands

the usage of the stakeholder relationship model for DHO proposed by Fontainha et al. (2017).

Additionally, to analyze the findings of the structured review and the theoretical discussion, we develop a case study, which considers the response to massive landslides that occurred in the state of Rio de Janeiro in Brazil in 2011 due to its significant impact (more than 900 deaths and 300,000 people affected) and the number of stakeholders involved (World Bank 2012). This disaster caused the Brazilian government to be challenged to devise more solutions and infrastructures to better mitigate the effects of disasters in the future. Thus, the Brazilian federal government began to adopt more structured and complete measures in the management of disasters at the national level that also involve the entire society. Considering that the militaries have been in the past and still are the first and foremost respondents supporting the Civil Defence in a major disaster response effort, the armed forces began to deploy disaster response simulations. For instance, in 2017, they simulated the response to massive landslides in the region of Rio de Janeiro, similar to the one that occurred in 2011. Thus, the case study discusses the stakeholders' wants and needs considering the Military perspective in complex relationships with stakeholders from private and people groups in both situations (the real disaster in 2011 and the simulation in 2017), also revealing how the subject evolved during the disaster response efforts in Brazil according to a stakeholder perspective.

Thus, after this introduction, Section 2 details the research methodology. The third section presents the results and the synthesis of the wants and needs from each stakeholder that were reported in the academic literature analyzed. The following section discusses the case study according to the findings from the structured review. The final section presents an overview of the main conclusions and a research agenda.

## 2. Research methodology

The structured review followed the approach developed by Denyer and Tranfield (2009) and the step-by-step method to conduct a literature review in Operations Management from Thomé, Scavarda, and Scavarda (2016), which is composed of the following eight steps: formulation of the research problem, searching of the literature, data gathering, quality evaluation, data analysis and synthesis, interpretation, presentation of the results, and updating the review. These steps are defined by Thomé, Scavarda, and Scavarda (2016) and are mainly based on Denyer and Tranfield (2009) but also consider other recent literature reviews. The first step is associated with the paper's objective presented in the previous section with a discussion on the gap in the existing literature and the aim of this research. Thus, the research question that guides the present Thomé structured review is as follows: what are the stakeholder's wants and needs during the response stage of DHO, considering the complex relationships and the differences between the flow of resources and the flow of III?

The second step is performed through a search in the Scopus database due to its extensive collection of peer-reviewed literature (Mongeon and Paul-Hus 2016), which is the document type also considered by other literature reviews related to the Humanitarian Logistic and Disaster Management field, such as those of Leiras et al. (2014) and Fontainha et al. (2017).

The search is conducted using keywords defined and grouped to be sufficiently broad to avoid any artificial limitation on the papers retrieved while still providing limits to exclude undesirable results (Cooper 2010). Hence, considering the research question, three groups of keywords are considered in the search. The first group refers to the disaster and humanitarian scenario, which is defined in accordance with the literature review of Leiras et al. (2014) and Fontainha et al. (2017). These authors indicate synonyms for the term disaster occurrence, such as 'disaster', 'relief' and 'humanitarian' variances, which are aligned to the purpose of this research. The second group refers to the main stakeholders involved in a DHO, with words identified as synonyms as defined in a literature review on stakeholder models and stakeholders' nomenclature for a DHO developed by Fontainha et al. (2017), which is also aligned to the purpose of the current research. These authors identified, for example, several terms used in the academic literature in reference to the stakeholder Private sector, such as 'private', 'company', 'firm', 'enterprise', and 'industry'. Fontainha et al. (2017) also identified common patterns regarding the nomenclature of the main stakeholders involved in a DHO and clustered them into the public, private, and people stakeholder groups, as well as the Beneficiary. The third group refers to the response stage in the disaster lifecycle (mitigation, preparedness, response, and recovery – according to Altay and Green 2006) on which the research focuses.

The combination of such keywords was applied to the following fields of the Scopus database: title, abstract, and keywords. The code used was: (disaster OR relief OR humanitar\*) AND (response) AND (military OR public OR govern\* OR regulat\* OR legisl\*) AND (private OR company OR firm OR enterprise OR industry OR supply OR media) AND ('aid network' OR NGO OR 'non-governmental' OR 'not-for-profit' OR volunteer OR donor OR community OR 'red cross' OR 'united nations'). By integrating these keyword groups from different previous literature reviews, this search led to a unique combination that retrieves papers relevant to the research goals, complementing and extending the content and discussion of previous studies. Thus, this combination guaranteed that the papers discussed at least one stakeholder from each of the three stakeholder groups, and therefore allowed a determination of how the wants and needs from these stakeholders were assessed so far in the literature.

Considering the 903 papers initially retrieved in this search on May 16th of 2017, a set of exclusion criteria was defined. First, a filter was selected to retrieve only papers classified as Article, Review, and Article in Press, due to the academic relevance of peer-reviewed works required to address the research topic (Magon et al. 2018); this

elimination process resulting in 598 papers. Second, papers published in journals classified in the medical and nursing subject area in the Scopus database were excluded due to the specificity of hospital and medical operations in disasters to the medical audience of these journals. However, this criterion did not cause the exclusion of the papers discussing logistics operations in disaster scenarios that considered hospital and medical supplies as one of the various aspects of the disaster response operations; this process resulted in the selection of 316 papers for title and abstract reading. Third, the papers eliminated in the abstract reading were as follows: papers discussing hydrological, geological and other physical models, works with a focus on danger products, those only citing disaster as a risk factor in supply chains and studies focussing solely on the stages of mitigation, and/or preparation and/or recovery. This analysis resulted in the identification of 133 papers addressing the research subject, which were selected for full text reading. Fourth, papers not addressing interactions among stakeholders from each of the three groups (public, private, and people) or those only discussing dyadic relationships were excluded in the full text reading, resulting in the selection of 72 papers to be included in the detailed analysis for this research. The process of searching the literature is summarized in Figure 1.

The third step of the literature review (data gathering) was performed by the identification of the main stakeholders of a DHO of each paper according to the stakeholders defined by Fontainha et al. (2017), which are as follows: Donor, International aid network, Local aid network, Military, Government, Legislative and regulatory, Private sector, Direct supplier, Media, and Beneficiary, followed by the

identification of what the wants and needs are of each stakeholder in complex relationships with other stakeholders. Then, the wants and needs were classified according to three possibilities, as follows: solely the flow of resources; solely the flow of III; and a combination of both flows. This data gathering used an auxiliary table to register the information from each paper selected in the structured review.

The fourth step refers to the quality evaluation related to the searching of the literature and data gathering, which ended on September 2017. Since only one researcher gathered data, the quality evaluation of the process is not quantitatively registered. However, the minimization of such selection bias is ensured due to the transparency in each step of the structured review undertaken and described in this section and by the discussion and validation of the entire research method with the other co-authors (e.g. exclusion and inclusion criteria in the searching of the literature). The quality is also ensured due to the nature of peer-reviewed papers, which minimizes the chance of the inclusion of poor-quality works, which is acknowledged in other literature reviews (e.g. Thomé, Scavarda, and Scavarda 2016; Fontainha et al. 2017; Egbunike, Purvis, and Naim 2018; Magon et al. 2018[]). Nevertheless, it is also acknowledged that this criterion might introduce a bias related to the preclusion of ongoing research, as indicated in Magon et al. (2018) and is suggested for consideration in future research.

The data analysis, synthesis and interpretation stages are based on the content-analysis approach (Seuring and Müller 2008; Seuring and Gold 2012) and are developed according to the three deliverables described by Torracco (2005), as follows: a taxonomy, the organization of the findings using the

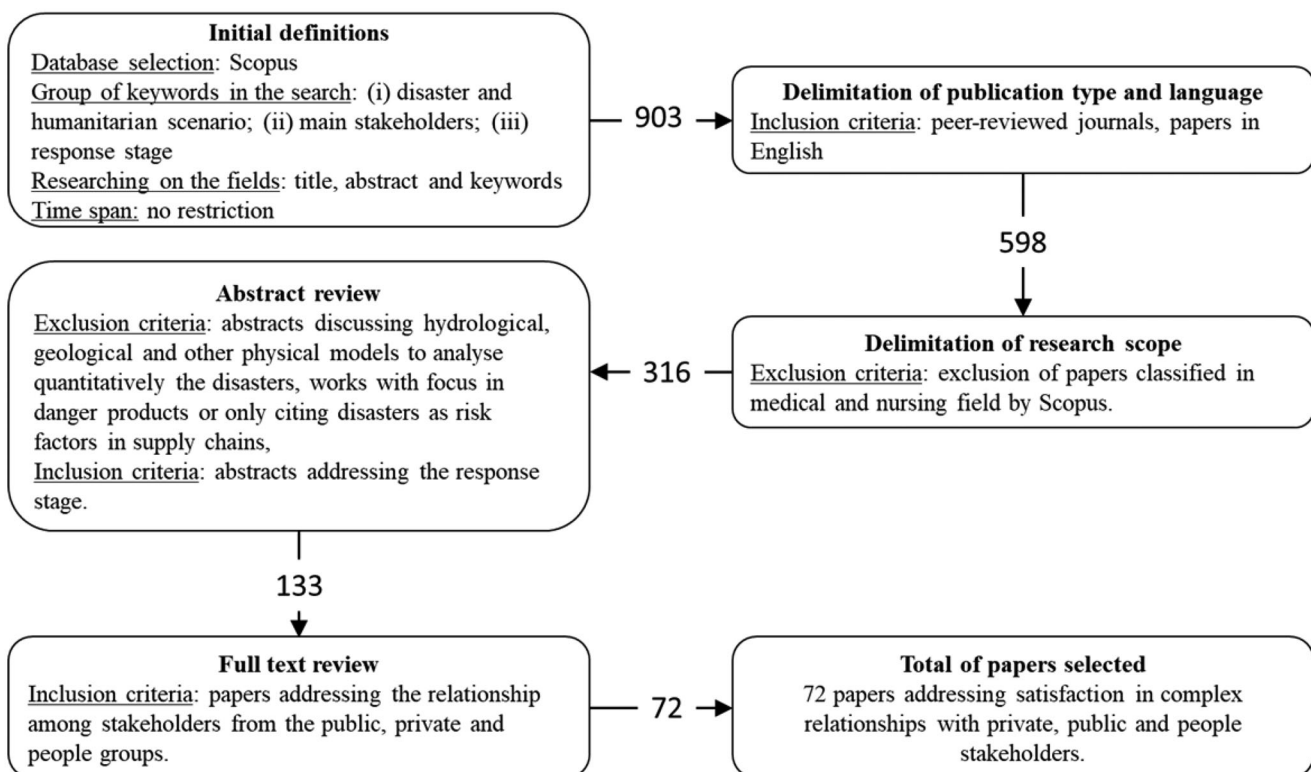


Figure 1. Summary of the material collection process and the evolution of the total number of papers retrieved.

**Table 1.** Research steps for the structured review.

Steps	Main actions conducted
Formulation of the research problem	What are the stakeholder's wants and needs during the response stage of the DHO, considering the complex relationships and the differences between the flow of resources and the flow of Ill?
Searching the literature	<p>Research performed on May 16th of 2017 on the Scopus base considering the following three keywords groups: disaster context, response stage, stakeholders.</p> <p>Exclusion criteria in the abstract and full-text reviews:</p> <ul style="list-style-type: none"> <li>• Papers published in journals classified in the medical and nursing subject area in the Scopus database;</li> <li>• Papers discussing hydrological, geological and other physical models;</li> <li>• Papers with a focus on danger products;</li> <li>• Papers only citing disaster as a risk factor in supply chains</li> <li>• Papers focussing solely on the stages of mitigation, and/or preparation and/or recovery;</li> <li>• Papers not addressing interactions involving stakeholders from each of the three groups (public, private and people)</li> <li>• Papers only discussing dyadic relationships.</li> </ul> <p>Selection of 72 papers for the analysis.</p> <p>Inclusion criteria in the abstract and full-text reviews:</p> <ul style="list-style-type: none"> <li>• Papers published in peer-reviewed journals;</li> <li>• Papers in English;</li> <li>• Papers discussing the response stage of a DHO;</li> <li>• Papers addressing complex relationship involving at least one stakeholder from each of the three groups (public, private and people).</li> </ul>
Data gathering	<p>Considers the discussion of each paper based on the concepts of complex relationships and the differences between the flow of resources and the flow of Ill.</p> <p>The data discussed in each paper is registered in an auxiliary table, with the articles in line with the stakeholders as well as other categories listed in the columns. This process enables the identification of patterns related to the stakeholders' wants and needs in the disaster stage of a DHO.</p>
Quality evaluation	The evaluation of the quality of the works is based on the selection of works that have been peer-reviewed.
Data analysis and synthesis	Content analysis by detailing the wants and needs of stakeholders.
Interpretation	Analysis of the patterns observed, the consequences of these standards, and how the proposed syntheses help in the progress of the stakeholder management in the response stage of DHO.
Presentation of the results	Presentation of the research in this document.
Updating the review	Proposed as future research.

framework of a stakeholder model developed by Fontainha et al. (2017), and a research agenda. The data are analyzed according to the similarities of wants and needs from the perspectives of the main stakeholders addressed in the papers and the issues that are transacted in such relationships (flow of resources, flow of Ill, and a combination of both flows). The result of this analysis is presented in Section 3.2 and detailed in the Appendix Table A1, which summarizes the stakeholders' wants and needs. Next, these findings are organized according to the framework of stakeholder relationships developed by Fontainha et al. (2017). To this end, each stakeholder's satisfaction in the auxiliary table is counted as one point, and the sum considered in both directions of the relationship - for example, the Government's satisfaction from the Media, and the Media's satisfaction from the Government are combined. Then, the representation of such findings considers the differentiation in the level of the stakeholders' relationships through the thicknesses of the lines in the model, also proposed by Fontainha et al. (2017). The interpretation of the results is discussed based on the intersectional correspondence among the stakeholders, revealing the most recurrent perception required from each stakeholder to satisfy the remaining stakeholders, and the similar satisfactions from multiple stakeholders. The result of this analysis is presented in Section 3.3.

Last, a research agenda is proposed to enhance the understanding of the research topic, which includes suggestions for updating the review. Other future research indications embrace the research limitations of the current

structured review, as follows: consideration of different databases and document types (e.g. grey literature), quantification of the agreement level in the searching of the literature as well as the data gathering steps. Table 1 presents the summary of the steps followed in this structured review.

Regarding the empirical test of the findings discussed in the structured review, the research applies the case study method based on the steps defined by Yin (2013). As indicated in the Introduction, this case study aims to analyze the wants and needs observed by the Military involved in the following two units of analysis: (a) the response to the landslides that occurred in 2011 in Rio de Janeiro, Brazil; and (b) the simulation of the same disaster and region, which was deployed in 2017.

The case study considered the satisfaction retrieved from the structured review as the theoretical framework for the data collection and analysis. Thus, semi-structured interviews were conducted with 11 members of the three branches of the Military (Army, Navy, and Air Force) that were involved in the specific disaster response in 2011 and the simulation in 2017.

The data collection followed a specific protocol for the interviews based on the procedures discussed by Kelliher and McAdam (2018), which consists of presenting the data retrieved from the literature and the consequent opportunity given to the respondent to explain how they perceived the situation using their own words. Thus, the results previously obtained in the structured review that were required for the interviewee's comprehension were presented in slides

together with the questions. Moreover, the protocol was previously submitted for evaluation by specialists, who analyzed the clarity and relevance of the questions to guarantee the validity of the content. The face-to-face interviews were performed between September 2017 and February 2018, with durations ranging between 1 to 2 hours, following this sequence:

- a. open questions related to the interviewee's role in the event (the real disaster operation in 2011 or the simulation 2017);
- b. structured question related to the identification of what stakeholders the Military interacted with during the event (the real disaster operation in 2011 or the simulation 2017);
- c. structured question to verify whether the stakeholders' wants and needs involving the Military, which were obtained from the structured review, were met by other stakeholders (explaining the stakeholders' satisfaction factors obtained in the structured review);
- d. open question to verify whether the interviewee is aware of any other Military satisfaction factors in complex relationships;
- e. structured question to verify whether the Military met the wants and needs of other stakeholders (explaining the stakeholders' satisfaction factors obtained in the structured review);
- f. open question to verify whether the interviewee is aware of other stakeholders' satisfaction factors involving the Military in complex relationships besides the ones identified as result of the structured review;
- g. open question to verify how the interviewee perceived the flow of resources and the flow of Ill in complex relationships in the event (explaining the difference in definition of the two types of flow).

The roles of the interviewees in the real disaster response operation in 2011 were as follows: Member of the Logistic Transport Centre, Assistant to the Chief of the Social Services Division, Assistant to the Chief of the Operational Engineering Division, and Commander of the Marines. The roles of the interviewees in the simulation in 2017 were as follows: General Coordinator of the Department of Disaster Relief Operations, General Coordinator of the Department of Prevention and Preparedness, Colonel of the Active Artillery Staff, Assistant to the Chief of Operations, Assistant to the Ministry of Defense's Supplementary Operations Section, and Commander of the Marines. All the interviewees have more than ten years of experience in the Military operations and performed strategic roles in the disaster response in 2011 or the design of the simulation in 2017. Considering the size of the disaster in 2011, where more 900 people died and the Military was the main organization responsible for performing the disaster response operations, the relevance of their roles in the specific disaster and simulation as well as their extensive experience in Military operations are considered reliable for this research.

In addition to the interviews, the research protocol included data collection from reports and organizational documents, as well as news about the disaster. Therefore, the protocol also considered the data triangulation among these sources to ensure the robustness of the case study and to increase the construct validity. The research protocol and the development of the database also contributed to improving the reliability of the research (Kelliher and McAdam 2018; Yin 2013).

Finally, the data analysis followed the pattern matching technique, which is a technique in which the empirical data are compared to a prognostic basis, and if the patterns match, the baseline results are considered evidence that reinforces the internal validity of both the case study and the theoretical framework (Yin 2013). Thus, the data collected in the interviews are compared to the stakeholders' wants and needs that are summarized in the results of the structured review. This analysis aims to contribute to the validation of the findings and brings new contributions based on a real context DHO. Moreover, the consideration of two units of analysis related to similar disaster response operations (the real operation in 2011 and the simulation of the same disaster and location in 2017) might also provide insights regarding the evolution into the Military perception of stakeholders' wants and needs through the years.

### 3. Stakeholder satisfaction in complex relationships during the disaster response

This section starts by presenting the study descriptors of the structured review, followed by the taxonomy of the stakeholders' satisfaction factors addressed in the extant literature. Finally, this section presents a synthesis of these findings through an integrative perspective from all stakeholders.

#### 3.1. Study descriptors

Figure 2 presents the number of publications among the 74 papers analyzed that address the perspective of each stakeholder in the complex relationships involved in a disaster response. The results reveal a lack of research discussing the wants and needs of some stakeholders. The lack of research considering the Donor perspective may be justified by the inherent dispersion of this stakeholder and its lower capability to develop long term relationships, as indicated by Kilama (2016). The number of publications addressing the Military may be justified by the rigidity and broad diversity of the operations performed by this stakeholder, which minimizes the need for interactions with other stakeholders, as indicated by Hall (2016). Finally, the context of the research discussing the Legislative and regulatory bodies and the Direct supplier may be justified by the fact that these stakeholders deal mainly with long-term actions in DHOs, as indicated by Fontainha et al. (2017), and it is not often discussed in the research involving disaster response operations.

The broad nature of the stakeholders and stakeholder groups engaging in disaster response is observable in the interdisciplinary nature of the journals addressing

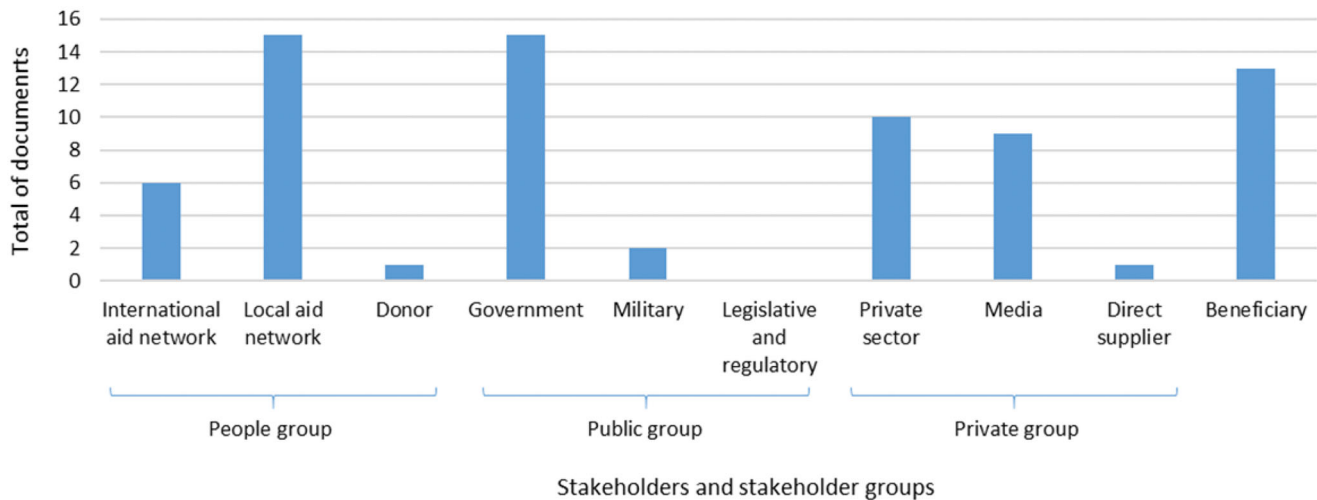


Figure 2. Number of publications from each stakeholder perspective.

the complex relationships within the disaster and humanitarian fields. Nevertheless, the journals that are publishing more papers on this topic are 'Natural Hazards' and 'Disasters', both of which have four publications each, followed by the 'Journal of Humanitarian Logistics and Supply Chain Management' with two papers; the remaining 62 journals published only one paper each. This reinforces the interdisciplinary nature of the research addressing stakeholder management in DHOs, as observed in Fontainha et al. (2017).

Likewise, the population of authors publishing research on this topic is also diverse, with 154 authors having published only one paper each. Exceptions are observed for the following five authors: Cumbie and Sankar focus on the Local aid network perspective (Cumbie and Sankar 2012; Sankar and Cumbie 2014); McKnight and Linnenluecke focus on the Private sector perspective (McKnight and Linnenluecke 2016; Linnenluecke and McKnight 2017); and Tatham focuses on the Private sector and International aid network perspectives (Tatham, Loy, and Peretti 2015; Tatham, Spens, and Kovács 2017).

### 3.2. Stakeholder satisfaction – a taxonomy

This subsection presents a taxonomy classifying the wants and needs of the main stakeholders involved in complex relationships during a disaster response. As indicated in the Introduction and Research methodology sections, the present research considered the ten stakeholders presented in a recent literature review of stakeholder models for DHOs (i.e. Fontainha et al. 2017). The classification of the stakeholders' wants and needs is presented in the Table A1 according to the flow of resources and the flow of III in complex relationships, as advocated by Frooman (1999) and Rowley (1997), to identify patterns, correspondences, and differences among the satisfaction factors from various perspectives. The Table A1 details a total of 28 stakeholders' wants and needs, which are summarized in this subsection. Nevertheless, the perspective of Legislative and regulatory stakeholders is not directly observed among the papers identified in the literature review, as observed in Figure 2 and is only discussed

through the perspective of other stakeholders in the following subsections.

According to the Table A1, the extant research focussing on the Government's satisfaction is extensive, addresses the interaction with all other stakeholders, and involves physical and financial and resources, as well as close interactions with the stakeholders addressed in the people group, simultaneously with the significant presence of Media and engagement of the Private sector and Direct supplier on the provision of resources and public-private relationships (Attwell 2013; Bajracharya and Hastings 2015; Boin and Lodge 2016; Bugliarello 2005; Changnon 2005; Chen et al. 2013; Chern and Liu 2014; Doswell 2003; Du and Qian 2016; Mert 2013; Osei 2007; Paynter 2013; Raggio and Folse 2011; Tang et al. 2015; Taucer, Alarcon, and So 2009). The Military's satisfaction is more restricted and does not reveal any interaction with the Donors or Legislative and regulatory stakeholders. Moreover, the Military's satisfaction concentrates the expectation of having their operation recommendations acknowledged by the Government and International aid network stakeholders, having the Media working to communicate to the Local aid network to obtain more resources, while also observing if the Private sector and Direct supplier return their operations to normal because it can be associated with the ceasing of the disaster response (Hall 2016; Heyman, Eldad, and Wiener 1998). The satisfaction of the Government and the Military is predominantly related to the flow of resources with stakeholders from other stakeholder groups, including the satisfaction factors interconnected with the flow of III. Regarding the interactions that only involve stakeholders within the public group, the satisfaction is focussed more on the flow of III (Boin and Lodge 2016; Chern and Liu 2013; Hall 2016; Mert 2013; Taucer, Alarcon, and So 2009).

The Direct supplier satisfaction is debated only in terms of having other stakeholders coordinate their efforts to contract with the Direct supplier (Denis et al. 2016), which is a specific satisfaction factor involving the flow of III. The Media satisfaction mainly involves the development, sharing, and validation of information related to the disaster response



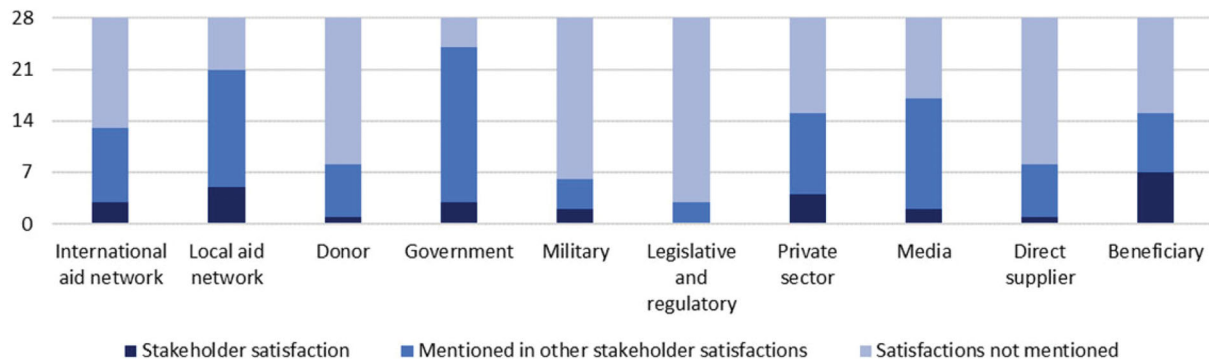


Figure 3. Number of satisfaction factors involving each stakeholder.

– satisfaction related to the flow of resources – but also considers the provision of relief by other stakeholders to the Beneficiary and to the Government (Kim et al. 2016; Marks and Thomalla 2017), as well as pressure applied to the engagement of Donors (Cooley and Jones 2013; Houston et al. 2015) –satisfactions which are related to the flow of III. The Private sector satisfaction, however, provides additional elements for the analysis due to the increased quantity of wants and needs related solely to the flow of III. Such satisfaction factors are related to the need for fair distribution (Marks and Thomalla 2017), the need for other stakeholders to fight for the Private sector interests (Pennington-Gray, Schroeder, and Gale 2014), and the need to be considered in the disaster response plan (Carpenter 2015; Linnenluecke and McKnight 2017; McKnight and Linnenluecke 2016; Lee and Potangaroa 2016; Parthasarathy 2015).

The satisfaction of stakeholders from the people group is almost entirely composed of wants and needs that combine the flow of resources and the flow of III. The Local aid network provides insights related to the flow of III, especially in the form of their want or desire to be considered in the disaster response plan (Aguilera and Planchon 1995; McLennan, Whittaker, and Handmer 2016; Montgomery 2013; Nakashima et al. 2014; Turner 2012). Although only one satisfaction factor is observed from the Donor perspective, such an interaction highlights the fact that donations for the disaster response are also a channel in the flow of III (Kilama 2016). However, the interaction regarding the flow of III in the satisfaction of the International aid network is more focussed on third-party stakeholders, after the immediate direct relationship with the stakeholders that are focussed more on the flow of resources.

Finally, the Beneficiary's satisfaction requests a collaboration among several stakeholders in the provision of relief supplies and the communication of information related to the disaster but also emphasizes the eventual adverse effects resulting from some operations as addressed by Gorman-Murray, McKinnon, and Dominey-Howes (2014) and Rubin (2016). Considering the perspective of the flow of resources and the flow of III, the Beneficiary's satisfaction is very balanced and consistent.

### 3.3. Discussion on the complex relationships identified in the structured review

Figure 3 depicts the number of papers in which each stakeholder is addressed among the 28 stakeholders' wants and needs, revealing the predominance of satisfaction factors involving the Government, followed by the Local aid network and then the Private sector. Despite the lack of papers addressing the perspective of the Legislative and regulatory stakeholder, as indicated in Figure 2, this stakeholder is mentioned in the wants and needs of the stakeholders in the public and people groups as well as that of the Beneficiary.

Table 2 details the number of papers addressing satisfaction in complex relationships according to the perspective of pairs of stakeholders. These results reveal a lack of publications discussing the interactions of some stakeholders in complex relationships, such as Donor and Direct Supplier, as well as Direct Supplier and Media. The visual representation of this analysis is presented in Figure 4, which considers the structure of the stakeholder model developed by Fontainha et al. (2017). To this end, the dashed lines in Figure 4 represent the stakeholders' interactions that are not observed within the 28 wants and needs of the stakeholders in complex relationships during the disaster response. The regular lines indicate that from 1 to 10 publications discuss the satisfaction factors between two stakeholders, and the bold lines indicate that more than 10 publications address complex relationships involving the pair of stakeholders.

In addition to the analysis involving the number of publications addressing the stakeholders' satisfaction, Figure 4 also presents the satisfaction factors that different stakeholders expect from each stakeholder. While the previous section and Table A1 detail what each stakeholder expects from others, Figure 4 indicates the opposite perspective. For example, the majority of satisfaction factors in complex relationships describe the need for Media involvement to broadcast information and connect several stakeholders (flow of resources) as well as a channel to exert the flow of III. Thus, Figure 4 summarizes such a synthesis of satisfaction factors that involve the Media from different stakeholders' perspectives, as well as the synthesis that involves each stakeholder according to the perspective of the other stakeholders in complex relationships.

**Table 2.** Summary of stakeholders’ relationships identified in the academic literature.

Main stakeholder	International Aid Network	Local Aid Network	Donor	Private Sector	Direct Supplier	Media	Government	Military	Legislative and Regulatory	Beneficiary
International Aid Network	3	1	6	3	6	11	3	1	2	
Local Aid Network	-	2	12	4	16	26	1	1	12	
Donor	-	-	3	0	2	6	0	1	2	
Private Sector	-	-	-	2	2	19	1	1	6	
Direct Supplier	-	-	-	-	0	6	1	0	1	
Media	-	-	-	-	-	15	1	1	9	
Government	-	-	-	-	-	-	3	2	12	
Military	-	-	-	-	-	-	-	0	1	
Legislative and Regulatory	-	-	-	-	-	-	-	-	1	
Beneficiary	-	-	-	-	-	-	-	-	-	

Low quantity of papers addressing the relationship (0 papers)
Regular quantity of papers addressing the relationship (from 1 to 10 papers)
Large quantity of papers addressing the relationship (more than 10 papers)
Reflective relationship

Another interpretation of the data presented in both the Table A1 and Figure 4 (see the bold-lined items and the summary of the primary wants and needs expected from each stakeholder) is related to the satisfaction factors that are similar from different stakeholders’ perspectives. In other words, despite the specificities of each stakeholder, some of the stakeholders have the same wants and needs. The first satisfaction factor shared among several stakeholders is related to the extended and interconnected flow of resources. This perspective is observed in the flow of resources involving communication by the Media and its connection with almost all stakeholders, while the flow of resources involving funding and relief supplies may come from stakeholders in the people, private, and/or public groups, and the funding and supplies are either exchanged among them or sent to the Beneficiary.

The second satisfaction predominant among different stakeholders is related to the need for coordination and the complementary provision of resources. This observation represents evidence confirming that the stakeholders themselves acknowledge the impossibility of independently providing all the relief. The third shared satisfaction is each entity’s desire to be considered in the disaster response plan. Such a finding reveals that, despite the acknowledged importance of having the engagement of various stakeholders in the disaster response, many entities still perceive that they are not included. This situation is observable among different stakeholders, especially from the Private sector and Local aid network perspectives.

The fourth and last issue that permeates different satisfaction factors is the intrinsic involvement of the flow of III within the complex flow of resources. The analysis of all stakeholder satisfaction factors reinforces that the flow of resources cannot be detached from the flow of III due to the intrinsic relation of both flows in almost every stakeholder satisfaction factor during the disaster response. Nevertheless, each different stakeholder details such satisfaction factors according to their own interests, for example, the Donor perspective relates to having their interests attended through their donations (Kilama 2016) and the desire for other stakeholders to be engaged in the disaster response to fight for the Private sector (Pennington-Gray, Schroeder, and Gale 2014).

#### 4. Case study of stakeholder satisfaction regarding the complex relationships during a disaster response

After the identification and analysis of the stakeholders’ wants and needs according to the existing academic literature, the research moves to an empirical test of such discussions in a case study of a disaster response. As indicated in the introduction, the research considers the Military perspective in the following two units of analysis: (a) the response to massive landslides in Rio de Janeiro in 2011; and (b) the simulation of the same event and region developed in 2017.

Considering the perspective of the military professionals involved in the real disaster response in 2011 and the

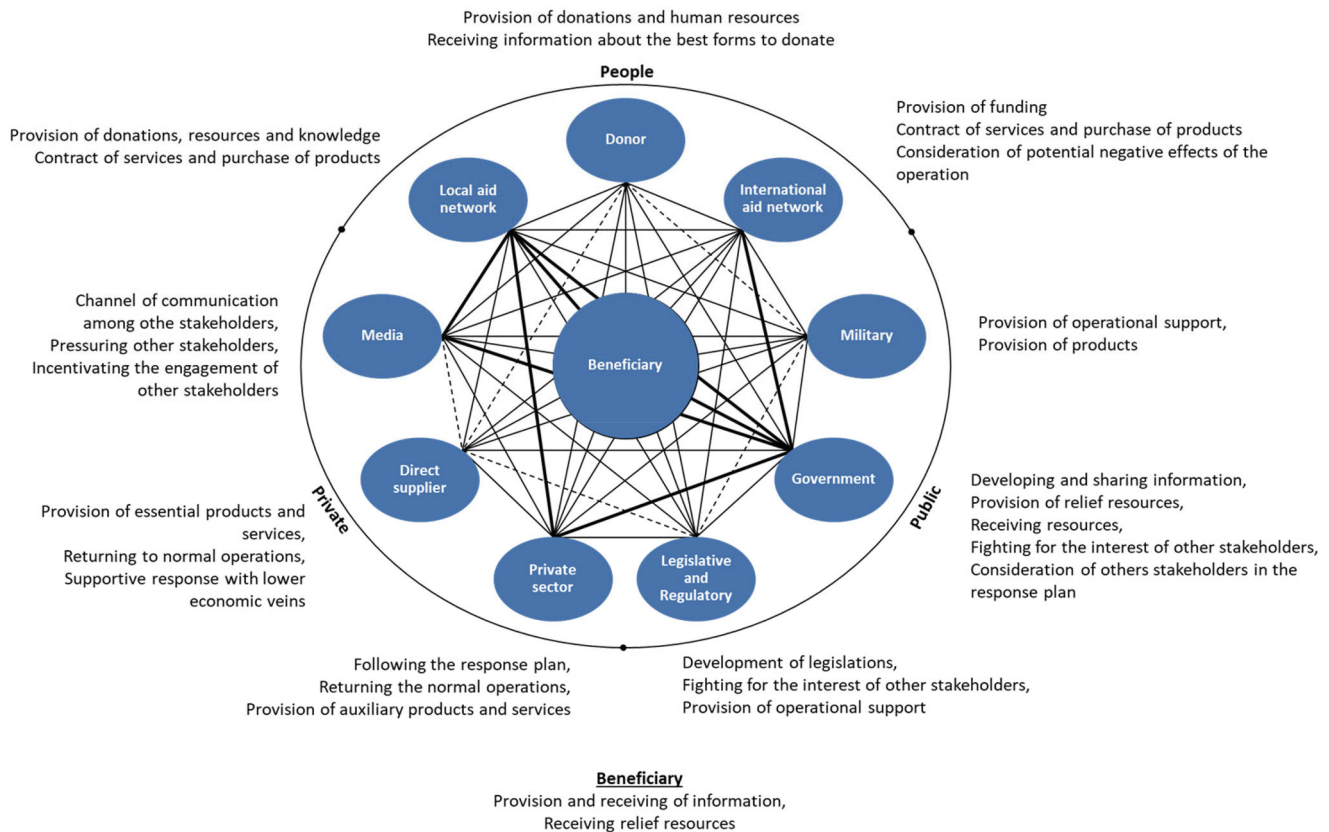


Figure 4. Synthesis of the flow of resources and information among the stakeholders considering the stakeholder satisfaction factors. (Adapted from Fontainha et al., 2017)

military professionals involved in the simulation in 2017, all interviewees agreed that the satisfaction factors of the Military are met by other stakeholders (satisfaction factors #4 and #5 detailed in the Table A1). However, two interviewees involved in the response in 2011 indicated that in addition to the wants and needs reported in the academic literature, the Military also wants the 'coordination, with each [of the different organizations involved] making their efforts and contributing to the same end'. In the same sense, an interviewee involved in the simulation in 2017 reported that 'what the military and other stakeholders most want is integration, that everyone knows what to do, do not keep pounding, that is important', 'interoperability among participants, that is, that we are integrated, that we have the possibility to interact and solve that problem, each one within what is destined to him, that he knows how to do'.

In addition to the validation of satisfaction factors #4 and #5 presented in the Table A1, these interviews brought new insights into other Military's wants and needs. The different answers that indicate additional wants and needs converge to the definition of the following Military's satisfaction factor: the Military wants and needs coordination, alignment, and integration of actions in the response to disasters among all the stakeholders involved in the disaster response. Nevertheless, this new satisfaction factor is reported by a similar number of professionals engaged in the real disaster response in 2011 and the simulation in 2017. For this reason, this contribution from the case study to the discussions in the academic literature is not associated with any evolution

in the discussions of DHOs through the years by the Brazilian Military. This case study contribution is presented as satisfaction factor #29 in the Table A1.

All interviewees also agreed that the Military met the satisfaction of other stakeholders in complex relationships during the disaster response (satisfaction factors #1, #3, and #18 of the Table A1). Regarding the simulation performed in 2017, only one professional reported that much information during the simulation was restricted within the crisis cabinet and the military environment. This situation is contradictory considering the need for such information by other stakeholders such as the Direct Supplier, Government, and Local aid network, to define aligned actions during the simulation. Along with this perspective, another professional attending the simulation in 2017 reported that unmet needs and frustrations might arise as a result of interactions between other organizations and the military because other organizations do not know the military hierarchy and may fail in establishing an appropriate channel of communication with military personnel.

This finding reveals another satisfaction factor that was not observed in the theoretical reference. The satisfaction factor is perceived by the Military but is essentially the wants and needs of other stakeholders when interacting with the Military and the Government, i.e. Direct Supplier, and Local aid network. Although the object of satisfaction factor is the same for both stakeholders, i.e. the need for information from the Military and Government, the contribution provided by the case study offers one new satisfaction for Direct

supplier (detailed as #30 in the [Table A1](#)) as well as expands the discussion of one satisfaction factor from the Local aid network related to the need for information (satisfaction #13, which is already detailed in the [Table A1](#)). While no professional engaged in the response operation in 2011 observed an additional satisfaction factor of other stakeholders interacting with the Military, one professional involved in the simulation in 2017 did. This slight evolution from 2011 to 2017 can be associated directly with the fact that the simulation aimed to improve the collaboration of stakeholders during a disaster response operation. Nevertheless, the existence of problems with meeting such satisfaction factors due to the security level of information indicates that the Brazilian Military still needs to improve its operations.

The subsequent analysis is related to the flows of resources and III. One of the interviewees involved in the operations in 2011 indicated that the flow of resources is very natural and that the flow of III converged in the decision-making carried out in high-level meetings. Another interviewee also involved in the disaster response in 2011 reported that the flow of resources is very visible throughout the operation and emphasized that the flow of III mainly concentrates around the political influence in the decision-making process discussed in high-level meetings. Two other respondents that participated in the operations in 2011 emphasized that the military operation is much larger in terms of the resource flow due to the main characteristic of disaster response in which there is a significant lack of resources, while also recognizing that the flow of III ultimately ends up being executed mainly in meetings of high command. These two interviewees also reinforced that the characteristic of military involvement for a short time in the specific disaster response in 2011 did not generate a need to resupply resources, and consequently, there was a lower degree of interaction complexity between the two flows (resources and III).

Contrary to such a perception of separated flows of resources and III observed by the interviewee involved in the disaster response in 2011, the perception of respondents who participated only in the simulation in 2017 was that there was a great interference between III and the flow of resources. This is mainly due to the notion that the Military can be required to act in a disaster response, as observed in the disaster of 2011, which opened opportunities for the political interference of municipalities asking for military intervention even when local resources are not exceeded. All interviewees reported the interconnection between both flows (resources and III) and that this phenomenon was observed in the discussions in high-command meetings related to decision-making during the simulation in 2017.

This significant difference in the perception of the interviewees regarding the flow of resources and the flow of III between 2011 and 2017 represents clear evidence that the issues related to the flow of III gained evidence by the Brazilian Military in the disaster response operations through the years. This conclusion is also reinforced by the professionals involved in the operations in 2011 based on the justifications for reporting only the flow of resources in 2011.

This scenario indicates a significant evolution of the Brazilian Military in considering a broad perspective of the relationship with other stakeholders in the disaster response.

The last analysis address the four issues related to the satisfaction that are shared by several stakeholders in complex relationships during the disaster response and presented in Section 3.3. Regarding the first shared satisfaction factor, while general satisfaction involves an extensive flow of resources among various stakeholders, the Brazilian Military had little discussion on the flow of resources in 2017, as the discussion of the flow of III increased in relevance since 2011. Considering the second shared satisfaction factor, this case represents a significant contribution by indicating that the Military also needs the coordination of response actions, as indicated in the satisfaction factor #30 that was mentioned by the Brazilian Military professionals, which is aligned with the satisfaction shared by many stakeholders involved in complex relationships during the disaster response. For the third shared satisfaction factor, in which the stakeholders want to be considered in the disaster response plans, this aspect is not directly observed in the perspective shared by the Brazilian Military. On the one hand, the interviewee acknowledged that engaging in the disaster response is only a supplementary duty, as the Military's core mission is national security. On the other hand, the Military is officially recognized as the first and foremost organization responsible for acting during a disaster response effort by the Brazilian Government and currently leads some initiatives for improving disaster response operations, as observed in the leading role in planning the simulation in 2017. Consequently, the Brazilian Military professionals did not note the absence of a specific satisfaction factor related to the need to be considered in the disaster response plans among the satisfaction factors presented in the [Table A1](#). Thus, in the Brazilian context, the Military did not report the need to be considered in the disaster response plans because they are one of the main stakeholders involved in these plans. Finally, the fourth shared satisfaction factor related to the strong interaction between resource flows and III is indicated by respondents as something that evolved from 2011 and is currently observed in the Brazilian Military's perspective of disaster response efforts.

## 5. Final considerations

### 5.1. Conclusions

Considering that the academic literature in the HSC faces a lack of research discussing theories in the HSC domain and the empirical evaluation of such findings (Behl and Dutta 2019), this present paper highlighted the topic of stakeholder satisfaction in complex relationships involved in disaster response effort and contributed to the discussion on the topic from both theoretical and empirical perspectives. First, the research applied a structured review, which is a suitable method to structure the current understanding on an emerging topic through the analysis of an extensive number of abstracts (316 papers) and full text readings (72 papers). Despite the importance of the research on this topic, the

structured review identified that the complex relationships in disaster response efforts are spread among different journals, most of which are not related to the disaster and humanitarian arenas. Thus, the present research reinforces the need to embrace the discussion of stakeholder management from different stakeholders' perspectives, providing a more focussed forum in which obstacles can be discussed as well as the best means by which they can be overcome by the researchers and practitioners involved in disaster response efforts.

The results retrieved from the structured review link the result of the previous research, as indicated by Thomé, Scavarda, and Scavarda (2016) and Egbunike, Purvis, and Naim (2018). This is provided by the consideration of the managerial concepts and the identification of 28 wants and needs of all stakeholders involved in complex relationships during a disaster response effort, while also detailing the differences between the flow of resources and the flow of III. This result is detailed in the Table A1 and can be considered a general reference/tool for academics and practitioners in the discussion of stakeholder satisfaction during a DHO, which requires the verification of suitability and/or adjustment according to each specific situation. In addition, the paper showed that different stakeholders have the same expectations, which was observed from the following four perspectives: the complex and extensive flow of resources among the stakeholders, the complementary coordination of the resources provided, the desire to be considered in the disaster response plan, and the interdependency of the flow of III together with the flow of resources during the disaster response effort.

In addition to the theoretical contribution provided by structuring the existent discussions of stakeholders' wants and needs that are addressed in the DHO literature, the case study presented in this paper confirmed such findings and contributed to the identification of two new stakeholders' satisfaction factors as well as the extension of another satisfaction factor already discussed in the literature. Moreover, discussing the Military perspective in the case study brought new insights to this emerging topic (i.e. the Military's want and need for operational coordination with stakeholders from private, people and public groups; and the need for information from the Military on the part of the Direct Supplier, Government and Local aid network). This contribution from the case study to the literature also highlights the need to extend the empirical research on this topic, especially that which addresses a stakeholder that is little discussed in the existing publications, as observed in both Figure 2 (Section 3.1) and Figure 4 (Section 3.3). The first figure details the number of papers considered by each stakeholder as the most important for the discussion, and the second figure indicates the number of papers citing each stakeholder in the discussion of the stakeholders' wants and needs in complex relationships during the response in DHO.

### 5.2. Findings

The overall findings discussed in the paper are relevant to both academics and practitioners. For practitioners, the

results stress the critical issues that permeate the stakeholders' relationships and are fundamental to maintaining the satisfaction of the stakeholders during the disaster response effort. In this sense, any stakeholder can determine if their own actions are in accordance with the wants and needs of all the stakeholders involved in the disaster response effort. In so doing, a specific stakeholder is able to ask for more collaboration with the other stakeholders, avoid or anticipate conflicts, and deploy more efficient operations through a holistic disaster response plan that considers all stakeholders. Moreover, the findings complement and expand the existing research on stakeholder management in an HSC, such as the literature reviews of Jabbour et al. (2019) and Fontainha et al. (2017), as well as the discussions focussed on the relationship between swift trust and commitment in an HSC (Dubey, Altay, and Blome 2019), and the role of information flow among stakeholders (Altay and Labonte 2014).

The academics may reference this paper as a consistent research-based record of what is involved in the stakeholders' satisfaction due to the research methodology applied – the structured review. In this sense, the paper presents the state-of-the-art research regarding the subject, indicating patterns and the issues already discussed in some relationship structures and, consequently, other relationships and perspectives not yet discussed (for example, the wants and needs of the Legislative and regulatory stakeholder that were not identified among the literature retrieved in the present structured review). Moreover, the results are relevant for a discussion on more consistent alternatives and specific strategies to foster effective collaborations and improved stakeholder management in the disaster and humanitarian context.

### 5.3. Future research directions

The present research delivered a summary of 30 issues considered in the stakeholders' satisfaction factor in the response stage of a DHO, which can be used as a guide to the discussion of stakeholder collaboration during a disaster response operation. However, such satisfaction factors may change according to the different types of disasters, actors involved, and the local culture's characteristics. Thus, the research agenda includes the development of different case studies to discuss the findings with all the stakeholders engaged in a disaster response effort. The case studies or surveys can provide an opportunity to bring new insights from practitioners through the perspective of each specific stakeholder or the complete view of all stakeholders. For example, the research on different configurations of complex relationships can be further investigated, such as the relationship among stakeholders from the same group and from pairs of stakeholder groups. Moreover, such case studies and surveys are essential to address the stakeholders' wants and needs that are not discussed in the academic literature (e.g. the Legislative and regulatory stakeholder) as well as the stakeholders that are not addressed sufficiently in the existent literature, as reinforced in the case study presented in this paper.

The research agenda also embraces discussions addressing the influence of the stakeholder's satisfaction in stakeholder management, as well as in other managerial subjects, such as strategic management, performance management, and process management in the disaster response context. First, the wants and needs detailed in this paper can be debated in combination with the effects of other issues considered in stakeholder management, such as trust, organizational boundaries, and scales (Bajracharya and Hastings 2015; Tatham and Kovács 2010). Considering the performance management perspective, a discussion on how the stakeholders' wants and needs are considered in the strategy of action deployed by the stakeholders during a disaster response operation is suggested. Moreover, it is recommended to investigate how the stakeholders' wants and needs influence the definitions of the performance indicators and how they are considered within the processes executed during a disaster response operation. It is also essential to consider the differences between the flow of resources, which is more tangible, as well as the flow of Ill, which are more difficult to measure and manage.

Another future research suggestion involves the research method to analyze the stakeholders' wants and needs. The content analysis could rely on a discourse analysis method due to the influence of the flow of Ill on the flow of resources during the disaster response. This approach might contribute to exploring the reasons and background issues that interfere in the relation of these two essential flows in the disaster response, for instance, if the country level of development affects the flows' interaction. In addition to the discourse analysis, a multicriteria approach related to the imprecision of the preference level can bring new insights into quantifying the importance of the stakeholders' wants and needs. Nevertheless, it is essential to define which criteria to consider in such a priority analysis (e.g. gravity, urgency, and tendency) by comparing and contrasting the results according to different stakeholders' perspectives. This process would lead to the identification of the most critical stakeholders' wants and need according to the stakeholders themselves.

Nevertheless, due to the research limitation of including only peer-reviewed papers, conference and grey literature and other databases could be added in the future research. The investigation of complex stakeholder relationships in disaster response efforts from a dynamic perspective that considers the stakeholders' interactions along a timeline or cycles of interactions is suggested. Finally, the research also suggests the consideration of other document types (e.g. conference papers, thesis, project reports, and grey literature) and other databases (e.g. Web of Science), to update this research as indicated in the steps detailed by Thomé, Scavarda, and Scavarda (2016) for literature reviews and extend this investigation to other disaster lifecycle stages, such as mitigation, preparation and recovery.

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Table A1. Stakeholder satisfaction in complex relationships during the disaster response.

Government	Issues transacted	Satisfaction factor	References	Stakeholders involved	Satisfaction factor in detail
	III	#1 – Implementation, support, supervision, and cooperation with the government's decisions	Du and Qian (2016), Mert (2013)	Local aid network, Media, Private sector, Military	#1 – The Government expects the Local aid network to implement the Government's decision and to supervise the Government's actions in a close relationship. Along with this, the Government wants the creation of an atmosphere by the Media to incentivize the engagement of the Local aid network (Du and Qian 2016) and the deployment of actions by the Private sector in accordance with the Government's plans, in addition to the operational support of the Military (Mert 2013).
	Resources	#2 – Provision of resources combined with information broadcasting	Tang et al. (2015)	Donor, Local aid network, Media	#2 – The Government's satisfaction is related to the provision of donations and human resources by the Donor and Local aid network, as well as having the Media as a one-way channel and two-way channel with the Beneficiary (Tang et al. 2015).
	Resources + III	#3 – Provision of resources combined with demonstration of gratitude, information exchange, return to normality, operational support, and development of legislation	Attwell (2013), Bajracharya and Hastings (2015), Boin and Lodge (2016), Bugliarello (2005), Changnon (2005), Chen et al. (2013), Chern and Liu (2013), Doswell (2003), Osei (2007), Paynter (2013), Raggio and Folse (2011), Taucer, Alarcon, and So (2009)	International aid network, Local aid network, Donor, Direct supplier, Media, Private sector, Military, Legislative and regulatory, Beneficiary	#3 – The Government expects to receive funding, human resources, knowledge and training, and operational support from stakeholders from the people group (International aid network, Local aid network, Donor). Additionally, the Government wants the Direct supplier and the Private sector to provide resources to address the disaster (Attwell 2013; Bajracharya and Hastings 2015; Bugliarello 2005; Boin and Lodge 2016; Changnon 2005; Chern and Liu 2013; Chen et al. 2013; Doswell 2003; Paynter 2013) creation of groups led by the Private sector to facilitate Public-Private-Partnerships with the Government (Chen et al. 2013), gratitude towards people group stakeholders for their engagement through the Media communication (Raggio and Folse 2011), the deployment of a communication programme including dissemination of warnings by the Media to the Beneficiary (Chen et al. 2013; Doswell 2003; Osei 2007), and the Private sector's return to normal operations (Taucer, Alarcon, and So 2009). In addition, the Government expects operational support from the Military in the disaster response effort (Chern and Liu 2013) and the creation and approval of legislation by the Legislative and regulatory stakeholders (Boin and Lodge 2016; Taucer, Alarcon, and So 2009).
Private sector	III	#9 – Engagement to develop legislation for disaster response efforts	References	Stakeholders involved	Satisfaction in detail
			Pennington-Gray, Schroeder, and Gale (2014)	Local aid network, Government, Local aid network, Legislative and regulatory	#9 – The Private sector expects the Local aid network to engage in the decision making and legislation developed by the Government and the Legislative and regulatory stakeholders, such that all of these stakeholders are fighting for the interests of businesses located in regions affected by the disaster (Pennington-Gray, Schroeder, and Gale 2014).

(continued)

Appendix Table A1. Continued.

Issues transacted	Satisfaction factor	References	Stakeholders involved	Satisfaction factor in detail
Resources + III	#10 – Inclusion in the disaster plan and contract activation in case of disasters	Carpenter (2015), Lee and Potangaroa (2016), Linnenluecke and McKnight (2017); McKnight and Linnenluecke (2016), Parthasarathy (2015)	International aid networks, Local aid network, Media, Direct Supplier, and Government	#10 – The Private sector expects to have its operations considered in the disaster response plan, as well as its products and services, contracted or considered by international aid networks, the Local aid network, the Media, the Direct Supplier, and the Government (Carpenter 2015; Lee and Potangaroa 2016; Linnenluecke and McKnight 2017; McKnight and Linnenluecke (2016); Parthasarathy 2015).
	#11 – Information exchange and usage	Avanzi et al. (2017), Pham and Vinck (2012), Tatham, Loy, and Peretti (2015)	International aid network, Local aid network, Government and Direct supplier	#11 – The Private sector expects to have information shared and used by the international aid network, the Local aid network, the Government, and the Direct supplier (Avanzi et al. 2017; Pham and Vinck 2012; Tatham, Loy, and Peretti 2015).
	#12 – Provision of resources and fair distribution	Marks and Thomalla (2017)	Donor, Government	#12 – The Private sector expects that Donors will provide financial and material means to the Government, and from this last stakeholder, the Private sector expects a fair distribution without political influences (Marks and Thomalla 2017).
Local aid network	Satisfaction	References	Stakeholders involved	Satisfaction in detail
Resources	#13 – Receipt, development, and broadcasting of information to align operations	Hirata (2011), Montgomery (2013), case study contribution	Government, Media, Beneficiary, Military, Direct supplier	#13 – The Local aid network expects to receive resources from the Government, to develop communications to be used by the Government itself, to have the Media as a channel to broadcast such information to the Beneficiary (Hirata 2011) or expose the needs of the Beneficiary (Montgomery 2013). Additionally, the Local aid network expects to receive information from the Military and Government to align its operation also with the Direct supplier (contribution from the case study).
Resources + III	#14 – Inclusion in the disaster plan combined with the provision of resources, implementation of plans, information broadcasting, and the provision of training	Aguilera and Planchon (1995), McLennan, Whittaker, and Handmer (2016), Montgomery (2013), Nakashima et al. (2014), Turner (2012)	Government, Private sector, Direct supplier, Media, International aid network, Beneficiary	#14 – The Local aid network expects to be considered by the Government in the disaster response plan. Moreover, the Local aid network's satisfaction is related to the provision of essential resources by the Direct supplier to the Beneficiary (Nakashima et al. 2014), the Private sector's implementation of the plans defined by the Government (Turner 2012), the Media's broadcast of information to the Beneficiary (Aguilera and Planchon 1995; McLennan, Whittaker, and Handmer 2016) or an exposure of the Beneficiary's needs (Montgomery 2013), as well as the engagement of the international aid network in providing training to the Local aid network (McLennan, Whittaker, and Handmer 2016).
	#15 – Provision of resources combined with the definition of regulations for disaster response efforts	Allen and D'Elia (2015), Green, Hamelin, and Zitelman (2011), Sutter and Smith (2017)	Government, Legislative and regulatory, Private sector, Direct supplier, Beneficiary	#15 – The Local aid network expects to receive resource requests from the Government, in partnership with the provision of such resources by the Private sector, defined regulations from the Legislative and regulatory stakeholders (Allen and D'Elia 2015) the Government's provision of relief to the Beneficiary, and the Direct supplier's increased support in its response to the Beneficiaries, thereby overcoming the capitalism vein (Green, Hamelin, and Zitelman 2011; Sutter and Smith 2017).

(continued)

Appendix Table A1. Continued.

Issues transacted	Satisfaction factor	References	Stakeholders involved	Satisfaction factor in detail
	#16 – Provision of information as well as sensibilization to donation issues	McWilliam (2013), Özpolat et al. (2015), Saputro (2016), Samarajiva and Waidyanatha (2009)	Government, Media, Donor, Beneficiary	#16 – The satisfaction of the Local aid network is associated with having the Government as the source of information to be broadcasted to the Beneficiary, the Media as an intermediary in such communication (McWilliam 2013; Samarajiva and Waidyanatha 2009) together with its provision of awareness and communication to the Donor about the best form of donation and requests to increase the amount donated (Saputro 2016; Özpolat et al. 2015).
	#17 – Development of trust and information exchange	Cumbie and Sankar (2012), Sankar and Cumbie (2014)	Government, Private sector	#17 – The Local aid network expects the Government to develop trust and share information with the Private sector (Cumbie and Sankar 2012; Sankar and Cumbie 2014).
Issues transacted	Satisfaction	References	Stakeholders involved	Satisfaction in detail
Resources	#24 – Collaboration and coordination in resources provision combined with dissemination of alarm and information	Baxter (2005), Calvin (2012), Colbeau–Justin and Mauriol (2004), Finch, Emrich, and Cutter (2010), Nagarajan, Shaw, and Albores (2012), Sawada and Takasaki (2017)	Local aid network, Donor, Military, Government, Media, Private sector	#24 – The Beneficiary's satisfaction is related to having collaboration from the Local aid network, the Donor, the Private sector, the Government and the Military in coordinating and providing relief required in the disaster response (Calvin 2012; Finch, Emrich, and Cutter 2010; Sawada and Takasaki 2017) and/or having the Media to disseminate alarm and information related to the disaster (Baxter 2005; Colbeau–Justin and Mauriol 2004; Nagarajan, Shaw, and Albores 2012).
Resources + III	#25 – Alignment and coordination in the provision of services	Rubin (2016)	International aid network, Local aid network, Government	#25 – The Beneficiary's satisfaction is related to having collaboration from the International aid network, the Local aid network, and the Government in the provision of coordinated services during the disaster response (Rubin 2016).
	#26 – Intermediation in the provision of resources combined with engagement in the response plan and policy development as well as information broadcasting	Conway and Shaw (2008), Silver and Matthews (2017)	Local aid network, Government, Private sector, Legislative and regulatory, Media	#26 – The Beneficiary expects that the Local aid network will act as an intermediate and identify the Beneficiaries to receive the relief supplies provided by the Government (Conway and Shaw 2008; Silver and Matthews 2017). Additionally, the Beneficiary's satisfaction is involved in the engagement of the Private sector in the disaster response plan, and the Legislative and regulatory stakeholder in the development of policies to deliver the aid to the Beneficiary along with the other stakeholders (Conway and Shaw 2008), as well as having the Government engaged in a close relationship with the Media or social media to disseminate information to the Beneficiary and other stakeholders (Silver and Matthews 2017).
	#27 – Provision of resources combined with sensitivity to create a better environment during disaster response, as well as manifestation to raise disaster awareness	Chamlee–Wright and Storr (2010), Flatau et al. (2014)	Local aid network, Government, Direct supplier	#27 – The Beneficiary wants the Government and Direct supplier to provide relief resources and essential services, as well as the Local aid network and the Private sector acting with sensitivity to create a better environment (Flatau et al. 2014) or the Local aid network to deploy demonstrations and protests to strengthen the Beneficiaries' needs and

(continued)

Appendix Table A1. Continued.

Issues transacted	Satisfaction factor	References	Stakeholders involved	Satisfaction factor in detail
Military	<p>#28 – Information broadcasting to provide pressure for the provision of resources</p> <p>Satisfaction factor</p> <p>#4 – Recognition of expertise and return to normality</p>	<p>Roldan (2015)</p> <p>References</p> <p>Hall (2016)</p>	<p>Media, Donor, Government</p> <p>Stakeholders involved</p> <p>Government, International aid network, Private sector, Direct supplier</p>	<p>catch the Government's attention (Chamlee-Wright and Storr 2010).</p> <p>#28 – The Beneficiary expects the Media to broadcast information related to the disaster to pressure the Donor, which will result in the provision of funds to the Government, after which point the Government will deliver relief to the Beneficiary (Roldan 2015).</p> <p>Satisfaction factor in detail</p> <p>#4 – The Military expects to have its expertise related to the disaster scenario and operational recommendations acknowledged by the Government and International aid network. Moreover, it expects the Private sector and Direct suppliers to return to normal operations in commercial and essential services to bring an end to the disaster response (Hall 2016).</p>
Resources + III	<p>#29 – Coordination, alignment, and integration of operations</p> <p>#5 – Communication to raise awareness and gather resources</p>	<p>Case study contribution</p> <p>Heyman, Eldad, and Wiener (1998)</p>	<p>Local aid network, International aid network, Donor, Government, Legislative and regulatory, Media, Private sector, Direct supplier, and Beneficiary</p> <p>Local aid network, Media</p>	<p>#29 (contribution from the case study) – The Military wants and needs coordination, alignment, and integration of actions in the response to disasters among all the stakeholders involved in the disaster response.</p> <p>#5 – Military satisfaction is associated with the need for broadcasting news about the disaster by the Media to raise the awareness of professional volunteers (Local aid network) to integrate the missions (Heyman, Eldad, and Wiener 1998).</p>
Direct supplier	<p>Satisfaction</p> <p>#6 – Agreement to guarantee the provision of essential services</p>	<p>References</p> <p>Denis et al. (2016)</p>	<p>Stakeholders involved</p> <p>International aid network, Government</p>	<p>Satisfaction in detail</p> <p>#6 – The satisfaction of the Direct supplier is associated with the cooperation between the International aid network and the Government in establishing agreements to guarantee the provision of essential services by the Direct supplier (Denis et al. 2016).</p>
Resources + III	<p>#30 – Exchange of information to align operations</p>	<p>Case study contribution</p>	<p>Local aid network, Military, Government</p>	<p>#30 – The Direct supplier expects to receive information from the Military and Government to align its operation also with the Local aid network (contribution from the case study regarding the disaster in Rio de Janeiro).</p>
Media	<p>#7 – Collaboration to provide emotional support</p>	<p>Kim, Jung, and Chilton (2016)</p>	<p>International aid network, Local aid network, Government, Beneficiary</p>	<p>#7 – The Media expects the International aid network and/or the Local aid network to act in collaboration with the Government to provide emotional support to the Beneficiaries through the Media and social media (Kim, Jung, and Chilton 2016).</p>
Resources + III	<p>#8 – Information exchange combined with data validation, pressure over other stakeholders, and provision of resources</p>	<p>Cooley and Jones (2013), Curtis (2015), Hall (2011), Houston et al. (2015), Kim, Jung, and Chilton (2016), Mehta, Bruns, and Newton (2017), Resnyansky (2015), van den Homberg (2017), Wukich et al. (2017)</p>	<p>International aid network, Local aid network, Government, Donor, Beneficiary</p>	<p>#8 – The Media expects the International aid network and/or the Local aid network to develop and share information related to the disaster and appropriate expectations around the disaster response effort through the Media and Social Media. Additionally, the Media wants the Government to develop and share documents and information in a collaborative way with the other stakeholders (Cooley and Jones</p>

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Appendix Table A1. Continued.

	Issues transacted	Satisfaction factor	References	Stakeholders involved	Satisfaction factor in detail
International aid network	Resources + III	Satisfaction #18 – Provision of resources and operational support	References Ali (2015), Fitz-Gerald (2002), Jahre and Jensen (2010), Kadiyala and Gillespie (2004)	Stakeholders involved Direct supplier, Private sector, Government, Military, Local aid network, Beneficiary	Satisfaction in detail #18 – The wants and needs from the international aid network are that the Direct supplier or Private sector will provide essential or auxiliary resources as requested by the International aid network, together with support from the Government in the delivery of such relief to the Beneficiary (Fitz-Gerald 2002; Jahre and Jensen 2010; Kadiyala and Gillespie 2004; Ali 2015) and with support from the Military and the Local aid network (Ali 2015). #19 – The satisfaction of the international aid network is contingent on incentivizing the employees from the Private sector to engage in the disaster response; with the Media carefully covering the International aid network's actions in favour of the Beneficiary, and with the Government and Legislative and regulatory stakeholders providing all the support required by the International aid network to do its work (Renner, Chafe, and Mastny 2007). #20 – The International aid network desires for the Media to work as an intermediate in the communication among the stakeholders, together with the Government's permission to operate in the country (Tatham, Loy, and Peretti 2017). #21 – The Donor wants the Government to deploy actions to boost the Private sector's operations (e.g. construction, agriculture, manufacturing, small business, etc.) to increase the potential for developing future economic partnerships (Kilama 2016). #22 – The Beneficiary expects that the International aid network will consider the eventual consequences of its actions to avoid creating secondary problems, will have support from the Media to apply pressure to any Government failure and that the Beneficiary's voice will be considered by the Government (Rubin 2016). #23 – The Beneficiary wants respect from the Local aid network, the International aid network, the Media, and the Government in the specific consideration of the LGBT community and other racial, gender and minorities in the delivery of relief and the policies developed (Gorman-Murray, McKinnon, and Dominey-Howes 2014).
Donor	Resources + III	Satisfaction #19 – Encouragement of employees to engage in disaster response through information broadcasting, as well as operational support	References Renner, Chafe, and Mastny (2007)	Private sector, Media, Government, Legislative and regulatory Beneficiary	
		Satisfaction #20 – Intermediation in the communication and permission to operate in the disaster site	References Tatham, Spens, and Kovács (2017)	Media, Government	
		Satisfaction #21 – Deployment of actions to increase potential economic partnerships	References Kilama (2016)	Government, Private sector	
Beneficiary	III	Satisfaction #22 – Attention to direct and indirect stakeholders failures through media coverage, as well as inclusion in the disaster plan	References Rubin (2016)	International aid network, Media, Government	
		Satisfaction #23 – Respect to population minorities in relief delivery and development of policies	References Gorman-Murray, McKinnon, and Dominey-Howes (2014)	Local aid network, International aid network, Media, Government	